



Department of *Economics and Finance*

Chair of IO & Competition Theory

From the knowledge to the abuse of dominant
position

*treatment through economical and antitrust instruments, of the
advantages and risks of the patent.*

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Introduction

The main topic treated in this thesis, around which considerations and reflections are expressed and analysed, is the patent. Generally speaking, the concept of patent, is something abstract, globally used and generally accepted; it is one of the main pillars of the economy spread in our world because, as we are going to proper discuss later, it allows the privatization of the knowledge, which is a common good.

The essence of the patent, as the economy's one, is something that most of the persons miss because we are so immersed in that we really do not appreciate its essence. All this might seem a nonsense, how can we ignore something that surrounds us and that we are soaked in? Well, to provide an example, we can tap into an anecdote by David Foster Wallace, American author of novels, short stories and essays, defined by The Los Angeles Times's "one of the most influential and innovative writers of the last twenty years", who wrote: "There's these two young fish swimming and they meet an older fish swimming in the opposite direction and they nod, saying, "Hey, guys, how's the water?" And the two young fish keep swimming for a while and eventually one of them looks at the other and says, "What the hell is water? ".

If we read this metaphorical short story with a critical eye, we can interpret the water as the economy and the two young fishes as average persons who are not interested too much in economical stuff. Economy envelop us, it is intrinsic in quite everything we do, we live in it but is not immediate nor obvious that we appreciate it or understand the mechanisms that regulate it.

For these reasons, our goal with this discussion is trying to provide a critical representation of the patent, highlighting its advantages but, at the same time, warning about its dark sides. We start our dissertation, with the definition of the knowledge as a common good, outlining its economical features and stressing out its limits concerning the development of the economic sector. Secondly, we focus on the adoption of the patent; we describe how it allows a process of privatization of the common good, protecting the intellectual properties of the innovator and granting him revenues that not only cover production costs but also ensure a medium-term profit, solving the problematics that derive from the philosophical nature of the concept of knowledge.

Subsequently, after talking about all the positive advantages that the presence of patent brings to society, especially in terms of the efficient allocation of the resources, we expose

the downside that derived from the power of a patent; specifically we dwell on the abuse of dominant position that manifests as patent misuse, which makes worse off the entire resource allocation, putting in the hand of one single individual a monopolistic power; in particular, we focus on three particular patent misuse like patent pooling, tying and patent hold-up.

This specific kind of patent misuse gives us the opportunity to characterize a special type of patent called Standard Essential Patent (SEP) which is a very complex and sensitive issue because it concerns specifically innovations considered fundamental for a sector and because of this, its use must be granted to the rivals of the patentor under a Fair, Reasonable And Non-Discriminatory (FRAND) price.

Once researched more in deep the meaning of the term “Fair” in the economy and having explained how a FRAND commitment is reached, we present one of the biggest and controversial cases about the abuse of dominant position occurred in Europe, the “Samsung vs European Commission” of 2011. Once reported the development of the case and the final decision taken by the EC, we provide different interpretations of authoritative professors and economists that could have fit the lawsuit and, if followed blindly, could make us think differently, tipping the case in favour of the South Korean company.

In the end, we intend to describe and characterize the elements of patent and of antitrust cases, which are, most of the times, completely ignored or more simply underestimate by the public opinion, drawing their complexity, their relative nature but stressing out their fundamental role for the healthy development of our society.

1. Knowledge

Nowadays, the concept of property rights, is something that everyone accepts and it is part of common knowledge. All of us know that to use something legally, the inventor of that good or service must be compensated; that is so because he needs to cover the cost of R&D, the cost of production, laborers' wages and lastly he must protect his intellectual property. All these items are secured through the use of copyrights, which is an instrument that requires a payment of a sum of money, by any willing user of the patented object, in order to allow them to consume the good. So, it is quite intuitive: a good or service asks a remuneration in terms of money to any person intended to enjoy it; this happens every day in our lives in different fields, for instance, it is so with the music we listen to, the books we read, the merchandise of our favourite films and series and so on.

But, the question that arises is: even if everyone has metabolized and get the concept behind the payment of a product, does anybody know how the legal system has arrived at the concept of patent? Do we understand which are the economic benefits and legal implications of that?

1.1. Definition of common good

The patent is the last step of a long process that has as its first pillar the knowledge. This philosophical concept is economically defined as a public good which, as such, has two main characteristics: non-excludability and non-rivalry. Like is reported in "The Library of Economics and Liberty", in an article named "Public Goods", written by Tyler Cowen, an economics professor at George Mason University and director of the Mercatus Center and the James M. Buchanan Center, the former adjective means that is difficult to exclude users by the good taken into consideration because it would be very expensive, and the latter one, implies that the consumption of such good by another individual does not affect the total amount that can be consumed by the others or the quality enjoyable by the consumers.

1.1.1. Example of common good

To formalize the theory, Tyler Cowen provides the example of a firework show. He highlights that, even if the fireworks show is worth ten dollars each, probably few people will be willing to pay ten dollars to the entrepreneur, in fact, everyone will seek to "free ride" by leaving others to pay for the show, watching for free it from his backyard. If the free-rider

problem cannot be solved, valuable goods and services, none people otherwise would be willing to pay for, will remain unproduced.

The second point of public goods is what economists call “non-rivalrous consumption.” Imagine that the entrepreneur decides to exclude noncontributors from watching the show, suppose that people can see the show only from a private field; because of the organizer’s will, the entrance to the field is monitored and a price will be charged for watching the show. In this scenario, people who are unwilling to pay that price will be excluded, but, if the field is large enough exclusion is inefficient because also nonpayers could watch the show without increasing its cost or diminishing anyone else’s enjoyment; in other words, this means that the relevant consumption is non-rivalrous. Nonetheless, non-excludability is usually considered the more important of the two aspects of public goods, if the good is excludable, private entrepreneurs will try to serve as many fee-paying customers as possible, charging lower prices to some customers if need be.

2. Patent

With these premises, no one would be incentivized to research and develop because, assuming the knowledge as a public good, they would not bring advantages nor returns for the money spent to conduct them, and it would represent exploitation of intellectual properties. To avoid this situation, which would discourage people to create new products and would lead to a stagnation of the entire society, as explained in the book “Industrial Organization Context”, written by Stephen Martin in 2010, the patent plays a fundamental role. It represents the solution of the vicious circle that can be potentially triggered by the “public” nature of the knowledge because it gives to the companies the right to rendering it an exclusive and private good, which means potential profit gainable, incentivizing the R&D. The exclusivity and the privatization, allow a firm to achieve an advantage over the other competitors of the market for a lapse of time, depending on how long the patent is, permitting the achievement of a profit. Obviously, it is an aspect that gorges the players, boosting the investment in research, finalized to achieve that kind of leadership in the sector.

There exist four kinds of patent: Plant Patent, granted by a government for a person that discovers a new variety of plant, Utility Patent, attributed to an inventor that discovers any new kind of process, software or machine, Design Patent, assigned to a person that improved decorative appearance or shape, used when the fundamental product already exists and is not

being improved upon in function but only in style, and lastly the Standard Essential Patent that we will discuss deeply later. A person is entitled to obtain a patent when his patentable idea is new, non-obvious and has commercial applications.

2.1. Patent's life

Every patent has a "life" that is structured and decided by the institution which emits it. It is a really sensitive issue because it determines the duration of the competitive advantage of the owner over his rivals. In fact, after its expiration date, the original inventor has no more the exclusivity nor the power to exclude his opponents from it.

As we can observe on the site "Investopedia", one of the best online sources of financial information available on internet which has been acquired by Forbes Publishing in 2007 and that boasts over 20 million visitors per month, patent's life is sometimes predefined, three out of four patents listed above, have fixed duration. We see that Plant Patent has a life of 20 years, exactly as Utility Patent that lasts 20 years too, on the other side, Design Patent provides the exclusivity and the right to prohibit the production and the selling of the protected product for 14 years; however, other times, it changes depending on the discretion of the emitting authority, that is so because, the scrutinized item, represents a more sensitive element than the cited above, so, if it's life is too short, the advantage of the patent holder would not be long enough to recover from the expenses of research, development, production and distribution, that would badly affect the developer and, after all, would be penalizing for him, while, on the other hand, if it lasts too much, the patent holder would increase its market power up to arriving at the achievement of a monopoly within this sector, which would be inefficient for many different economic reasons as the control over the quantities produced of that good, usually lower than the equilibrium, and the ability to raise the price of such product, since the elasticity of demand in a monopoly is very tiny. Usually, the criteria applied for attribution of exclusive rights is inversely proportional relationship between the original profitability of the company and patent protection, therefore, for these reasons, the corresponding authorities, after having released the patent, closely supervise the holder, in order to intervene, when necessary, to stem the abuse of dominant position.

2.1.1. Graphical example of patent life

To make you more familiar with the just explained concept, the mechanism of attribution of patent life is explained by the following graph, where there are, to simplify, only two firms, Firm 1 and Firm 2, studied in 4 periods: $t=0$, the starting point, $t=1$, where Firm 1 innovates,

$t=2$ where the patent's life expires and $t=2^*$ which is the case in which the patent's protection has not finished yet. "CS" is equal to consumer surplus and "X" is the total cost for R&D:
 (1)

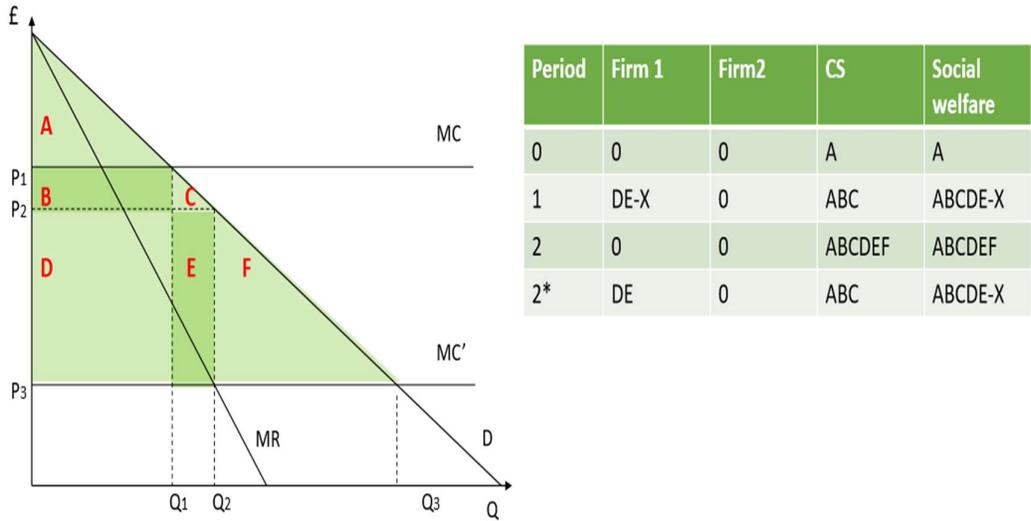


Figure 1: Graphical comparison between innovative firm and competitor with referments to consumer surplus and social welfare

Focusing on the coloured areas of the graph, it easy to evince that, protecting the firms, safeguarding their investment in R&D, assuring them the exclusivity about the innovation and giving them the right of excluding the competitors from the patent, makes everyone better off: the innovator generates a profit, if $DE > X$, consumer surplus increases from A to ABC and also the total welfare rises from A to ABCDE - X.

2.2. Patent's benefits

This mechanism of achievement such favourable position, generates competition among the players of the same sectors, this challenging enviroment, as known from the theoretical economic point of view, tends to efficiently allocate the resources in an economy, guaranteeing to the consumers the best products possible at the lowest prices, avoiding deadweight loss and permitting the achievement of the maximum social wealth. In the end, the competition is a sane and fundamental component of an economy and is the carrier

¹ Image taken from class material of the course "Economic Aspect of Competition Policy", BUST10124, taught by Professor Augusto Voltes-Dorta, Senior Lecturer in Business Economics at University of Edinburgh Business School.

through which the ultimate goal of the competition policer is achieved: efficiency. Their aim is to protect and safeguard the consumers, assuring them the best quality at the lowest prices. The maximum benefit is achieved in the long run, once the patent is expired, where nobody is not more excluded from it and there is a wide possibility of enjoying it; however, in order to reach this situation, a temporary monopoly has to be inevitably conceded to the patent holder.

2.3. Patent breadth

In addition to the patent life, to properly present the concept of patent, we need to explain, as reported in “Patent Breadth, Patent Life, and the Pace of Technological Progress” by Ted O’Donoghue, Suzanne Scotchmer and Jacques-Franc, Ois Thisse, the concept of patent breadth. While the patent’s life defines how long it has to last, the patent breadth regulates how broad it can go, in the sense that it defines how close the rival companies can imitate the protected products of the patent holder, without infringing the copyrights.

2.3.1. Lagging and leading breadth

First of all, we can characterize two different kinds of patent breadth: lagging breadth and leading breadth. The first protects against competition derived from products classified as inferior to the patented product, and the second protects against competition from products produced with higher quality level. Lagging one alone, may provide insufficient incentives for investment even when the statutory patent life is very long, so leading breadth can extend effective patent life and stimulate R&D, increasing the level of innovation.

2.3.2. Horizontal and vertical breadth

Secondary, the other two types of patent breadth that we need to delineate are: horizontal and vertical. The former sets how many kinds of the same product are protected by the a patent, without changing it, (ex. Samsung’s smartphone line “S”, once the South Korean company has obtained the patent for the S1 model, it is valid and gives to the patent holder the rights on all the following models of the line) while the latter means how much vertical differentiation of the a specific product are covered by the same patent. The most intuitive example is the one regarding the I-phone and the I-pad; the patent that grants the exclusivity to Apple for the smartphone is the same that protect it for the tablets. An increasing of the horizontal breadth gives to the holder, a larger monopoly power because it restricts the firm’s competitors’ capacity to develop the original technology and any other variation of the early

technology, whereas the increase of the vertical breadth incentives the investment in fundamental technologies but may deter innovation in second generation types of product.

3. Standardization

3.1. Coordination problem

That being the case, moreover than setting exclusivity, the patent plays another crucial role in the economy's sectors, it draws down the guidelines about the standard concerning a product that every player has to follow in order to enter a business or continue being competitive in it with respect of its rivals. The standardization, substantially erases entry barriers, useless investments in innovation, which would generate products not able to communicate and/or interact with the other goods already present in the market, and the potential "coordination problem" that could arise. This last concept is a crucial factor of uncertainty in the production phase of a firm, inasmuch it represents the risk of investing in one or more technology/technologies not knowing the engineering used by the other producer companies. This represents a problem because the tech-products hire worth as long as they possess the ability to be compatible and to be able to communicate with other goods already existing in the market, if they were not, their commercial value would shrink, and they would not be nothing more than pieces of hardware.

Following, we are going to present a potential coordination problem between Firm A, DVDs' producer for movie, and Firm B, DVD players for movie. Each firm has to decide in which technology investing, Blu-Ray or HD DVD.

		Coordination Problem	
A	B		
		200,100	0,0
		0,0	100,200

Figure 2: Coordination problem: game with plurality of Nash Equilibria²

Analysing the game, we can see that each firm can gain a profit if and only if both choose the same technology to manufacture their products, so, or they two converge to Blu-Ray or both of them tacks on HD DVD. The presence of a double chance of profitable outcome is called in games' theory "plurality of Nash Equilibria", and represents a scenarios in which the players, if act rationally, searching the maximum gain possible, would have, as can be seen in the representation of the game, two way to gain a profit, or converging both on AA position, or otherwise join both the BB position. In the remaining two outcomes, either AB or BA, they will obtain 0, which would be the result that derives from incommunicability between the two goods respectively produced. Obviously, this last scenario scares the producers, it would represent a disaster because, after all the investment in R&D, all the cost of production and distribution, the market profitability would be zero.

3.1.1. Example of coordination problem solution

Standardisation solves the ambiguity of the game, cancelling out the plurality of Nash Equilibria, indicating a unique equilibrium possible, avoiding chaos and uncertainty, that represent the two most important causes of wrong investments and waste of time, pointing out the righteous way and setting the standards that everyone has to follow in order to develop competitive products. So, referring to the case brought above, if, for example, HD DVD would have been set as the standard in the sector, it will be considered fundamental technology at the expense of the other one and would be the referment for the present and future investments in that environment, making the plurality of Nash equilibria converging

² Image taken from class material of the course "Economic Aspect of Competition Policy", BUST10124, taught by Professor Augusto Voltes-Dorta, Senior Lecturer in Business Economics at University of Edinburgh Business School.

to one efficient equilibrium position, providing certainty about which direction the investors should spend economic and temporal resources.

3.2. How network effects affect standardisation

The benefits deriving from standardisation can be magnified if direct and indirect network effects occur. By definition, the network effect is a phenomenon whereby, increased numbers of people or participants, improve the value of a good or service; we have the direct network effect, also known as same-side effects, where the value of service simply goes up as the number of users goes up, and indirect network effect, also known as cross-side effects, which increases the value of the service for one user group when a new user of a different user group joins the network, so you must have two or more user groups to achieve indirect network effects. Obviously, enlarging the game illustrated above to an entire sector, we can easily understand that the perks of standardization would boost if one among the two technologies possible, Blue Ray Disc and HD DVD, would be chosen either by Firm A's group and by Firm B's group, expanding the total number of users and diversifying the audience with the presence of two different clusters.

4. Patent misuse

As we have said above, the real power of the patent, from the perspective of the patent holder, is the right of excluding the rest of the competitors from his knowledge for a determined period of time. This ability invests the patent's holder of great powers, but in addition to the legally advantages gainable, it also brings a bunch of potential misuses that, as the etymology suggests, is an unsuitable usage of the patent. It is illegal and strongly anti-competitive in the sense that a patent's owner can take advantage over the rivals, exploiting its monopoly power, extending it persistently in the long run, arising the barriers to entry and making unprofitable the entrance for new investors in a market. This would cancel out the maximum benefit, planned by the patent institutions, achievable by the society, excluding, not officially but practically, the competitors from the breakthrough, arresting the innovation and the presence of rivalry among the competitive firms, affecting the quality and the price of the

products. This, in the end, damages the consumers. The most common causes of patent misuse are patent pools, tying and patent hold-up.

4.1. Patent pools

The first patent misuse that we are going to treat is the patent pools. As explained in the World Intellectual Property Organization (WIPO), it is defined as “an agreement between two or more patent owners to license one or more of their patents to one another or to third parties”. Generally, it deals with mature technologies and, most of the times, is associated with high tech innovations that require complementary patents in order to provide efficient technical solutions.

Patent pools have been subject of lots of criticisms and doubts because, even if on one hand, pooling technologies, knowledges and knowhows, may produce more innovative and competitive products, avoiding problems like double marginalisation, (a phenomenon in which different firms in the same industry that have their respective market powers, but at different vertical levels in the supply chain, apply their own mark-ups in prices with the aim of generating profit) guaranteeing lower costs, erasing one step by the supply chain, on the other hand, sharing intellectual properties may lead, as any other communication and cooperation between competitors, to a collusive behaviour, enabling the institution of a cartel, (form of coalition of enterprises of the same class agree to suspend mutual competition, committing themselves to comply with particular conditions of sale, price and production), bringing annex risks that it involves. The most common is the exercise of market power derived by the collusion of the patent pools participants. It manifests itself through anti-competitive behaviours like price fixing, restrictions concerning the number of output produced and vertical foreclosure (acquisition a supplier that supplies both the company and several competitors with raw materials; the company then uses its leverage over the supplier to receive a discount over raw materials, while reduces quantity and raises prices when its competitors buy them).

4.1.1. Example of patent pool (Hartford-Empire Co.)

An example of patent pools is the one of Hartford-Empire Co. The case, as reported in The United States Reports (the official record of the Supreme Court of the United States and that include rulings, orders, case tables in alphabetical order both by the name of the losing party and the prevailing party), and analysed by Philip Marcus in “The Georgetown law journal”, through the article “Patents, Antitrust Law and Antitrust Judgement Through Hartford-

Empire”, concerned the patent about the manufacture of glass for jars, bottles, and other glass containers around the ‘40s in the United States. Here, three different companies, Hartford, Owens and Hazel-Atlas, possessed three different patents about the glass production for commercial purpose.

In this way, none out of the three players could gain the benefit the market power deriving from the patent right, because they were almost perfect substitutes and this gave to the consumers the possibility to have high bargaining power, being in the strong position in the commitment. Thus, the competition among this three producers were savage, because each of them was forced to lower the asked price in order to remain competitive (analysed in a theoretical way, the situation, presenting few firms serving many customers with homogeneous product, could be properly represented as a Bertrand model, which brings the problematic of Bertrand Trap, that is the constant lowering of prices by the firms, till the arrival to the minimum threshold possible, $\text{Price}=\text{Marginal Cost}$).

Understood it, the companies decided to collude to not compete anymore. They decided to pool together the three patents, instituting a bundle. Doing so, more than 94% of the total production of glassware, was owned or controlled by Hartford- Owens- Hazel-Atlas, making impossible the access to glassware-making machinery out of the Hartford-Empire, imposing the choice to the costumers that, as we have already explained before, in the end, undermines the total social welfare.

4.2. Tying

The second element of the patent misuse that we have mentioned is the tying. As defined by Michael D. Whinston on the “National Bureau of Economic Research” in 1989, tying is a mechanism whereby a multiproduct firm, which produces two different goods in pronouncedly different market conditions, for example, product A made and sold in a monopoly and product B, produced and sold in a competitive market, forces, with the acquisition of product A, the purchase of the complementary product B, exercising its monopoly power derived from market of A. The company leverages its strength from product A’s market to foreclose sales in the other one, altering its competitive nature; this shifting of market power would occur from a section where the company is legally entitled

to have it, thanks to the patent coverage that confers it the monopoly status, to another one that is based on the plurality of suppliers and should be reflecting competition, granting a determined standard of pricing. Such equilibrium would be tampered with this act, advantaging unlawfully the monopoly enterprise because, obliging the purchase of the two goods together, the company has the possibility to continue selling the same quantity of both products even if it increases the price of product B, which, in normal market conditions, would face a fall in unit sold because of the raise of asked sum for them.

Potentially, the practice helps to produce savings in production, distribution, transaction costs, efficiency and furthermore, combining two independent products into a new single one, may be an innovative way to market the products. These are all elements that must be considered for the benefit of consumers. Following the reasoning, the welfare effects for both consumers and aggregate efficiency, are in general ambiguous because potential gain for consumers arises from the usual reasons associated with price discrimination, while the loss arises because when tied market rivals exit, prices may rise and the level of variety available in the market prospective falls.

Unfortunately, in most of the cases analysed by the Courts, foreclosing the competitors, leads to increases in all prices, making consumers uniformly worse off and allocating in an inefficient way the social resources.

4.2.1. Example of tying (Canon)

An example that can be brought for tying is, for instance, taking into consideration a company like Canon, that can be considered a monopoly in a market of a specific good but that produces also other products. Specifically, this Japanese multinational, sells printers and ink cartridges, having a monopoly control on the former product's market, while being one of the players that compete in the sales of the latter. This implies that even though in the printer's market, Canon can exercise its market power, rising the prices, in the cartridge's one, has less freedom of movement, needing to align its product's price with the other players' ones to stay competitive.

Hypothetically, if Canon were to force the costumers to buy the two products together, or if it would oblige them to purchase its own-made cartridges because only they work with its printers, it would be illegal because Canon could be able to undisturbed increase cartridge's price without decreasing the quantity, in terms of unit sold, which would increase the profits. This behaviour would represent an abuse of dominant position, because would guarantee a

level of earnings to the firm, not gainable otherwise, configuring the infringement of the Article 102 TFEU. As explained above, part of the market power held on printers would be unlawfully transferred on the market of cartridges, imposing a level of price on them above the competitive level, leaving no choice to clients and forcing them in buying the product anyway, affecting their demand elasticity.

4.2.2. Finnish case

Sometimes, very rarely, this procedure is permitted and supported in order to allow the penetration into the society of a fundamental technology that is not spreading on its own, like has happened, for instance, in Finland with the 3G technology between 1997 and 2006.

As treated in the “Journal of Competition Law and Economics”, Volume 14, Issue 1, March 2018 by Thomas W Hazlett, Sarah Oh, Brent Skorup, most European Union countries had distributed 3G licenses to mobile carriers as early as 2000 and 2001. The standard manner for marketing these services, involved the sale of a bundled contract: the customer was offered a 3G handset and a service agreement, usually for one or two years. Typically, the carrier-subsidized handsets sold in this manner, lowered the customer’s upfront payment and recouped the subsidy over the term of the contract. However, telecommunication regulators in Finland, pre-empted this business practice, through a set of laws of 1997, by which mobile carriers were prohibited from bundling handsets with wireless subscription; in this way 3G network had lagging development.

The Finnish law ensured that the major Finnish carriers, Elisa, Sonera, and DNA, were unable to sell handsets with mobile service as 3G and it was introduced as far it was viewed as pro-consumer efforts to provide pricing transparency and mobile device competition. Nevertheless, demand for mobile service was reportedly diminished in these early years: in addition to relatively high upfront prices for consumers, coordination issues arose, in many instances, subscribers had difficulty accessing the wireless network with their devices, for this reason. In 2005, Finnish regulators reversed the course. Positing that carrier-subsidized handsets would support emerging ecosystems for data services, the Finnish communications regulator asked the Finnish parliament to eliminate the anti-bundling rule and it did; deregulation went into effect in April 2006.

This decision significantly spread out the technology in the country, as testified by the following table, taken from Wireless Intelligence Database (2013):

	2004-II	2005-II	2006-II	2007-II	2008-II	2009-II	2012-II
Finland	0.00	0.35	3.42	13.06	26.78	46.65	102.92
EU15*	0.69	2.86	7.49	14.33	24.52	36.18	69.18
EU27*	0.66	2.40	5.26	10.11	18.08	28.10	59.77
Nordic*	1.24	3.74	7.20	14.99	28.07	46.88	101.76
Finland Rank (EU27)	—	21	19	14	10	5	2

Figure 3: 3G distribution considering subscriptions per 100 population

It represents the percental distribution of 3G technology in population. It can be observed that from 2006, the percentage has risen exponentially and that it had quickly filled the gap between the early European countries (EU15), the European countries after 2004 (EU27) and the Nordic counties, all computed without considering the impact of Finland on the data (this computational criterion is represented by “*” in the chart).

4.3. Patent hold-up (briefly introduction)

4.3.1. Standard essential patent (SEP)

The last example of patent misuse that we have mentioned, was the patent hold-up. In order to properly present it, we need to make a digression concerning a special type of patent, that we have cited in the first paragraph of page 8, the Standard Essential Patent (SEP).

In the wide world of the patents, as argued in the “Research Policy” by the authors Rudi Bekkers, René Bongard and Alessandro Nuvolari, all the inventions are ranked through several characteristics like citations received, renewals, family size and opposition, which attributes an economic value, social improvement and industrial importance. Clearly, these ranks are made by competent institutions, called Standard Developing Organisations, which are formed by representatives of industry and that flesh out technical specifications of a standard in order to outline all the characteristics that patent must own to be classified as SEP.

The mechanism that lays behind the process is that, if a patent receives many citations by representatives during the screening, this means that the technological solution outlined in that serves as a basis for many subsequent technological developments and so can be

classified both as a “standard” and as “essential”. The logical consequence is that, the technological value and the significance of a patent, can be captured by the number of citations that it gains, so, a SEP will typically have a higher number of forward citations than non-essential patents. As we can learn from “Trends In The Interplay Of IPR And Standards, FRAND Commitments And SEP Litigation”, written by Knut Blind and Tim Pohlmann, in total over 1,500 standard projects are subject to declared SEPs by Standard Developing Organizations (SDOs), such as ETSI, ITU, IEEE, IETF or TIA, and, as demonstrated by the outcome of a recent study, 95% of all publicly declared SEPs can be related to Information and Communication Technologies (ICT), as we can graphically see from the following graph, taken from a research named “Landscaping study on Standard Essential Patents (SEPs)”, conducted by market intelligence company “IPLytics” for the European Commission.

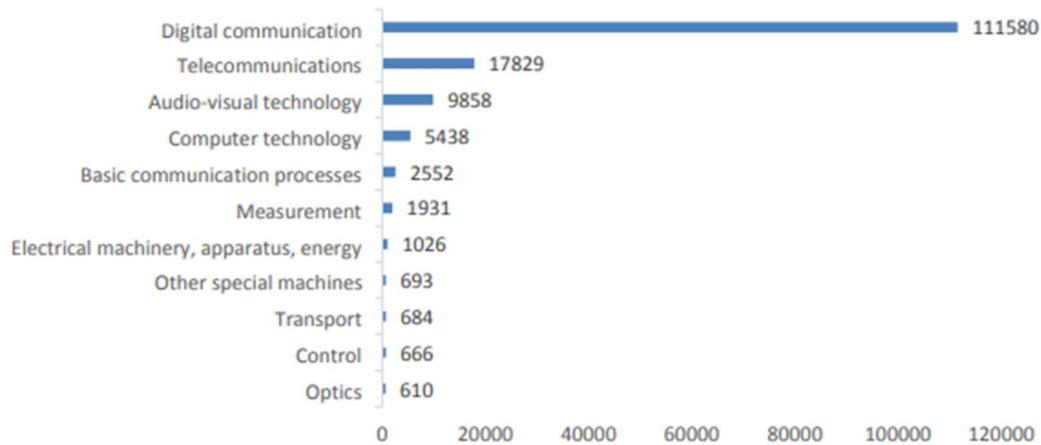


Figure 4: Number of declared SEP families as to main industry classification.

This may be a reason for, over the past twenty years, the constant increase in the number of SEPs, mainly driven by big standard projects such as GSM, UMTS, LTE, Wi-Fi, Bluetooth and MPEG that have seen the light in lasts decades.

As highlighted in “Unified Patents” website, a member-based organization whose goal is decreasing the quantity of non-practicing entity (NPE) assertions in specific technology areas, thanks to their intrinsic essential nature and the widespread distribution, the possible profits gainable from the recognition of the SEP for its owner, are huge. We are talking about trillion sales coming from four main different industries as internet, mobile, digital music and video streaming, which make this special type of patent a strongly desirable item. Because these volumes of profits and unit of licenses sold, it has been proven by research,

that SEPs are litigated, in average, four times more than other common patents; intuitively, they vary concerning the different kind of SDO, but it may be carried as evidence of their strategic value.

Unfortunately, the desire to put the hands on the coveted SEP, can sometimes lead to some peculiar abuses linked to them. Following a conducted inquiry made by the international organization Unified Patent, they can be grouped into four main categories: overestimation, invalidation, licensing costs and royalties stacking.

The study found out that around 80% of the SEPs are wrongly declared as essential and/or subsequently invalidated. Moreover, it highlighted the fact that licensing costs are usually too high and disproportional to the real value of the patent, ignoring that also other SEPs holders must be compensated, increasing time after time the total amount of fees concerning SEPs that have to be paid. Consequently, most of the times the costs of registering a SEP are enormously higher than the intrinsic value of the patent itself.

In order to stem the flow of incomes that derive from the entitlement of a SEP, since it is a particularly powerful patent, in very sensitive sectors like the ICT, once the SEP's holder is entitled of that, he is generally expected to commit the license of his technology under particular terms. These conditions will limit the ability of the owner to exercise all the bargaining power, deriving from the entitlement, over his competitors. This measure is taken because the market power of the patent's holder, coming from the temporary monopoly gained by the concession of the Standard Developing Organization, could be potentially lethal for the competition and, subsequently, for the Pareto's efficiency in the long run. The impossibility, of many producers, to use at an affordable fee a SEP, could discourage companies to reinvest in the sector because of the fear of turning the investment spending into sunk costs and, at the same time, deterring the entrance of new players because scared by the narrow possibility of profits. As we have explained above, this could damage the consumers, concentrating the market power in a few firms, giving them the chance of rising prices and lowering the quality of the products.

Therefore, to safeguard the consumers' interests, the SDOs impose some restrictive measures about the commitments concerning the adequate fee to be paid. These are summed up in three main characteristics, the price asked from the SEP's holder must be Fair, Reasonable and Non-Discriminatory (FRAND).

4.3.2. *Fair digression*

Let us try to focus, for a moment, on the first and more important adjective of the acronym, “Fair”. If we look in the dictionary, the definition of the adjective fair is: “treating someone, or a group of people, in a way that is right, equally and not allowing personal opinions to influence your judgment”. As may be seen, behind a simple word, lays a noble and complex spirit, that fix the equality as the core principle. Basically, the concept of fairness is not an idea that belongs to the economical universe, but to the metaphysical one, as British economist Joan Robinson pointed out, “... a remarkable example of a metaphysical notion which inspires original thought and is quite devoid of operational meaning”.

So how does a metaphysical thought can play so important role in the economy? How do these parallel worlds meet? An answer to these questions can be found in the article “Beyond a subjective theory of value and towards a “fair price”: an organizational perspective on Fairtrade minimum price setting” by Juliane Reinecke. In his opinion, the metaphysic and the economic fields, collided for the first time, during the past decades, when the wave of marketization of numerous domains of social life, has given rise to fundamental questions about the ethical dimension of competitive markets as the dominant principle of valuation. So, the underpinning theory of value, is not just a descriptive device, but a carrier of normative presuppositions about the ways in which markets should be organized.

Throughout history, two main trains of thought have developed, the orthodox and the classical views. According to the former, which defines value subjectively by the principle of marginal utility, the real value on the market does not exist, while, in the latter political economy philosophy, and Marxian economics in particular, the theory of value was a concept with social and political content, employed to make important social statements on the nature of the economic world. Its importance lies less on its explanatory power to describe the causal determination of prices than in recognizing that exchange value is a social abstraction, which conceals many things of social, economic, ethical and political importance.

But do really theories of value matter? Neither the subjective theory of value, the building block of orthodox economics, nor the objective theory of value, which puts the labour process at the centre of value production, provide an empirically accurate account of price formation. The former fails partially because free competition in the classic form, as treated in economic textbooks, has never existed in capitalist economies, as assessed by Kalecki in

1986. Marx's labour theory of value, on the other hand, struggles to explain how value translates into prices, which is known as the transformation problem. However, an objective theory of value, therefore, matters for ethical and political reasons because ideas and institutions influence each other reciprocally. As Fine argues, "an analysis that is based on an uncritical acceptance of the clothes in which capitalism presents itself will tend to produce an ideology supporting alterations to the clothes, rather than to the mode of production itself". Furthermore, the theory of value matters because it has ramifications for who it is that values, and hence how social and economic power becomes manifest in valuation.

On the market, the commensuration of different use-values is achieved through the principle of competition. This establishes equivalencies of general validity between things so that private goods can pass ownership anonymously without leaving behind personal traces. Anthropologists have noted that all standards of value are alike in that, they are all expressions of power. Anyway, the peculiar character of the competitive market consists in the fact that economic power becomes mystified as an "objective", "impersonal" and "systemic" process, such that it is the "self-propelling metaphysical dance of capital that runs the show".

To achieve a meaningful price level, two main elements are taken into consideration: "industrial" and the "civic" principle. The first has a scientific point of view, aimed to provide a reliable approximation to real cost-covering prices, based on objective and reliable facts, finalized in setting minimum price, defined by virtue of a Cost of Sustainable Production methodology (CoSP). It was treated like a quasi-scientific problem that could be researched and eventually, objectively defined. Subsequently, having recorded the results of CoSP, begin the "civic" part, which elaborates price proposals and fed them into consultation rounds with producers, traders and national Labelling Initiatives, to test the possibility of constructing a general agreement. The concept of fairness, in the "civic" world, was based on consensus and compromise between different players with their respective point of view and lays the foundation of the creation of Fairtrade. It solves the bias of both the valuations in terms of exchange and orthodox market valuation, since the first had the problem of objectifying the exchange value in prices, attributing an "appearance-form" of value that mystifies social relations between human beings, and the second restricted the object of valuation to the commodity. Conversely, Fairtrade also brings the producer into the valuation process, both as the generalized beneficiary of the Fairtrade system as well as its concrete embodiment through producer representatives in decision-making committees.

Based on CoSP, Fair Trade Market Price (FTMP) setting reveals the social relations of the labour process that are hidden behind the phenomenal form, the abstract appearance form of value. The recognition that value depends on the political, social and ecological relations of production, preserves an attachment to the social and cultural biography of a product, so, the minimum price symbolizes this social relation to the producer, who becomes visible at the point of sale. The critical practice of setting a FTMP refuses such a naturalization of inequalities, injustices, and exploitation, as the outcomes of the perpetual movement of self-regulating market forces. The point of price determination in Fairtrade takes place in a political arena, the multistakeholder committee, this locus provokes a physical confrontation between market participants as political actors; rather than impersonal forces, the calculation becomes a collective deliberation on what is substantively a fair price. While this does not necessarily mean that economic power is more evenly distributed, it just signifies that the political struggle for power becomes visible, which the mysterious workings of the “invisible hand” tend to conceal.

4.3.3. FRAND rules

So, after the digression about the generic concept of the value and, in particular, the determination of a fair one of goods definable “normal”, we can get back to the original theme, FRAND rules. They are designed to forbid the exercise, at the full scope, of the market power held by the SEP’s holder and have two main goals: firstly, promote the standard by assuring the companies who implementing it that they will be neither blocked nor held-up from bringing their products to market, as long as they are willing to pay reasonable royalties for any standard-essential patents and, secondly, providing affordable rewards to those who have invested in research and development to flesh out the technology used by the standard.

Lingering on the “reasonable royalties” point, with the help of Mark A. Lemley and Carl Shapiro and their publication “A simple approach to setting reasonable royalties for Standard-Essential Patents”, we can assert that the FRAND procedure has been created with the idea that the number of revenues gainable by the SEP, reach a “reasonable” level, striking the threshold obtainable in open competition with other technologies, not the royalties that the patent holder can extract once other participants are effectively locked in to use technology covered by the patent. Moreover, according to patent law, a reasonable royalty is normally based on a theoretical arms-length negotiation between a willing buyer and a willing seller, that takes place at the time when the infringement begins. Specifically, in the

case of standard essential patents, a reasonable royalty has to be based on a hypothetical, arms-length negotiation that takes place at the time the SDO is setting the standard. This means that for parties making a FRAND bargain, during the standard-setting process, the reasonable price is the one they would negotiate at that point, not a fee that differs for each implementer depending on the fluke of when that party begins implementing the standard.

By construction, the reasonable royalty rate does not comprise the worth attached to the creation and adoption of the standard itself; in this way, it enable patentees to catch that value, which derives from the collective adoption decisions of the group rather than from the underlying value of the technology chosen, preventing the undermining of the goals of the FRAND commitment. The hypothetical negotiation over the last cited element, is a bilateral bargain between the patent holder and one implementer, who should not be understood as an irrelevant counterparty during the transaction because, the proof of dealing with it, could be brought as the evidence of a reasonable price, clearly representing relevant evidence in the arbitration. On top, dealing with other parties may be binding due to the non-discrimination commitment.

However, the hypothetical ex-ante negotiation, is not a kind of negotiation in which all the buyers act collectively to reduce prices, it is one in which patentees transact with individual licensees just as they would in any other circumstance, remaining in an unfavourable position, even though the constraint that they are subjected to, have pre-committed to not discriminate. The commitment to license to all comers, without distinction, makes the auction approach, in the opinion of someone, inappropriate. Royalty stacking, the problem already treated with the presentation of SEP abuses, arises when implementers must pay royalties to multiple patent owners, in such way, those royalties rank up or "stack" on top of each other from the perspective of the implementer, increasing time by time their level.

To address the problem of royalty stacking, the hypothetical negotiation needs to consider the presence of patents held by other people that deal with the same product. In practice, negotiation would not consider in a vacuum one party's standard essential patent portfolio, or even the standard essential patents related with one of many standards being deployed in a given product, the price that any implementer would be willing to pay for a given standard essential patent portfolio, depends on the summation of all the other royalty fees which will be asked to them in order to make possible bringing their product to market. For this reason, the hypothetical negotiation, needs to consider and account the total amount of royalties necessary for standard essential patents held by others, nothing more than a reasonable

royalty in patent damages. Properly understood, it must include the concept of sharing of the value of a product among multiple contributors to that. This is part of what is intended as the "well-informed" aspect of the hypothetical ex-ante negotiations.

Economics studies conducted upon this problematic, demonstrate that when various essential inputs are priced singularly, the collective result tends to show up overpriced, due to the "Cournot complements" problem. This overpricing, which come out in practice in the form of royalty stacking, decreases the collective returns to standard essential patent owners and to implementers. To avoid this mutually undesirable outcome, Standard Setting Organization (SSO) best practices should be aware of the problem of royalty stacking, empower the arbitrator to account for that, and provide it with the best possible information and all possible means to do so.

Courts and arbitrators can gain insight from the commercial arrangements that companies have employed to deal with royalty stacking, notably with the help of patent pools, an element that we have already treated and already individuate as potential patent misuse, or other mechanisms involving the aggregation of essential patents. An arbitrator does not have the presumption nor the privilege of resolving all standard essential patent disputes at the same time, as there is a lack in solving mechanism of SSO rules that forbid to handle all standard essential patent disputes on the same patent in the same arbitration proceeding. Anyway, the arbitrator can and should take evidence on the existence of other standard essential patent portfolios that the licensee would have to pay, reflecting them on the royalty rate.

As SSOs' best practice explicitly specifies, parties have to note the timing and context for the hypothetical ex-ante negotiation, underlying the reasonable royalties' concept. The hypothetical negotiation needs to take place under conditions where the alternative specifications have been identified, so that the parties are well informed about the best potential non-infringing alternatives to the proposed standard. In some cases, the best ex-ante technological alternatives would have required some development effort by SSO participants and could not simply have been taken off the shelf. The key idea here is that a reasonable royalty should reflect what would happen as a result of well-informed ex-ante technology competition. The incremental value of the patented technology over and above the next-best alternative, serves as an upper bound to the reasonable royalties; to this end, SSO best practice includes maintaining records, such as minutes from SSO meetings, that will inform subsequent negotiators and arbitrators of the ex-ante technical alternatives that

were feasible or considered, along with their pros and cons. After all, a FRAND engagement is nothing more than a promise to later license to a party only if the patentee feels like it is not a commitment at all even if it represents a limitation for him.

The usual procedure under FRAND regime, functions as follow: an SSO participant who makes a FRAND commitment is obliged to make a "FRAND offer" to any interested party who agrees to reciprocate. A "FRAND offer" means a purely monetary offer to license the SSO participant's entire portfolio of standard-essential patents on reasonable and non-discriminatory terms for the purpose of making, using, or selling products that comply with the standard.

If the licensee accepts, the game ends, while, if they cannot come to terms with each other about implementing the standard, the FRAND commitment provides a fallback position which can be solved through two ways by the SEP holder, the first concerns giving up the possibility to ask for an injunction and trying reaching an agreement with the licensor about the FRAND royalties while, the second foresees exercising its right and file the injunction. Before that, this court has to check the validity of the SEP, remember that it is far from being obvious since 80% of SEPs are assessed to be invalid and/or overestimated. Once having examined the documentation, it has to pronounce with a judgement asserting if it is valid or not. If the evidence showed that the patent had been wrongly considered as SEP or it is not valid, the Court voids the patent and its holder pays damages for the litigation cost of the licensee and the game terminates.

The mandatory to make a FRAND offer, does not prevent the SEP possessor from entering into an alternative licensing arrangement, such as a portfolio cross-license, with an implementer of the standard; it will often make sense for private parties to enter into a deal that reflects their specific circumstances. To help facilitate these deals while giving effect to the non-discrimination prong of FRAND, SSO best practices should include a mechanism by which the owner of standard essential patents is obligated to disclose to any willing licensee the terms on which it has already licensed its standard essential patents to other parties, subject to a suitable mechanism to protect the owner's confidential non-price business information.

The FRAND commitment in no way prevents or discourages private licensing agreements, and indeed we think they will be the norm precludes it from going to court to enforce its standard-essential patents against implementers of the standard, except in very limited circumstances. In this way, after the explicit statement of IP policies by both the SSO, the

patent holder gives up his right to seek an injunction against any willing licensee for infringement of any of its standard-essential patents. Explicitly ruling out injunctions will tend to steer bilateral negotiations towards a reasonable royalty rate.

A key principle of bargaining theory is that the threat points of the two parties, along with their bargaining skills, which determine how their combined gains from reaching a deal are split, govern the outcome of bilateral negotiations. So long as the arbitration procedure itself is unbiased, bargaining in the shadow of binding arbitration will tend to lead to reasonable rates.

Conversely, if the impasse is not solved through the giving up of his right to seek an injunction, participants promise that the question of the proper FRAND royalty rate, will be subject to binding arbitration; their best practices include specifying a reputable arbitration association, not related to any government actors, with established and unbiased rules for the conduct of the proceeding that is called to emit a judgement concerning the adequate FRAND royalty rate applicable at the entire portfolio of standard essential patents.

The definition that sector operators use in this situation, is "baseball-style" theory and argumentations exposed by it, are considered at the net of over declaration and invalidity cases. This technical jargon implies that during the arbitration the parties convey evidence and arguments, brought in order to demonstrate the solidity of the offer, which must culminate with a proposal of an applicable royalty rate; once having the feedbacks of calculations in its hands, the arbitrator must pick one of the two numbers offered and cannot come up with her own number. Using baseball-style arbitration, logically drives the parties towards making reasonable proposals, because the party that pretends too much, or tries offering too little, risks losing the case altogether; for this reason, FRAND disputes are well suited to baseball-style arbitration, because the only thing at issue is which of two numbers in fact represents the more reasonable royalty which can be requested.

Moreover, this kind of arbitration has a wide multiplicity of advantages. The more evident, as specified in the presentation of the method, are that arbitrator does not need to decide whether any given patent is valid or infringed, nor does it need to decide whether a particular patent is essential, except in unusual circumstances. Both of those things may be disputed and the evidence on each question will likely affect the reasonableness of the competing royalty recommendation. But differently from a court that might have to rule on any number of subsidiary factual issues, the only thing the arbitrator needs to do is select the best among the two proposed royalty rates. Thereby, any arbitration decision will be disclosed to willing

licensees, as under SSO best practices, furthermore, this disclosure, is justified by the non-discrimination provision. It is hard to know whether a royalty unfairly favours one party unless we also know what other parties had to pay.

Disclosure to willing licensees has other advantages: it will stimulate implementers to file an injunction, submitting an arbitration. This can streamline the juridical process, reducing the need for duplicative arbitrations, avoid giving one party an informational advantage if they have already been involved in an arbitration, and help build a record of what constitutes FRAND royalty rates that may encourage subsequent parties to resolve their disputes themselves. In any given arbitration, excepting circumstances of antitrust inquiries, the standard essential patent owner and the licensee may well prefer to keep the arbitration outcome secret because, for the reasons just provided, such secrecy would undermine the effectiveness of the FRAND regime, so, anyway, courts are not likely to allow it, at least when a party to a subsequent dispute can show that the information is potentially relevant. Finally, like any arbitration, opportunities for appeal will be limited under this approach, commonly, parties to an arbitration can appeal only in cases of legal error or some procedural deficiency.

To conclude, FRAND rules are structured in order to be as most fair as possible, towards both SEPs' holders and its competitors. In the end, their goal is just feeding the flame of competition, bringing it to such a level that does not contrive too much the party in a momentaneous dominant position and, at the same time, gives the opportunity, to the rest of the industry, to invest in the future main standard of the sector. They are anomalous patent conditions because they do not give the plenty right to the licensor to exclude his rivals from its creation but, their unusual nature, is constructed as such in the consumers can enjoy.

4.4. Patent hold-up

So, having explained the concept of a SEP and of a FRAND price, now we are able to present properly the last type of infringement, presented some pages above, that is possible to implement having the right of possessing a patent: the patent hold-up.

It is a kind of abuse where the SEP's holder exercises his bargaining power over a willing to pay party, not asking FRAND price, as foreseen by the protocol, but pretending an amount hugely higher. When the owner of the patent wants to maximize the yield, it will wait until

the standard has already become widely adopted among the productive process of competitors and therefore difficult or impossible to change or switch without great expenses, this technique is also known as “submarine attack”. The owner of such a patent acquires monopoly power over the market for those products and it can charge as much as it wants, or only grant licenses to some parties, or charge some parties more than others.

The strength of the proprietary derives from the huge amount of money that its competitors have invested in order to manufacture the products produced to the new standard in the sector, noted as sunk costs. The patent’s holder exploits these relationships-specific costs as a threat towards the other part, using the risk of stopping the selling phase as leverage to raise the price asked, exceeding the FRAND conditions. The concept is that a producer cannot start to sell a product before having paid fees to and having received the authorization from, all the patents’ holders of the technologies that compose such good.

4.4.1. Example of patent hold-up (Acer)

For example, if we think at a product that we usually use every day like the laptop, the firm that produces it like, for instance, Acer, needs to pay for all the technologies that are inside the computer, like the USB port, the ethernet port and so on. So, Acer could obtain the authorizations to use all the patented inventions but, if even just one does not concede to it the concession, the selling is not allowed.

The exercise of the patent hold-up affects the competition, making, sometimes, the access to a sector for new competitors impossible, rising the barriers to entry and, consequently, deterring the quality of the products in the long run, damaging the clients, leaving them in the hands of a monopoly which is able to set not competitive prices and that is not prodded in producing the best products possible, with the absence of competition.

4.5. Reversal hold-up

On the other hand, the problem can be seen from the downside. Sometimes can happen that an innovation that was considered revolutionary and was set as a standard, in the end, is re-sized, remember it is more frequent than one can image. In this situation, the bargaining power passes from the patent’s holder to the manufacturer, who can exercise it presenting a price offer that can be considered by the counterpart well below the FRAND conditions. This abuse of market power is known as reversal hold-up.

4.6. Summary mind map

We are going to provide a graphical recap of the path that we have followed in this thesis up to now:

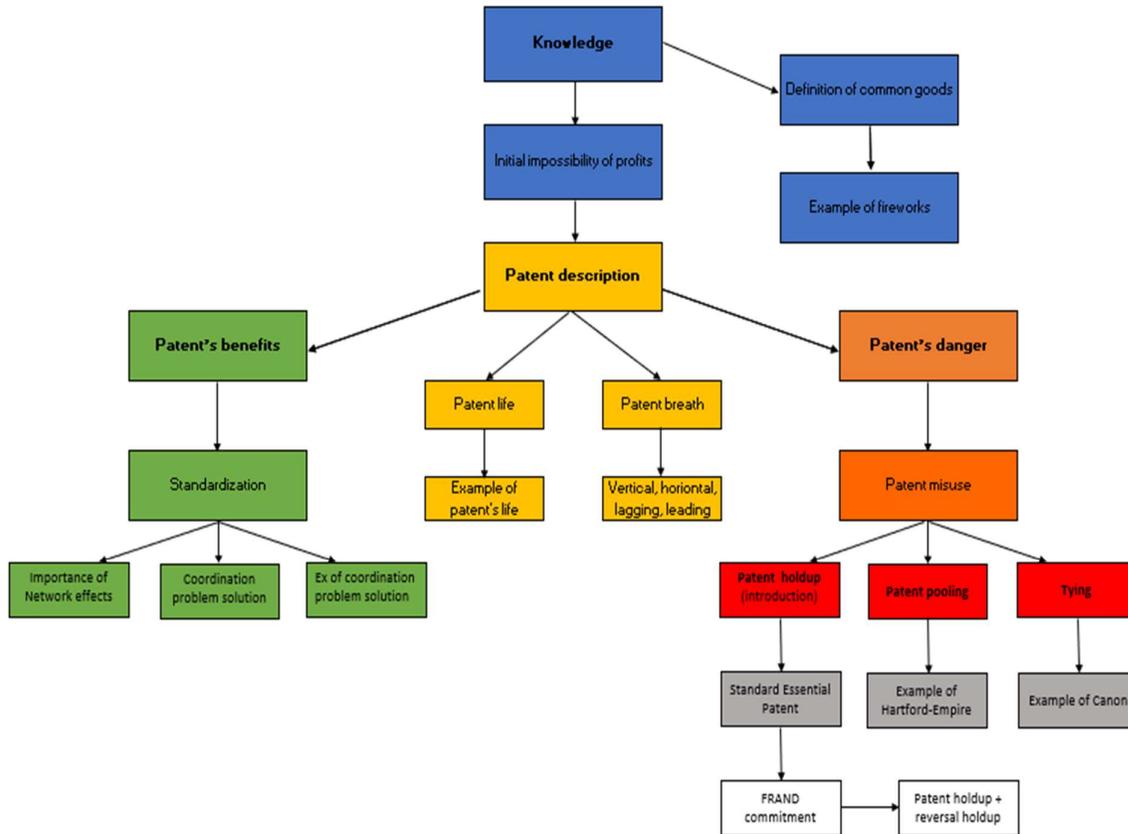


Figure 5: Mind map of the already covered topics.³

5. Samsung case

In order to provide an example of patent holdup and reversal holdup, we are going to present, in next pages the antitrust case of Samsung vs European Commission of 2011 which has been one of the biggest and most relevant litigation during the last years in Europe.

So, first of all, let us briefly illustrate all the parties involved in this litigation. They were three in total, the two litigants and the court. We had Samsung, the South Korean multinational company founded on March 1, 1938, which, since 1990, has based its most important source of income on sales of mobile phones and semiconductors and who has

³ Mind map is self-elaborated with the use of the program “Microsoft Excel”

exercised a strong influence on South Korea's economic development, politics, media and culture, being one of the main driving forces behind the "Korean economic miracle, Apple, the American company that manufactures operating systems, computers and multimedia devices based in Cupertino, California, founded in 1976 by Steve Jobs, whose name is linked to the sales of iPhones, iPads, laptops and computers and since 2011 is one of the largest companies in the world for equity capitalization, and, lastly, we had the European Commission, one of the main institutions of the European Union, whose task is performing the executive body role and promoting the legislative process throughout the European countries, representing and protecting the interests of the European Union in its entirety, likewise, having a monopoly of the power of legislative initiative, it proposes the adoption of EU legislative acts and is also responsible for the implementation of policy decisions by the legislative bodies.

5.1. Court judgment

The European Commission has notified Samsung with Statement of Objections (a formal step in Commission investigations by which it informs the parties concerned, writing the objections raised against them and to which they can reply requesting an oral hearing to present comments) and a Preliminary View for an abuse of dominant position, with a misuse on mobile phone Standard Essential Patent, which violates the article 102 of TFEU. As provided in the standard procedure, once Samsung obtained the SEP, it guaranteed a FRAND price distribution for its rivals, the Antitrust Division of European Commission, closely monitored the situation, in order to check if the price asked by Samsung was truly FRAND or not and, unfortunately, it was not the case. Because the observed owner of a patent, that has been declared SEP, required the payment of more than "reasonable and non-discriminatory" fees from implementers of a standard, the firm founded in 1928 in South Korea, was imputed of the misuse of the patent, through the exercising of patent hold-up.

The patent hold-up in question is about SEP regarding the 3G UMTS, that, as explained on the European Telecommunications Standards Institute (ETSI) website, is a key industry standard for mobile and wireless communications that has developed under ITU-R umbrella IMT-2000, on the 2nd generation mobile communication system, solving its capacity limitations, better facing the increasing demand for the support multimedia services that were much wider than voice support services, and better managing higher data rates as well as the request for a worldwide spreading mobile communication system.

With this CDMA technique, multiple users could transmit in the same larger band and in the same decoder, which, using a wide frequency band, made the system inherently resistant to many of the aspects of radio communication which plague narrow band systems, such as bursty noise, multipath reflections, and other interfering transmissions.

The position of the European Commission about the situation was clear and it was made public through the press release made in Brussels, 21 December 2012, with the speech of Commission Vice President in charge of competition policy, Joaquín Almunia, who asserted: "Intellectual property rights are an important cornerstone of the single market. However, such rights should not be misused when they are essential to implement industry standards, which bring huge benefits to businesses and consumers alike. When companies have contributed their patents to an industry standard and have made a commitment to license the patents in return for fair remuneration, then the use of injunctions against willing licensees can be anti-competitive". European Commission clearly considered guilty Samsung, of the violation of the article 102 TFEU, concerning the abuse of dominant position, distorting competition in European mobile device markets in breach of EU competition rules, as written by Damien Geradin, on "Journal of Competition Law & Economics", 9(4), 1125–1145, in the article "The European Commission policy toward the licensing of standard-essential patents: where do we stand?".

In 2011, Samsung started to seek injunctive relief before courts in various the Member States against Apple, based on claimed infringements of certain of its 3G UMTS SEPs, even though the American company has shown to be willing to make an agreement on FRAND condition. Because of that unusual behaviour, the Commission indicated that it would investigate whether Samsung, in seeking injunctive relief in various Member States' courts, against Apple, had failed the promise to honour its irrevocable commitment, given in 1998 to the European Telecommunications Standards Institute (ETSI), to license any standard essential patents relating to European mobile telephony standards on fair, reasonable and non-discriminatory (FRAND) terms, and as well as such behaviour amounted to an abuse of a dominant position, which is prohibited by Article 102 TFEU, because, as usual in these cases, Apple, as any other player in the sector, had sunk costs in developing and manufacturing its products to be able to sustain the new technological standards 3G UMTS, giving as certain that Samsung would have asked a FRAND cost to exploit its patent and the risk was that due to the abuse of Samsung, the American company could face a tremendous loss.

The circumstances of this case are unusual because, first, Samsung was one of Apple's main component suppliers, in fact the two companies were thus key commercial partners, which probably yet need each other nowadays; second, Apple initiated the "patent battle" between the two firms by filing a complaint in the United States District Court for the Northern District of California in April 2011 asserting that several of Samsung's Android phones and tablets violated the Apple's intellectual property, as such its patents and trademarks concerning user interface, and style. After that Apple's motion, the "patent war" deflagrated with all its power, since Samsung promptly retaliated by suing Apple for infringement of its SEPs in a number of jurisdictions, including some Member State patent courts. Therefore, the Commission investigation against Samsung is part of a wider commercial war between the world's most successful leaders in manufacturing and selling smartphones and tablets; therefore it is clear that, due to the dimensions and the strengths of the disputant, the committee was entering into a very complicated affair.

A few months later, in April 2012, the overall situation in the patent war reached a turning point. In that period, the Commission, besides the Samsung vs Apple litigation, has to manage also another thorny case as Microsoft vs Motorola. This one, even though dealt with different technologies, an IEEE wireless local area network ("WLAN") standard called the "802.11 Standard" and an ITU advanced video coding technology standard called the "H.264 Standard", concerned always SEPs patents and the annex discordance between the parties among which should had to be the FRAND fee. The decisions taken about these litigations would have been important as they would have created a guideline in dealing with cases involving this technological leap.

Finally, the European Commission, opened two formal investigations against Samsung and Motorola to define whether they had abusively exploit certain of their SEPs to distort competition. Following complaints by Apple and Microsoft, the Commission communicated that it would investigated whether, by seeking and enforcing injunctions against Apple's and Microsoft's flagship products, like, for instance, iPhone, iPad, Windows, and Xbox, all elements projected on their rivals' SEPs, Samsung and Motorola did not respect the commitments made about FRAND negotiations and breached Article 102 TFEU.

In this delicate scenario, focusing back on the Samsung investigation, two important evolution occurred in December 2012. The first was that, on December 18, 2012, Samsung communicated its decision to countermand all its ban sales requests against Apple products, on the basis of suspected violations of SEPs, on a wide Europe territory, apparently without

providing any explanations about the underlying logic of this behaviour. It must have been part of a last-minute effort to convince the Commission not to proceed to the next stage of its investigation by sending a Statement of Objections to Samsung, but, unfortunately, it has been done too late because, few days later, on December 21, 2012, and it is the second important evolution, the Commission sent anyway a Statement of Objections to Samsung in which it pointed out its preliminary view that “under the specific circumstances of this case, where a commitment to license SEPs on FRAND terms has been given by Samsung, and where a potential licensee, in this case Apple, has shown itself to be willing to negotiate a FRAND license for the SEPs, then recourse to injunctions harms competition.” The Commission, however, underlined that its Statement of Objections “does not question the availability of injunctive relief for SEP holders outside the specific circumstances present in this case, for example in the case of unwilling licensees.” So, the Commission, did not assert that the injunction instrument should not be available to the SEP holder, its position about the situation was that this instrument must represent an opportunity that can be exploited by the licensor when he faces, during the negotiations, a licensee that is unwilling to take the right of utilise the concession under FRAND terms.

The explanation given was that injunctions are legitim to protect firm’s interests, but if made in dynamics like the Samsung’s ones, they can result anticompetitive because, in face of an adequately willingness to pay for exploiting the license shown by the competitor, the request was exaggeratedly high. An injunction prohibits the recipient to use the object in question, in this case the patent for the technology, this impediment hurts primarily the standardization, secondly the development and the efficiency of the market’s product and lastly the social welfare, because of restricted competition, as explained by the European commission in its own site web. The main conclusion of European Commission was that Samsung could not ask commitment for 5 years against any potential licensee of these SEPs who agrees to accept a specific licensing framework that consists of a mandatory negotiation period of up to 12 months. If the negotiation fails, third party determination of FRAND terms by either a court, if one party chooses, or arbitration if both parties agree

Anyway, it can sound strange that the European Commission has sent the Statement of Objection even if, only few days before, Samsung decided to withdraw the injunctions that were the source of the Commission investigation. The most likely answer that can provide an explanation for this Statement of Objections is that, as also written above, the Commission wanted to establish a precedent allowing it to define the circumstances in which

the injunctions in SEP-related patent litigation are acceptable from a competition law standpoint.

5.2. Samsung's point of view

Other than the point of the European Commission, we want to provide the whole picture, exposing the potential different approaches that could have been taken by Samsung's position, trying to prove wrong the final statement emitted by the European implementation body of policy decisions provided by legislative entities.

5.2.1. *Spulber's considerations*

The first point of view that can be brought, is the one expressed by Daniel F. Spulber, into the "Journal of Competition Law & Economics", Volume 9, Issue 4, December 2013, Pages 777–825, through the article "Innovation Economics: the interplay among technology standards, competitive conduct, and economic performance". The author strongly rejects the traditional vision of the Innovation Economics (IE), frequently associated to the Harvard School of IO, which had as its foundation the paradigm "Standards-Conduct-Performance". This epitome, considers technology standards as exogenous factors, once they are established; it has also been used by the traditional IE, to draw a line of causation to the policy maker, from technology standards to IP owners' competitive conduct, and, in addition, from IP owners' competitive conduct to innovative efficiency. This reasoning culminates with the conclusion that, technology standards, automatically confer determinant market power on owners of SEPs.

His idea is deeply in contrast. First of all, he identifies the Modern IO as a more evolved school of thought because of different reasons, like it reflects the contributions of the Chicago School of antitrust, it gains from the development of game-theoretic approaches to competition and it also reflects advances in econometric analysis of market equilibria. Hence, for these reasons, it is the right model to avoid results subject to endogeneity bias. Secondly, he recognizes that the Modern IO, structures the market with competitive conduct of firms, that, through their entry decisions, dictated by the strategic behaviour, entry barriers and technology, endogenously affect the market structure and the economic performance of the industry.

The fact is that, with these premises, a concentrated market structure does not imply market power, because industries with few firms can be competitive and economically efficient

through the strategic interconnection among them and the potential attractive opportunity of entry for new interested firms. Starting from the basement that market structure and the economic performance are endogenous, Modern IO also considers technology standards as endogenous and determined by, the already cited, competitive conduct. Basically, technology standards, adequate to market competition and industry cooperation, with the help of standards organizations, and their design and commitment of commercialization, are just the mirror of the level of competition existing between the producers that exploit new ideas of product for inventions and final product.

Finally, Spulber concludes that, in his opinion, industries with dominant technological standards can be highly competitive and innovative because technology standards, being endogenous, provide incentives for increased competition, innovation and improve innovative efficiency. Moreover, he stresses that, under his point of view, patents are fundamental to the creation of markets for inventions, forasmuch when they are present, competition among inventors and producers increase encouragement to invent and to innovate. However, he thinks that patents as such, do not invest their owners of market power since actual and future competition in innovation concern substitutes and complements. He finally concludes two main points, first, contrary to the traditional IE suggestions, SEPs do not nor confer market power on their owners, because technology standards and competition are endogenous, jointly determined, and neither be used to foreclose the entry of new competitors. Second, the modern IE approach highlights that public policy recommendations, founded on the old “Standards-Conduct-Performance” paradigm, are the object of conceptual errors, which it led to a proliferation of unsupported concerns that technology standards have harmful economic effects on competition and innovation, suggesting that there is not much economic basis that deals with elements as patent holdup and royalty stacking.

5.2.2. Galetovic and Haber’s considerations

The second authoritative element that can be brought to defend Samsung position is the article of Alexander Galetovic and Stephen Haber, into “Journal of Competition Law & Economics”, Volume 13, Issue 1, March 2017, Pages 1–44, through the article “The fallacies of patent-holdup theory”. The two authors, criticize the way in which the patent hold-up system has been constructed through the years, accusing that, having been built upon structural fallacies, it has incorrectly driven the direction and the modality of antitrust surveys in the last two decades.

Starting from early 2000, the economists and antitrust academics, concentrated their attention in the tentative to answer to an important question: does a decentralized system of technology development, in which complex, interoperable information technology (IT) products rely on standard essential patents, owned by many firms, allow SEP owners to hold-up manufacturers, hence suffocating innovation and aching consumers in the form of higher prices underpinned with lower-quality products?

The answer that has been generally accepted, has been theorized as “patent hold-up theory”, and based its consistency on five hierarchical statements. The first is that patent owners, can systematically overcharge licensee manufacturers to their patents through the mechanism of holdup that consists in the opportunistic appropriation of rents of a downstream firm, granting a net profit in the short run, the second, arguments that, when there is a plurality of patent holders, each practicing the action just described in the first point, the hold-up on a downstream firm, cumulative patent royalty rates become disproportionately high. Such a phenomenon of accumulation of patent hold-up, as we have already disserted pages before, is defined as “royalty stacking.” The third point states that the hold-up problem is exacerbated when patented technologies are included in the industry standards necessary to make IT products interoperable and compatible; the fourth affirms that patent hold-up, royalty stacking, and the inclusion of patented technologies in industry standards, are throttling the innovation in general but particularly heavily in SEP-intensive IT products; lastly the fifth, suggests a government active intervein in situations like those because, a lazy attitude towards the above-cited problematics would lead the market to leave on its own, bringing it to the completely fail.

This worried approach has been widely shared and appreciated by numerous scholars over the years. The most respectable and known, among them, probably may be identified in the person of Carl Shapiro, who in various occasions has expressed his opinion on the matter, like when he wrote “The holdup problem is worst in industries where hundreds if not thousands of patents, some already issued, others pending, can potentially read on a given product. In these industries, the danger that a manufacturer will step on a land mine is all too real. The result will be that some companies avoid the mine field altogether, that is, refrain from introducing certain products for fear of holdup” or “Failure to prevent Patent Holdup relating to tomorrow's information technology and communications standards is likely to cause significant social welfare loss in the years ahead. If new and more effective private

solutions relating to standard setting do not emerge to promote innovation and protect consumers, antitrust enforcement is one of the only remaining remedies that seems feasible”.

However, Galetovic and Haber identify three main fallacies in the structure of patent hold-up theory that undermine their consequential conclusions. Their analysis starts with the demolition of the two main pillars of the patent hold-up theory, which are conflated to each other: hold-up and market power. What they underline, is that these two concepts are two different, mutually inconsistent, economic mechanisms, because hold-up assures a short-run revenue that is not re-invested in the market once its capital wears out, creating so, a not long-run equilibrium, while, the market power, is a long-run equilibrium, inasmuch the downstream firms will cover their long-run costs and continue to reinvest as their capital equipment wears out. This inconsistency opens the doors to three fallacies. The first is that becomes possible to concomitantly assert that patent hold-up is a variant of the hold-up, as it is meant in mainstream economics, and delineate it in ways, that are not consistent with the meaning of hold-up generically understood in mainstream economics. This is the logical consequence of that patent hold-up ignores fundamental assumptions of the standard theory, transforming necessary conditions, into sufficient conditions for a hold-up. The implications are fundamental because, in the established theory, firms, working together, will make structural, contractual, and behavioural adaptations in order to ward off hold-up, consequently sustaining trade and investment in equilibrium, but in patent hold-up theory, by contrast, firms cannot adapt and solve the problem wrought by an opportunistic renegotiation of a contract, since the game begins after the completion of R&D and manufacturers invest. It is evident that corrections to prevent hold-up are ruled out by construction, and market failure is inevitable.

The second fallacy is that patent hold-up theory claims that the same manufacturing firms can be held up many times over, creating the phenomenon of royalties stacking. Anyway, in reality, hold-up cannot be exercised many times over to the same firm, the difference between its revenues and its short-run costs, known as quasi-rents, can be derived by a firm only once, because any trial to extract more revenues, would cause the firm to shut down. The true nature of royalty stacking, by contrast, is about the exercise of market power by a variety of input suppliers to the respective downstream firms, but, even if this multiplicity of input suppliers might be an inefficient organization of a market, it can be a long-run equilibrium, a characteristic that does not belong to hold-up.

Lastly, the third fallacy, is that patented technologies, that constitute an industry standard, add little or no value to the markets that they contribute to create. Here, arise two problems with this fallacy, first theoretical and the second empirical. On one hand, the theoretical problem is, as expressed by the Nobel Prize winner Kenneth Arrow in 1962, that when an innovation is radical, which completely outperforms the set of all alternatives in the market, a profit-maximizing monopoly will cost less than the technology's incremental value, on the other hand, the empirical problem is that the sole goal of standard development organizations in IT industries is to make large technological jumps at intensive rhythms, such as manufacturers may produce superior products that consumers will embrace wholeheartedly, incrementing the revenues of all the industry shareholders, which are not businesses concerning small incremental improvements, they are changes that lead drastic innovations.

The final intention of Galetovic and Haber, was neither to elaborate an alternative theory nor to assess whether there could be progress in the contracting environment in SEP-intensive IT industries. Notwithstanding their intention was not to provide a new entire theory, they have clear in mind which should be the pillars on which this above-mentioned new philosophy should be built on. That was mostly ignored in the patent hold-up literature and they should be: first, R&D by technology developers and the setting of industry standards by manufacturers, technology developers, and other stakeholders in SEP-intensive, IT products occurs at the same time and in a prolonged way; second, the development and licensing of technology is characterized by large sunk costs; third, technology developers, manufacturers, and other shareholders play a repeated game in which the technology developers gain reputational rents for being reliable long-run partners of the just cited manufacturers and other stakeholders; fourth, technology developers, manufacturers, and other stakeholders compete with alternative technologies and products. This new theory, would explain how repeated play among technology developers, manufacturers, and other stakeholders, create a set of self-enforcing, equilibrium incentives, in which output raise, quality improves, prices decrease, profit margins attract new entrants and boost R&D, patent holders charge royalties well below those predicted by monopoly theory, and consumer welfare increases over time.

Their basic idea was that every participant in a market, even those ones which are prosperous, can indicate to particular features, of their working environment, that they would like to make it different in some ways. So, they do not take positions on whether

injunctions should be granted to SEP holders or whether any particular SDO might reform its practices, instead, their goal, was to assert and promoting a more essential point, which was that any set of policies or reforms, whose purpose is to improve a contracting environment, should not be based on patent hold-up theory because it bases itself on the fact that the SEP's owner has "opportunistic surprising position", while such assumption, in a coordinated, connected and standardised market cannot be credible and so, as long the surprise cannot exists neither the patent hold-up could.

5.2.3. Reversal hold-up theory

The last consideration that can be done by Samsung, in order to defend its own position, is stressing the fact that it was not him abusing of its dominant position over its rivalry, asking a too high charges for the licence of using its SEP, because it was linearly proportional to the huge costs in R&D and innovation. In its opinion the only party to behave cunningly was Apple, that, behaving as the innocent part and accusing Samsung of abuse of dominant position, has applied a reversal hold-up towards him, gaining, after the European Commission judgement, a fee rate that was well below the FRAND level.

6. Conclusion

So, in order to sum up the concepts treated during the narration, we have already attached an explanatory scheme at page 30, just before the dissertation about the Samsung's case. It shows graphically the path that we have followed during the discussion, starting from the concept of knowledge, highlighting its nature of common good, and stressing the fact that being as such, no one would be willing to invest in order to find new knowledges, in absolute terms, it would be a completely disaster for the development of the society. Fortunately, here comes the help of the patent, an instrument that allow the privatization of the knowledge, solving the issue and conferring a competitive advantage to the innovator, creating the concept of competition in markets and incentivizing the players to improve themselves, having in mind the objective of reaching that privileged position. Furthermore of competition, the patent sets the standard in that sector, an important tool that simplifies the decision making about which technologies investing on and giving an idea to all the willing entering people of how expensive would be having the minimum requisite to stay in the game.

Moreover of bringing advantages, patents can be used to strongly making worse off the society, through the patent misuse which damage the efficiency of the allocation of the resources, concentrating the power in the hands of few persons, and allowing them to hurt consumers leaving them the ability to decreasing the number of output and, at the same time, increasing the prices. We have analysed three main types of theme: patent pools, tying and patent hold-up, underlying their economical basements and describing their negative effects on the society, through some examples as Canon example, or Hartford-empire example or Samsung example. We have already underlined that, generally, the antitrust cases are a nice mix of economy and jurisprudence and because of their components their interpretation depends both on empirical economic data and on point of view, so that in certain cases governments enhance life quality, conceding the application of procedures that are banned in all the other cases, like the Finnish one. In order to properly describe Samsung case, we have first explained the concepts of SEP, describing how and when a patent can be considered a SEP, and then we have moved to FRAND commitments, bringing evidences on how the concepts of “fair” and “reasonable” are expressed in the economy. After these excursuses, we have focused on the antitrust case concerning the South Korean multinational, describing the outcome of the judgement and providing theories that could manifest Samsung’s point of view.

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