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Abstract

Recently, a variety of organisations, including car and consumer electronics manufacturers, have applied so called IP Pledges. They facilitate access to Intellectual Property Rights (IPRs) for a large group of third parties through a reasonable price or, in some cases, even entirely free of charge. Despite growing research to better understand IP Pledges, its underlying terminology remains contradictory. With this paper we contribute to building an established ontology of IP Pledges through proposing a definition and a taxonomy to distinguish different types of IP Pledges. Applying an inductive research approach, we analyse 59 pledges through a secondary data analysis. Based on the analysis, we propose a three-dimensional framework that can be used to distinguish eight types of IP Pledges. Extending this framework with examples from the literature we then propose an IP licensing taxonomy that can be used to distinguish IP licensing-strategies, including patent pools, cross-licenses, and trade secrets. Finally, we use this IP Licensing Framework to illustrate the paths IP owners take as they change their licensing strategies over time.

Key words:

Intellectual Property, ip pledge, open ip, patent pool, patent troll, cross-license, exclusive license, trade secret, licensing, taxonomy, strategy

1. Introduction

Firms dealing with Intellectual Property (IP) have never failed to challenge existing theories that aim to explain why and how companies use Intellectual Property Rights (IPRs). For instance, the consideration of the *revenue effect* and the *profit dissipation effect* introduced by Arora and Fosfuri (2003) cannot explain why firms like Tesla Motors give away their patents for free (i. e. without demanding royalty payments). While these effects and further theories play an important role in the classic licensing literature, the increasingly complex business environment and its novel licensing-approaches require some adaptation and extension of existing research. Especially the rise of open innovation and open source software caused some rethinking of long-established aspects within an organisation, including their attitude towards IP strategies (Chesbrough 2006; Hippel and Krogh 2003; Lerner and Tirole 2002). Subsequent, the announcement made by Tesla in 2014 triggered an ongoing debate inside and outside the academic world and has often been coined an *Open IP Strategy* or *IP Pledge*. While Tesla's IP Pledge might be the most popular one, it is by no means the only one. A less known example for freely available IPRs is the bundle of patents and trademarks relating to the QR Code. Even though such IP Pledges become increasingly frequent, they are far from new (Burnett 2011; Contreras 2018). In sum, the rise of IP Pledges, alongside with the increase of other IP licensing approaches such as *patent pools*, requires some rethinking of current IP-licensing theories and definitions.

This demand for more research has been recognized by many scholars, some of which produced seminal works in the area of IP Pledges (see for example Contreras and Jacob (2017)). The relatively rapid and simultaneous research, however, is followed by ambiguity: Academic scholars and industry professionals alike utilize terms, such as IP Pledges and Open IP, in inconsistent ways. For some, only IPRs that are entirely free of charge and available to the unrestricted public constitute an IP Pledge. Others include the access to IPRs on reduced licensing-fees available only to a certain community in their definition. This inconsistency hinders the comparison of academic work and impedes the communication between IP professionals.

The paper addresses this problem by first proposing inductively derived definitions of IP Pledges and Open IP; second, by proposing a taxonomy of IP Pledges consisting of eight mutually exclusive types; third, by proposing an IP licensing taxonomy that puts IP Pledges into perspective to other common licensing types, such as patent pools and cross-licenses. Both taxonomies are based on secondary sources: The taxonomy of IP Pledges is being inductively derived from publicly available IP licensing statements, whereas the IP licensing taxonomy constitutes an extension thereof and is validated using case examples. With these taxonomies, we aim to facilitate the distinction between different types of IP Pledges and other IP licensing types by positioning them in relation to each other, making it possible to recognize differences as well as similarities. Hence, we contribute to the ontology of IP licensing theory.

The paper is structured as follows: Section 2 briefly summarises the description of IP Pledges in the literature and contrasts existing definitions against each other. Section 3 describes the data collection and qualitative coding process and lays the groundwork for the taxonomy development. Subsequently, in section 4 we elaborate a definition for IP Pledges and Open IP and describe the IP Pledge taxonomy and the IP licensing taxonomy. Section 5 discusses the results and specifically focusses on changing licensing-approaches of case examples within the context of the IP licensing taxonomy. Lastly, section 6 concludes by focussing on contributions, limitations and suggestions for future research.

2. Theoretical background

IP Pledges are a phenomenon that gained significant traction over the last couple of years. As Contreras (2017) states, despite major importance of IP Pledges in both, the legal and economics literature, its formal study did not begin until 2012. However, these strategies are not new. Burnett (2011) provides examples of organisations that applied what he calls '*Forfeiture actions*', dating back to the 1940s. These actions inherit essential similarities to what we call IP Pledges, including the reasonable price for the respective IPRs and its broad availability. Despite this early occurrence of IP Pledges in the business environment, the focus on this phenomenon in the literature remained scarce. Allen (1983) was one of the first scholars to specifically investigate the free exchange of knowledge between firms. While not particularly mentioning the terms IP Pledge or Open IP, Allen describes the '*free exchange of information about new techniques and plant designs among firms*' as a requirement for collective invention (Allen 1983, p. 2). 20 years later, Harhoff, Henkel, and Hippel (2003) follow up on this idea by defining '*the free revealing of information by a possessor as the granting of access to all interested agents without imposition of any direct payment*' (Harhoff, Henkel, and Hippel 2003, p. 1753).

After these early works, an increasing number of scholars started paying attention to IP Pledges. The modern research of IP Pledges can be broadly divided into two '*camps*', according to the definition respective scholars use: On the one hand, some authors define IP Pledges strictly as the access to IPRs without any monetary compensation. For example, Ziegler, Gassmann, and Friesike (2014) state that '*Patent release or give away for free means that in contrast to classic licensing and cross-licensing agreements, there is no contractual definition of compensation from the receiving end to the original patent holder*'. Similar definitions are provided by Raasch, Herstatt, and Balka (2009), Schultz and Urban (2012), Alexy, George, and Salter (2013), Asay et al. (2015)¹ and Sundaresan, Jena, and Nerkar (2017).

¹ Asay et al. (2015) mention monetary compensation in the context of FRAND, which we understand as being not included into '*patent pledging*' as the authors define it.

On the other hand, some scholars widen their definition of IP Pledges by including the access to IPRs on reasonable royalty-rates. For instance, Chander and Sunder (2004) broaden their definition of a *Public Domain* by adding the option to demand a *nominal fee* rather than no monetary compensation at all. This idea is also supported by, Contreras (2015), Contreras and Jacob (2017) and Contreras, Hall, and Helmers (2018). Chesbrough (2003) promotes this definition specifically in the context of Open Innovation.

So far, Contreras and Jacob (2017) provide the most detailed classification of IP Pledges. They distinguish between the price and its underlying calculation third parties have to pay to access the respective IPRs and describe three broad categories: *Primary Accessibility Commitments*, *Secondary Royalty Commitments* and *Non-royalty Commitments* of IP owners. While this empirically derived categorization is, to our knowledge, the first transparent distinction of IP Pledges, it is also entirely price-focused. Other characteristics, such as who is entitled to use the IPRs and on what conditions, have been left out.

Table 1 contradicts definitions of IP Pledges described in the literature. It is important to note, however, that not all scholars use the term IP Pledge. In order to retain validity, we searched for the content of definitions rather than the terminology itself.

Table 1: Existing definitions related to IP Pledges or Open IP.

Definitions including monetary compensation	Definitions excluding monetary compensation
<p><i>'Resources for which legal rights to access and use for free (or for nominal sums) are held broadly.'</i></p> <p>Chander and Sunder (2004, p. 1338)</p>	<p><i>'Patent release or give away for free means that in contrast to classic licensing and cross-licensing agreements, there is no contractual definition of compensation from the receiving end to the original patent holder'</i></p> <p>Ziegler, Gassmann and Friesike (2014, p. 19)</p>
<p><i>'Patent pledges are [public] commitments voluntarily made by patent holders to limit the enforcement or other exploitation of their patents.'</i></p> <p>Contreras (2015, p. 787)</p>	<p><i>'OSI [Open Source Innovation] is characterised by free revealing of information on a new design with the intention of collaborative development of a single design or a limited number of related designs for market or non-market exploitation.'</i></p> <p>Raasch, Herstatt, and Balka (2009, p. 2)</p>
<p><i>'Pledge commitments fall into three general categories: (1) the primary commitment to license patents, either on royalty-free or FRAND terms, or not to assert patents at all...'</i></p> <p>Contreras and Jacob (2017, p. 13)</p>	<p><i>'Patent pledges are promises by patent holders not to enforce their patents under certain conditions.'</i></p> <p>Schultz and Urban (2012, p. 30)</p>
<p><i>'Thus, under a pledge model, patent assets are retained by their owners, who continue to incur maintenance and other fees, but the offensive use of such patents is significantly curtailed.'</i></p> <p>Contreras, Hall and Helmers (2018, p. 1)</p>	<p><i>'We define selective revealing as the voluntary, purposeful, and irrevocable disclosure of specifically selected resources, usually knowledge based, which the firm could have otherwise kept proprietary, so that they become available to a large share or even all of the general public, including competitors.'</i></p> <p>Alexy, George and Salter (2013, p. 272)</p>
	<p><i>'Parties are increasingly engaging in "patent pledging," a phenomenon where parties voluntarily commit to limit enforcement of their patent rights.'</i></p> <p>Asay et al. (2015, p. 261)</p>
	<p><i>'An open IP strategy is any strategy that allows external inventors and firms the use of technology developed by the focal firm without any financial or cross-licensing obligation.'</i></p> <p>Sundaresan, Jena and Nerkar (2017, no page number given)</p>

To conclude, some scholars support two different definitions of IP Pledges: IP Pledges that demand a (reasonable) fee for the usage and IP Pledges that do not demand any monetary compensation at all. This inconsistency impedes the comparison between different results, leading to a contorted understanding of IP Pledges. While Contreras and Jacob (2017) provide a classification of IP Pledges, it is price-focussed and leaves out further characteristics of IP Pledges.

3. Research approach

3.1 Data collection

As a first challenge we had to decide on which '*IP initiatives*' to be included in this study, hence which could be classified as a pledge as they all have varying characteristics. As a starting point, we used the collection of IP Pledges provided by Jorge Contreras.² The list contains 178 statements in which organisations pledge to apply a range of specific IP practices. However, the entries of this list are organisation-specific, meaning that every organisation that pledges a specific IP practice is counted as one entry (apart from the Open Invention Network). In order to avoid the inclusion of identical pledges, we take a different approach by summarising organisations that take part in the same initiative, counting pledges rather than individual organisations. Hence, our unit of analysis are distinct pledges rather than organisations. To further clean the data, we excluded 13 entries: (1) The facilitation for prior-art searches ('The Clearing House', Microsoft, Yahoo, SAS), (2) the promise to enable/improve the community review of IPRs (IBM), (3) entries with vague formulations (Novell's patent policy from 2014, Allergan's social contract with patients), (5) the promise not to sell IPRs to non-practicing entities (Verizon, Cisco Systems), (6) entries with a lack of information (John Gilmore, '*Patent Licensing Principles*' by Conversant), (7) an entry with the strict restriction to qualified customers (Microsoft's Azure IP Advantage programme), (8) the mere statement of availability of licenses without the specification of standardized or reasonable terms (Microsoft). Furthermore, we added 'The GreenXchange initiative' and all IPRs relating to the QR-Code technology to our unit of analysis, because they specifically address the availability of IPRs on standardized terms.

In total, we collected data for 59 IP Pledges, comprising 118 distinct organisations.^{3,4} The unit of analysis covers 261 pages of DIN-A4 PDF-files. Only in the cases of GreenXchange and the Eco-Patent Commons (both do no longer provide an active website), we rely on empirical data and descriptions provided elsewhere (Awad 2015; Contreras, Hall, and Helmers 2018). The complete list with information about number, type, and area of technology is provided in the appendix.

3.2 Data analysis

We coded the data in two cycles with the software NVivo™. In a first coding cycle, we followed the qualitative analysis approach of conventional content analysis, meaning that we avoided preconceived categories by allowing common themes to emerge directly from the raw data (Hsieh and Shannon

² The collection is publicly available on the website of the American University Washington College of Law under <http://www.pijip.org/non-sdo-patent-commitments>. We sincerely thank Jorge Contreras for his collaboration, specifically for his readiness to share the collected data and provide us with the original statements.

³ The 'Open Invention Network' (OIN) is counted as one firm since its 2700+ members would distort the results significantly. Ericsson, Sony, Sony Ericsson, Nokia, Siemens, Nokia Siemens Network, Xerox and Fuji Xerox are counted separately.

⁴ Some of the collected statements are no longer available on the respective organisation's website. However, PDF-files are available from us upon request.

2005; Kondracki, Wellman, and Amundson 2002). Through initial coding we ensured to stay open to new explorations by limiting the influence of our own subjective judgement (Charmaz 2006; Saldaña 2009). In a second coding cycle, specifically through *Pattern Coding*, we revisited the data in order to reorganise and adapt initial concepts_ (Saldaña 2009). We structured the emerging concepts by summarising them into 1st order codes, 2nd order codes and aggregate dimensions, as described by Gioia et al. (1994) (see Figure 1. See also Corley and Gioia 2004). Specifically, the dimensions *Accessibility*, *Compensation*, and *Conditions* emerge.

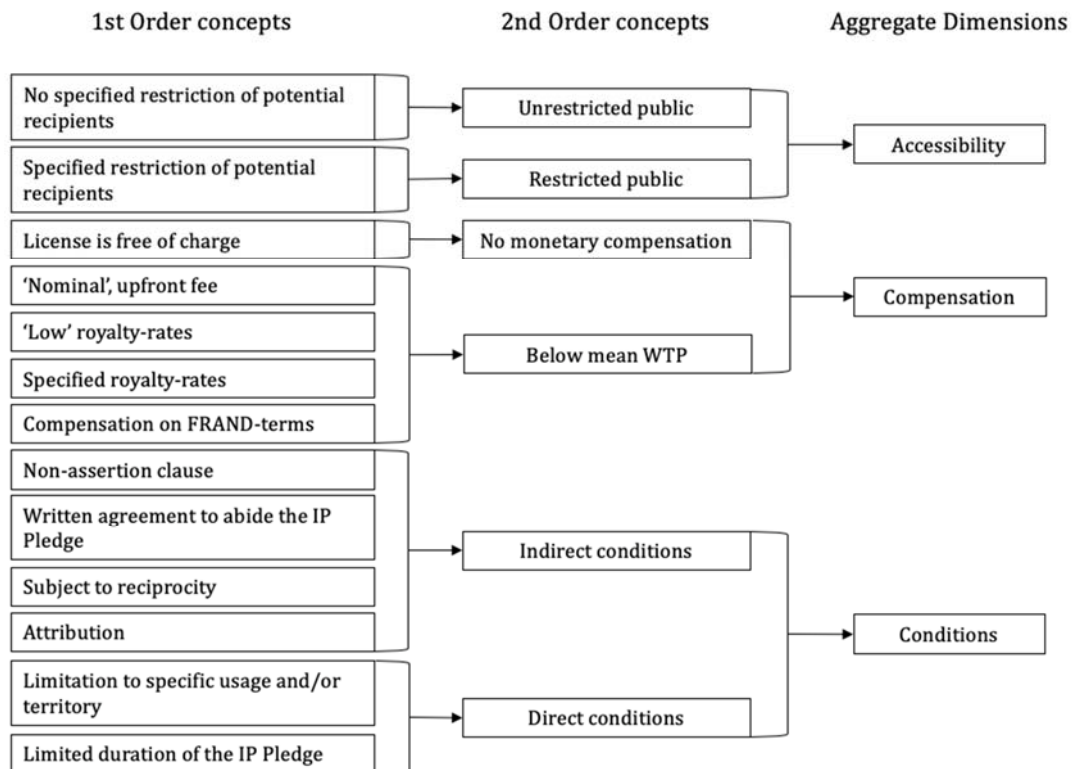


Figure 1: Emerging dimensions from the coding process.

3.3 Taxonomy development

We use an inductive research approach based on secondary data to develop a taxonomy of IP Pledges. The terms *taxonomy* and *typology* are often used interchangeably in the literature (see for example Nickerson, Varshney, and Muntermann 2013). A crucial difference between these terms is that the former consists of mutually exclusive sets while the latter relates to a set of ideal types. Importantly, only taxonomies provide decision rules that allow the classification of different organisations (Doty and Glick 1994). We avoid the common problem of merely summarising existing research in typology-based theory-building by using secondary data that have not yet been analysed (Cornelissen 2017). Furthermore, since our dimensions emerge directly from the collected sample, we are confident that the dimensions provided are representative. The three dimensions fulfil the criteria of *parsimony*, which Nickerson, Varshney, and Muntermann (2013) describe as the manageable number of

dimensions in order to prevent overextension. At the same time, however, our proposed dimensions allow for a clear distinction from each other. Since every collected IP Pledge can be assigned to specific values on every dimension, our taxonomy can be described as being comprehensive (Nickerson, Varshney, and Muntermann 2013). Lastly, the aggregate dimensions are not finite, which is a critical taxonomy attribute relevant for the development of our second taxonomy, the IP licensing taxonomy (Nickerson, Varshney, and Muntermann 2013).

4. Results

4.1 Definition of IP Pledges and Open IP

We develop a definition of IP Pledges that consists of elements that, to our understanding, are essential to the collected sample and can be consistently applied to all pledges. These elements are namely the three dimensions *Accessibility*, *Compensation* and *Conditions* alongside the fact that we only consider IPRs that are active (meaning the respective IPRs are not lapsed) and pledges that are publicly announced (meaning that in theory, the unrestricted public can access the information). Therefore, we define IP Pledges as follows:

'An IP Pledge is a publicly announced intervention by IP owning entities ('pledgors') to license-out active IPRs to the restricted or unrestricted public free from or bound to certain conditions for a reasonable or no monetary compensation using standardized written or social contracts.'

The term *reasonable* in this context refers to fair, reasonable and non-discriminatory terms (FRAND-terms). We follow the definition of FRAND-terms described by Sidak (2013) and Hausman, Leonard, and Sidak (2007). According to the authors, FRAND-terms can be economically determined by describing a hypothetical scenario of negotiations between the licensor and the licensee. A reasonable royalty rate falls somewhere between the patent holder's minimum willingness to accept and the would-be infringer's maximum willingness to pay (WTP) (Sidak 2013).⁵ Therefore, a reasonable royalty rate is considered **lower** than the maximum willingness to pay by the potential licensee, which is an important characteristic for our second taxonomy, the IP licensing taxonomy described later in this paper. The maximum WTP of a potential licensee can be summarised as the maximum price he is willing to pay for the license for which he assumes to still being better off than without a license (Sidak 2013). It is important to note, however, that the maximum WTP can be averaged among the elements of interest, which results in the **mean WTP**. Many studies apply mathematical models and statistical methods in order to calculate the mean WTP for a specific business area (see for example Buckland et al. 1999; Poe, Welsh, and Champ 1997). This value serves as a directive for a rough estimate of common

⁵ We follow the definition of WTP, or reservation price, provided by Varian (1992) (see also Wang, Venkatesh, and Chatterjee 2007; Miller et al. 2011).

royalty rates in a specific industry. For instance, the average royalty rate in the automotive industry is given as 4.7 % of the sales price, whereas in Pharmaceuticals it is estimated to be 7.0 % (Poltorak and Lerner 2004). While the proposed taxonomies attempt to be general rather than technology-specific, we leave the calculation of mean WTP-values for distinct business-areas aside.

Since the terms *IP Pledges* and *Open IP* are often used interchangeably of each other, we develop a definition for Open IP as well. We propose that Open IP should be seen as one particular type of IP Pledges, where the IP owner announces the availability of certain IPRs free of charge to the unrestricted public. Importantly, the IP owner, still, can specify certain conditions. Therefore, we define Open IP strategies as follows:

'Open IP strategies are an IP Pledge made by IP owning entities ('pledgors') to license-out active IPRs to the unrestricted public free from or bound to certain conditions for no monetary compensation using standardized written or social contracts.'

4.2 Taxonomy of IP Pledges

In order to distinguish different types of IP Pledges, we divide each of the three aggregate dimensions that emerged from the data analysis in two parts, according to our 2nd order concepts. Hence, we propose eight different types of IP Pledges. Subsequently, we define each dimension and the values it can take.

Accessibility is a measure for the potential recipients of the respective IPRs. According to our sample, IP Pledges are either addressed to a large number of third parties or to the public in general. The dimension *Accessibility* can take the values *Restricted Public* or *Unrestricted Public*. Importantly, the value *Restricted Public* is only concerned with the a priori restriction to specified licensees and must not be confused with the dimension *Conditions* described below. An example might clarify this point. Toyota pledges the availability of specified patents only *'to automakers who will produce and sell fuel cell vehicles, as well as to fuel cell parts suppliers and energy companies'*. This IP Pledge restricts the number of potential licensees from the outset. On the other hand, IBM's IP Pledge from January 2005 does not restrict licensees a priori, but the use of their IPRs is subject to a specified condition: *'IBM hereby commits not to assert any of the 500 U.S. patents listed below, as well as all counterparts of these patents issued in other countries, against the development, use or distribution of Open Source Software.'* This distinction is crucial, since in the former example only specified third parties can make use of the IP Pledge (=Restricted Public), while in the latter theoretically anyone, subject to specific conditions, has access to the respective IPRs (=Unrestricted Public).

Compensation refers to the monetary compensation the IP Pledgor demands in exchange for the license. Our sample shows that IP Pledges are either made on what the licensor broadly calls a *reasonable compensation* or entirely *free of charge*. As described above, a reasonable compensation in the literature is considered to be below the mean WTP. Hence, the dimension *Compensation* can take the values *'Below mean WTP'* or *'None'*.

Table 2: Conditions in IP Pledges.

Condition	Example
Non-assertion clause (in 21 out of 59 IP Pledges)	<i>'A party is "acting in good faith" for so long as such party and its related or affiliated companies have not: asserted, helped others assert or had a financial stake in any assertion of (i) any patent or other intellectual property right against Tesla or (ii) any patent right against a third party for its use of technologies relating to electric vehicles or related equipment (...)'</i> Source: Tesla Motors IP Pledge, Status: February 2019
Limitation to specific usage and/or territory (in 19 out of 59 IP Pledges)	<i>'The policy also broadens Microsoft's commitment to provide the academic community with IP under royalty-free terms for noncommercial use.'</i> Source: Microsoft IP Pledge, 12-03-2003
Subject to reciprocity (in 7 out of 59 IP Pledges)	<i>'Qualcomm has had a long standing policy of broadly offering to license its standards essential patents for CDMA-based telecommunications standards on terms and conditions that are fair, reasonable, and free from unfair discrimination (FRAND), subject to reciprocity.'</i> Source: Qualcomm IP Pledge, 2008
Limited duration (in 5 out of 59 IP Pledges)	<i>'Patents related to fuel cell vehicles will be available for royalty-free licenses until the end of 2020.'</i> Source: Toyota IP Pledge, 2015
Attribution (in 3 out of 59 IP Pledges)	<i>'As a condition of the copyright grant, you must include an attribution to the Specification in any derivative work you make based on the Specification.'</i> Source: OWF 0.9 (Copyright grant). Status: February 2019
Written agreement to abide the IP Pledge (in 1 out of 59 IP Pledges)	<i>'Thus, Google will require any person or entity to whom it sells or transfers any of the Pledged Patents to agree, in writing, to abide by the Pledge and to place a similar requirement on any subsequent transferees to do the same.'</i> Source: Google Open Patent Non-assertion pledge. Status: February 2019

Conditions is a measure for any condition that is part of the usage for the respective IPRs. Our unit of analysis shows that 45 out of 59 IP Pledges are subject to explicitly mentioned conditions. The coding process revealed six categories of conditions listed in Table 2 in descending order of frequency. In the IP Pledge taxonomy, we further distinguish the conditions according to the influence they have on the respective IP usage: Specifically, we summarise conditions that restrict the usage in either space or time as **direct conditions**. In our sample, direct conditions are the restriction to a specific field / territory or a time-limitation for the license. In contrast, **indirect conditions** do not affect the IP-usage in either space or time, such as the promise not to assert IPRs against the licensor (non-assertion clause).

Figure 2 shows the proposed taxonomy of IP Pledges. Following, we describe each of the types by providing an example. In this description, we do not particularly add the dimension *Conditions*, since the conditions described in Table 2 can be equally applied to all types of IP Pledges.

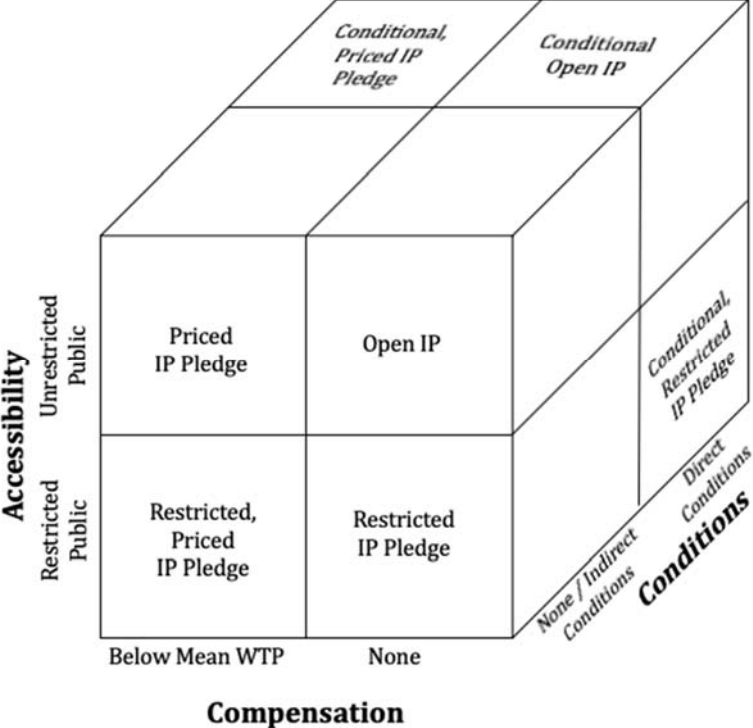


Figure 2: The taxonomy of IP Pledges.

A **Priced IP Pledge** is a pledge made from an IP owning entity by announcing the general availability of licenses. Importantly, the compensation *Below Mean WTP* must be equally available to all interested parties. An example is the IP Pledge from NTT DoCoMo et al. from 2002, in which they pledge the availability of licenses relating to the W-CDMA technology to the unrestricted public for ‘*a cumulative royalty-rate below 5 %*’.

A **Restricted IP Pledge** describes the free availability of licenses for the restricted public. The merger ‘*ThePatentPledge*’⁶ is an example for this type of IP Pledge in which 35 organisations pledge not to assert their software patents against firms that employ less than 25 people. Another example is Toyota’s IP Pledge from 2015, in which they announce the free availability of IPRs relating to the fuel-cell technology to ‘*automakers who will produce and sell fuel cell vehicles, as well as to fuel cell parts suppliers and energy companies who establish and operate fuelling stations, through the initial market introduction period*’.

⁶ www.thepatentpledge.org. Status: February 2019.

An **Open IP Pledge** constitutes the free availability of IPRs to the unrestricted public. Tesla Motors' pledge from 2014, for instance, falls under this category. Even though there has been much criticism of its initial inaccuracy, Tesla now provides an explanation of terms and conditions on its website: '*Tesla irrevocably pledges that it will not initiate a lawsuit against any party for infringing a Tesla Patent through activity relating to electric vehicles or related equipment for so long as such party is acting in good faith*'.⁷ In this case, the compensation is restricted to technologies relating to electric vehicles and is also condition to a non-assertion clause.

Our sample did not include a **Restricted, Priced IP Pledge**. One reason for that might be the intention of IP-owning organisations to, if they decide to license-out IPRs in order to generate revenue-streams through royalty-rates, they do not want to restrict potential licensees.

The distribution of our sample across the eight types of the IP Pledge taxonomy emerges as a result of the coding process. Exemplary, the distinction between an IP Pledge available to the *Unrestricted Public* and an IP Pledge available only to the *Restricted Public* can be easily identified. For instance, the Max Planck Gesellschaft states in its IP Pledge from 2006 not to assert some of its patents against third parties that '*sell or use DNA vectors which induce production of siRNA endogenously*'. In contrast, Tesla's IP Pledge does not restrict licensees in that way: '*Tesla irrevocably pledges that it will not initiate a lawsuit against any party...*'. The same applies consistently to specifications of the compensation and the conditions. In total, 22 IP Pledges of our sample (37%) are classified as a *Conditional Open IP Pledge*, 13 as a *Conditional Priced IP Pledge* (22%), 10 as a *Conditional Restricted IP Pledge* (17%), 8 as a *Priced IP Pledge* (14%), and 3 as an *Open IP Pledge* and *Restricted IP Pledge* (5%) respectively. Our sample did not show IP Pledges that can be classified as a *Conditional Restricted Priced IP Pledge* and *Restricted Priced IP Pledge*. The IP Pledges in our sample can be further allocated to different areas of technologies. 46 out of 59 IP Pledges (78%) relate to the area of Information and Communication Technology (ICT). 6 IP Pledges (10%) can be allocated to technologies that aim to be beneficial for the environment; 4 (7%) can be assigned to biotechnology and genetics. 3 IP Pledges are made by automobile manufacturers, 2 of them (3%) relating to electric vehicles (Tesla Motors and Ford) and 1 (2%) to the fuel-cell technology in general (Toyota). For the allocation of individual IP Pledges to the taxonomy-types and technology-areas, we refer to the table provided in the appendix.

4.3 The IP licensing taxonomy

As Nickerson, Varshney, and Muntermann (2013) point out, an important characteristic of a reliable taxonomy is that its dimensions can be extended. Therefore, in order to depict more IP-licensing approaches, we extend the dimensions *Accessibility* and *Compensation* of the IP Pledge taxonomy. We

⁷ The IP Pledge and further clarifications of its terms are available at www.tesla.com/en_GB/about/legal#patent-pledge. Status: February 2019

then provide purposefully, non-randomly selected examples of organisations described in the academic literature in order to verify these extensions and the resulting taxonomy-types (Eisenhardt 1989).

Specifically, we extend the dimension *Compensation* by adding the values *Mean WTP*, *Above Mean WTP* and *High-Priced*. The dimension now ranges from high-priced to free of charge. The relationship between FRAND-terms and the WTP, which is the maximal price at which a customer would buy a product or service (Varian 1992), of a potential licensee is described by Sidak (2013) and has been summarized above. For specific technology areas, there exist specific values for the mean WTP. Therefore, the IP licensing taxonomy should be used with regards to specified technologies.

The dimension *Accessibility* is being extended by adding the values *Selected Clusters*, *Selected Parties* and *None* and therefore ranges from no potential recipients to the unrestricted public. While the term *Cluster* often refers to the geographical location of firms, we use the term to address a conglomerate of entities defined by the licensor.⁸ Therefore, a cluster in the context of the IP licensing taxonomy is a number that falls somewhere between *Selected Parties* and *Restricted Public*. Loosely speaking, when an organisation specifies a cluster, it abandons some control over the number of the potential recipients by addressing a specific group of organisations that can change without the influence of the licensor. This stays in contrast to the value *Selected Parties*, in which the licensor addresses specifically named organisations, while retaining full control over the number. However, the number of recipients in a cluster is supposed to be smaller than the number referring to the restricted public.

The dimension *Conditions* in this context will not be explicitly described, as it is not being extended and does not change from the IP Pledge taxonomy. Generally, as is the case in the IP Pledge taxonomy, conditions in the IP licensing taxonomy can vary but include territorial / field-of-use restrictions and limited durations. For instance, the Pilkington Group Ltd. licensed out its IPRs on the float glass technology *only* outside of the UK in order to facilitate the commercialization process on the one hand but to maintain control over the technology in their domestic market on the other hand (Al-Aali and Teece 2013).

The IP licensing taxonomy is illustrated in Figure 3 below.

⁸ See for example Martin and Sunley (2003) for an overview of different definitions of the term *cluster*.

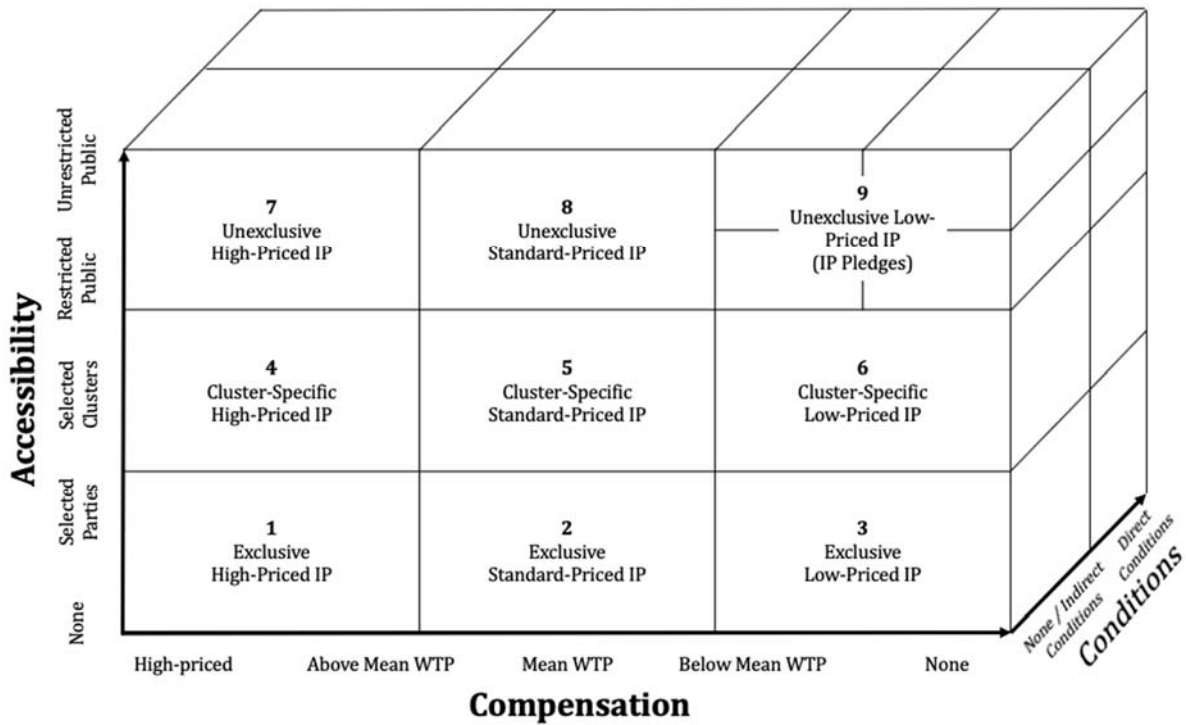


Figure 3: The IP licensing taxonomy.

The taxonomy of IP Pledges with its 8 distinct types proposed in the last section constitutes the upper right cornerstone of the IP licensing taxonomy. Hereinafter, we provide examples for each of the eight remaining types, numbered 1-8, drawing on prior literature.

1 Exclusive High-Priced IP

Exclusive High-Priced IP represents a proprietary approach to an organisation’s IPRs. IP owners that employ this licensing strategy only share their IPRs for a high price to carefully selected parties, if at all. *Exclusive High-Priced IP* includes trade secrets, which can be seen as an own form of IP (Levin et al. 1987) that has been given more attention over the last decades (Cohen, Nelson, and Walsh 2000). A current firm which makes extensive use of trade secrets is the aerospace manufacturer SpaceX. In an interview from 2012, SpaceX’ CEO and CTO Elon Musk said that if the company published patents, Chinese competitors would have easy access to their technology (Harrison, Sullivan, and Davis 2012). Instead, in an industry where the application of reverse engineering is hampered, it might be better to not publish the knowledge through patents.

Other examples for *Exclusive High-Priced IP* include Polaroid and Philips, for instance. Polaroid excluded its competitor Kodak from the instant camera industry in 1981 (Poltorak and Lerner 2004; Al-Aali and Teece 2013) and Philips used patents to maintain a monopoly over a specific shaving technology (Bogers, Bekkers, and Granstrand 2012). The academic literature often refers to this IP licensing type as a *monopoly*. Teece (1986) states that monopolies generally occur when firms seek to

commercialize protected inventions themselves. Hanel (2006) takes a more limiting view by saying that monopolies only occur when IPRs enable control over a specific product or production process.

2 Exclusive Standard-Priced IP

Exclusive Standard-Priced IP, in contrast to *Exclusive High-Priced IP* is characterized by a compensation that ranges closely around the mean WTP. Analogous to type 1, the IP owner allows only few third parties to access the respective IPRs. Exclusive licenses for different territories, which only allow one party (also excluding the licensor) the usage of IPRs in a specific area, are an example for *Exclusive Standard-Priced IP*. For instance, the initial polyester patent was exclusively licensed to Du Pont for exploitation in the U.S., while Imperial Chemical Industries (ICI) held the exclusive license for the rest of the world (Rockett 1990). The former license is not high-priced, since its territorial restriction only allows for the usage in a specific market without the possibility to expand.

3 Exclusive Low-Priced IP

Exclusive Low-Priced IP is accessible only to selected parties at a price that is below the mean WTP. Organisations within this area are selective in terms of who is allowed to use their IPRs, but the respective IPRs are also reasonably priced or entirely free of charge. An example for an organisation that applied this IP licensing type is Hewlett-Packard (HP). With its wide range of products and a large number of competitors and suppliers, many of HP's licensing activities did not primarily aim at revenue generation. Rather, it was its goal to establish long-term business partnerships that build upon low royalty-rates (Grindley and Teece 1997). Furthermore, open innovation collaborations with common IP transfers can be seen as another example (Chesbrough 2006). Lastly, cross-licensing agreements with or without additional royalty-payments, too, fall into this category. For instance, Intel and IBM both entered a cross-licensing covenant in the past, which licenses a major part of the respective firm's IPRs to the other party (Shapiro 2001). It is important to note that cross-licensing agreements can include monetary compensation and are not automatically free of charge.

4 Cluster-Specific High-Priced IP

Cluster-Specific High-Priced IP is characterized by IPRs that are available to a cluster of organisations at a price that is higher than the mean WTP. In this context, HP, again, is worth being cited as an example. As Grindley and Teece (1997) point out, HP developed and owned IPRs that were not necessarily of strategic importance to them but that were important for other organisations of a specific cluster. In this context, HP licensed-out these IPRs in order to generate additional revenues. However, to keep the price high, the license had not been offered to the restricted or unrestricted public, in order to allow potential licensees to keep a competitive advantage. Here, HP focused on the monetization of IPRs rather than the development of long-term business partnerships which have been described in type number 3. Hence, this strategy can be applied when particular valuable IPRs that are of strategic importance to other organizations are concerned (also referred to as *stick-licenses*,

see for example Poltorak and Lerner (2004)). In contrast to an exclusive license, the IP owner licenses its IPRs to a cluster of organizations in order to maximise its revenues. However, to keep the competitive advantage and the price of the license high, not every interested party is granted a license. Another example are organisations active in the technology market. Qualcomm, for instance, faced high competition for producing handsets embodying its Code Division Multiple Accessibility (CDMA) technology. To increase revenues, Qualcomm focused on out-licensing the technology to specified clusters rather than producing the technology itself (Ashish Arora, Fosfuri, and Gambardella 2001).

5 Cluster-Specific Standard-Priced IP

Cluster-Specific Standard-Priced IP refers to IPRs that are accessible to a cluster of third parties at a price that is close to the mean WTP. This type of the IP licensing taxonomy refers to the common licensing approach in which an organisation licenses its IPRs to third parties on a price that follows standard royalty-rates for this specific cluster (Ashish Arora, Fosfuri, and Gambardella 2001). For instance, the Cambridge University spin-off Cambridge Display Technologies (CDT) develops light-emitting plastics and initially tried to manufacture its products on its own (Eppinger 2015). Close to insolvency, CDT changed its business model and licensed-out the technology to entrenched manufacturers on royalty-rates that are considered as standard for this industry. The organisation needed fast revenues and had no core technology that would be essential for other firms. In order to survive, they offered a so-called *carrot-license*, meaning that they tried to incentivise others to buy a license (Poltorak and Lerner 2004).

6 Cluster-Specific Low-Priced IP

Cluster-Specific Low-Priced IP differs from IP Pledges in that the respective IPRs are made available to a specific cluster only. *Closed patent* pools are an example for this type. A closed patent pool allows its members to license patents from other members either for free or at reasonable costs (Maher 2016). For instance, the License on Transfer Network (LOT-Network) offers its members both, free and reasonable licenses, depending on the size of the licensee. LOT was founded by Google, Canon and RedHat and grants its members a license to about 1.2 million IPRs in case those rights are transferred to a patent assertion entity (PAE). Interested parties must join the LOT-Network and pay an annual fee for the membership. This fee depends on the annual revenue of firms and ranges from 0 US-Dollar (for firms that generate less than 25 million US-Dollar annually) to a maximum fee of 20.000 US-Dollar (for firms that generate more than 1 billion US-Dollar annually). Furthermore, a limited number of start-ups receive access to royalty-free licenses of three patents of their choice.⁹ Importantly, only LOT-members can benefit from these IPRs.

⁹ All information about the LOT-Network have been obtained from its official website at <https://lotnet.com> in December 2018.

7 Unexclusive High-Cost IP

Unexclusive High-Cost IP refers to IPRs that are offered to the restricted or unrestricted public for a price that exceeds the mean WTP. The literature suggests that trivial patents which cover multiple constructive technologies can force entire industries into paying high royalty fees, as the example of Amazon's 1-click patent from 1999 shows (Pohlmann and Opitz 2013; Bessen and Meurer 2009; Shapiro 2001). Examples also include non-practicing entities (NPEs, often referred to as *Patent Trolls*). NPEs license-out their IPRs to third parties under the threat of a litigation if the prospective licensee refuses to buy a license. Therefore, the compensation in this context is also influenced by the threat of an injunction (Pohlmann and Opitz 2013; Bessen and Meurer 2009; Diessel 2007). However, as Chesbrough (2006) concludes, NPEs can take many forms and seldom use a consistent business model. In sum, *Unexclusive High-Cost IP* occurs either as a consequence of trivial IPRs or due to IP owners with primarily monetary motives that seek to enforce royalty-payments. Typically, organisations that follow this approach are indifferent about the number of licensees, as long as they pay the price for it.

8 Unexclusive Standard-Priced IP

Unexclusive Standard-Priced IP is characterised by IPRs that are available to the restricted or unrestricted public at a price that is close to the mean WTP. *Open patent pools*, in contrast to closed patent pools described in type number 6 (*Cluster-Specific Low-Priced IP*), constitute an example for this licensing-approach. Open patent pools provide every interested third party with IP-packages at standard royalty rates. This is different from closed patent pools in the sense that an open patent pool does not require third parties to become a member. For instance, the patented technologies relating to the Moving Pictures Expert Group 2 (MPEG 2) and the Digital Versatile Disk (DVD) were being made available to the unrestricted public at standard royalty-rates through open patent pools (Eppinger 2015). There was no restriction of potential licensees. Generally, type number 8 includes IPRs that constitute a standard (so called standard-essential patents or *SEPs*) and must be made available to the unrestricted public on FRAND-terms. An important characteristic is that, in order for licensing models to be termed *Unexclusive Standard-Priced IP*, they must be made available to the restricted or unrestricted public. Compared to type number 6, this unexclusiveness comes at a higher price.

5. Discussion

5.1 Transitions through the IP licensing taxonomy over time

The examples provided in the last section can convey the impression that organisations take a specific licensing-approach and maintain it until the respective IPRs lapse. However, many real-life examples suggest that organisations change their licensing-strategies over time and adopt different approaches. Furthermore, it is common knowledge that organisations diversify their IP licensing-strategies for different technologies. For instance, BP Chemicals licensed its IPRs relating to acetic acid only very selectively (if at all), whereas it tried to license its IPRs in the area of polyethylene aggressively (Arora, Fosfuri, and Gambardella 2001).

We propose that the types within the IP Pledge taxonomy and the IP licensing taxonomy can be distinguished regarding their *openness* and *closedness*. We apply the terms open and closed in order to compare different types with each other. For instance, *Cluster-Specific Low-Priced IP* in the IP licensing taxonomy is more open with regards to the Accessibility and the Compensation than *Exclusive Standard-Priced IP*, for example. In contrast, it is more closed regarding the Accessibility than IP Pledges. Therefore, *openness* and *closedness* should always be defined with regards to the specific dimensions in the taxonomies. Subsequently, we describe some case examples for specific changes in openness of IP licensing.

Transitions from closed to open

Transitions towards more openness in IP licensing constitute common adaptations for organisations over time. For instance, Du Pont held a monopoly for moisture-proof cellophane in the 1930s and allowed only one other company, under a high-priced license, to use the technology. At this point, Du Pont's licensing-approach falls into the category *Exclusive High-Priced IP*. After Dow Chemicals introduced a new packaging material, Du Pont offered licenses to parties that had previously, without success, requested a license for cellophane. The new licenses had been offered on very reasonable terms in order to enable a quick start and deter Dow Chemical's entry into this specific market (Rockett 1990). These new licensing-offers caused a transition of Du Pont's licensing-strategy from *Exclusive High-Priced IP* to *Cluster-Specific Low-Priced IP*. Another example is Union Carbide. A major producer of ethylene glycol, the firm initially kept its own production process for glycol secret (*Exclusive High-Priced IP*). Facing increased competition, Union Carbide started to license-out the process very selectively and caused the shift of their licensing-strategy to *Exclusive Standard-Priced IP* (Fosfuri 2006). It should be noted that organisations do not always change their licensing-strategies voluntarily. AT&T, for instance, used its IPRs in the first 30 years after its foundation in 1885 in a closed manner in order to establish itself in the market. Forced by an antitrust consent decree in 1956, the firm was legally required to (openly) license all of its patents on reasonable royalty-rates far below market value (Grindley and Teece 1997). After the consent decree came to an end, AT&T returned to a more closed licensing approach, albeit not as closed as in its beginnings.

Transitions from open to closed

It is also conceivable that organisations start with an open approach and adopt a more closed strategy over time. A reason for this might be the attempt to initially accelerate diffusion- and adoption-rates of a technology protected and favoured by the licensor. Once the technology is established, the licensor can return to a proprietary strategy and recover competitive advantages. For example, Toyota's IP Pledge for the royalty-free use of thousands of patents relating to fuel cell vehicles is only valid until 2020. Therefore, until 2020, Toyota applies an IP Pledge. After this date, it is possible that the car manufacturer will demand royalty-fees for the usage of its patents, causing a shift to a more closed

type in the IP Licensing framework. Already over 30 years ago, this strategy has been described by Katz and Shapiro (1986) in the context of pricing strategies. The authors specifically describe penetration pricing in the early stages of a new technology to incentivise as many adopters as possible. Once consumers rely on this adopted technology, the organisation can regain profits by demanding higher prices at a later stage. This also explains why firms that apply IP Pledges keep their IPRs alive. If they gave up the protection, they could neither demand licensing-fees nor seek injunction at a later stage. This constitutes an important distinction between IP donations and IP Pledges. Another example for a firm that shifted from open to closed licensing-strategies is Nippon Shokubai with its process for producing acrylic acid in the 1970s. As the company changed its business model from licensing IPRs to the production of acrylic acid, it tightened its attitude by licensing only to markets that it could not supply itself (Fosfuri 2006).

Transitions along single dimensions

It is not surprising that organisations adapt royalty-rates for their IPRs to changing competitive conditions and the altered value of its underlying technology (Grindley and Teece 1997). They can charge different rates for different licensees or, if the license agreement permits it, they can even change royalty-rates for the same licensee.¹⁰ For instance, the US-firm Alliacense forces third parties into licensing agreements under the threat of litigations and hence, qualifies as an NPE. As Pohlmann and Opitz (2013) point out, a particularity of this firm is that it offers early licensees' lower royalty-rates in order to incentivise rapid licenses. The authors state that if an influential company first agrees to the reduced license, others are urged to follow into the same licensing-agreements at a higher price. This licensing strategy constitutes the transition from *Unexclusive Standard-Priced IP* to *Unexclusive High-Cost IP*. Similarly, IP owners can change the number of potential recipients or can introduce or eliminate conditions for the IP-usage.

¹⁰ Grindley and Teece (1997) describe so-called *fixed-period cross-licenses*, which allow the renegotiation of licenses after a certain amount of time.

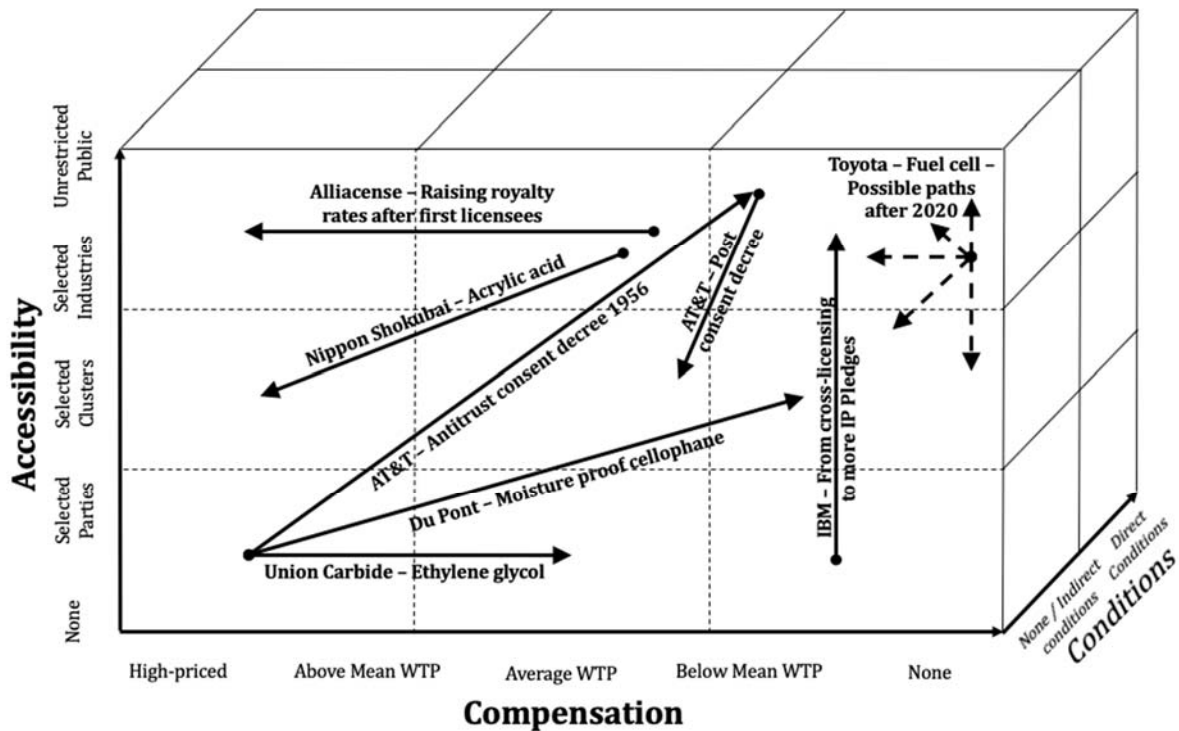


Figure 4: Selected paths through the IP Licensing Framework.¹¹

5.2 Further discussions and future research

The inductive, qualitative research approach applied to the inconsistent raw data revealed notably consistent patterns. Even though some of the collected IP Pledges are merely short statements with a questionable legal validity, they invariably provide information about the price to access the IPRs as well as the potential recipients. Both are essential elements of every valid licensing-contract. In the majority of cases, the pledges are terms to conditions such as the restriction of use to a specified technology area. As mentioned earlier, most IP Pledges relate to the area of ICT. Therefore, we confirm the statement made by Asay et al. (2015) that most IP Pledges occur in information technology. Furthermore, this focus strengthens the connection between IP Pledges, Open Innovation and open source software.¹² However, since the distinction between IP-protection and open source software is vague and also country-specific, future research must address this issue by incorporating open source software into the IP licensing taxonomy.

Regarding the distribution of IP Pledges, it is noteworthy that the combination *restricted – priced* did not occur in our sample. This lack could be a consequence of an organisation’s intention that, when it decides to license out IPRs on standardized terms in return for monetary compensation, it does not want to exclude potential licensees to maximise its revenue streams. While we are confident that both

¹¹ The positions of the arrows are derived from descriptions in the literature. The start and end points are estimated and should be seen as generalized demonstrations rather than exact illustrations.

¹² Da Silva (2017), for example, provides a review of the connection between Open Source Software and Open Innovation.

our taxonomies depict practical strategies that are actually used, our results are not definitive. Specifically, we aim to collect data about further IP Pledges in the future and aim to fill the gap of the *restricted – priced – combination* that our sample for the development of the IP Pledge taxonomy did not include. Future research should also aim towards a more detailed investigation of each individual type of IP Pledges, including the motives behind the respective approach and its fit for specific business models, for example.

From a practical perspective, the development of the IP licensing taxonomy allows us to draw connections between firms that apply different business models. By way of example, while Alliacanse and Nippon Shokubai are two organisations with different approaches, they both transitioned to a more closed licensing-approach. The IP licensing taxonomy is a practical tool that allows for the illustration of multiple licensing-strategies within the direct business environment of organisations. In order to make this illustration more precise and transparent, prospective research should focus on ways to objectively quantify the values of the proposed dimensions.

6. Conclusion

IP Pledges are a phenomenon that has recently gained significant attention in both, the day-to-day businesses of organisations and the academic literature. A review of the existing literature has shown that the term IP Pledges is still missing a clear definition. We believe this is because the consideration of different types of IP Pledges has been, to a large extent, overlooked by industry professionals and academic scholars alike. In general, not just IP Pledges but most IP licensing approaches suffer a lack of coherent definitions, which prohibits a clear distinction between licensing-strategies and the comparison of academic research.

In this paper, we proposed an inductively derived definition of IP Pledges and Open IP, and therefore contribute to the ontology of IP licensing. Furthermore, we proposed a taxonomy of IP Pledges and an IP licensing taxonomy. Both models allow for a better distinction of existing licensing-strategies in today's business environment and provide a coherent terminology. The taxonomy of IP Pledges classifies eight distinct types and allows for a coherent differentiation between licensing-approaches that, until now, have been roughly termed '*IP Pledges*'. By extending two dimensions of the taxonomy of IP Pledges we draw an IP licensing framework, namely the IP licensing taxonomy, that brings together all common IP licensing-strategies that IP owners can choose from. Apart from the facilitated distinction between different approaches, the IP licensing taxonomy enables organisations to illustrate IP licensing-strategies from their surrounding business environment, including their direct competitors.

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Appendix

Table 3: Unit of analysis.

Organisations	Date	Number / type of IPRs	Area of technology	Type of IP Pledge
Blackboard	13.03.2010	10 / patents (3 granted, 7 pending applications)	Internet based support systems	Conditional Open IP
Blockstream	19.07.2016	N/A / patents	Blockstream	Conditional Open IP
Computer Associates, International	09.2005	14 / patents	Information Technology	Conditional Open IP
Eco-Patent Commons	N/A	284 / patents	'Green' technology	Conditional Open IP
Google open patent non-assertion pledge (OPN)	Status: February 2019	202 / patents	Information technology	Conditional Open IP
GreenXchange (research non-exempt option)	N/A	N/A / patents	'Green' technology	Conditional Open IP
GreenXchange (standard plus option / conditions only)	N/A	N/A / patents	'Green' technology	Conditional Open IP
iBiquity (free license)	13.04.2005	N/A / patents	Standards for transmission equipment that implements NRSC-5	Conditional Open IP
IBM	11.01.2005	500+ / patents	Information technology	Conditional Open IP
IBM	13.07.2007	N/A / N/A	Specifically named specifications	Conditional Open IP
IBM	24.10.2005	N/A / patents	Healthcare / Education	Conditional Open IP
Microsoft	11.2005	N/A / patents	Microsoft Office 2003 XML reference schemas	Conditional Open IP
Microsoft	12.09.2006	N/A / patents	Various specifications	Conditional Open IP
Nokia	25.05.2005	N/A / patents	Linux technology	Conditional Open IP
Open Invention Network (OIN)	Status: February 2019	750+ / patents	Linux technology	Conditional Open IP
Open Web Foundation (OWF) 0.9	Status: November 2018	N/A / copyrights	Emerging web technologies	Conditional Open IP
Open Web Foundation (OWF) 1.0	Status: November 2018	N/A / patents	Emerging web technologies	Conditional Open IP
Organisations contributing to QR-Code technology	N/A	9 / patents 1 / trademark	QR-Code technology	Conditional Open IP
RedHat	29.05.2002	N/A / patents	Software	Conditional Open IP
Southern California Edison	2008	1 / patent	Method of communicating between a utility and its customer locations	Conditional Open IP
Sun Microsystems	30.09.2005	N/A / patents	Open document standards	Conditional Open IP
Tesla Motors	June 2014 Status: February 2019	361 / patents	Electric vehicles and related technology	Conditional Open IP
Apple	11.11.2011	N/A / patents	Cellular technology	Conditional Priced IP
Google	08.02.2012	N/A / patents	All existing licenses after the acquisition of Motorola Mobility Holdings, Inc.	Conditional Priced IP
GreenXchange (standard plus option / payment and conditions)	N/A	N/A / patents	'Green' technology	Conditional Priced IP
iBiquity (FRAND-license)	13.04.2005	N/A / patents	Transmission equipment that implements NRSC-5 (no standard)	Conditional Priced IP
Intel	17.02.2018	N/A / patents	'Industry Standards'	Conditional Priced IP
Microsoft	07.2006	N/A / patents	Operating system inventions	Conditional Priced IP
Microsoft	08.02.2012	N/A / patents	Standard technologies	Conditional Priced IP

Organisations	Date	Number / type of IPRs	Area of technology	Type of IP Pledge
Microsoft (Interoperability commitment general provisions)	16.12.2009	N/A / patents	Public standards in Microsoft's relevant software products	Conditional Priced IP
Nokia	08.05.2002	N/A / patents	W-CDMA technology	Conditional Priced IP
Nokia	2010	N/A / patents	Standards around long-term evolution and service architecture evolution	Conditional Priced IP
Qualcomm	08.12.2013	N/A / patents	Standards for CDMA-based telecommunication	Conditional Priced IP
Samsung	27.09.2013	N/A / patents	UMTS standards	Conditional Priced IP
Vodafone	2017	N/A / N/A	Mobile network technologies	Conditional Priced IP
CMAF	2013	1 / patent	Fraud protection method	Conditional Restricted IP
Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	2006	2 / patents	RNA interference mediating small RNA molecules	Conditional Restricted IP
Microsoft	03.12.2003	N/A / patents	Microsoft Office 2003 XML reference schemas	Conditional Restricted IP
Microsoft (Interoperability commitment Subject D.)	16.12.2009	N/A / patents	Interoperability information	Conditional Restricted IP
Microsoft	21.02.2008	N/A / patents	Technology relating to open source compatibility	Conditional Restricted IP
Microsoft (Open Specification / Community Promise)	30.09.2013	N/A / patents	Specifications for protocols that are used by Windows server operating systems to interoperate with Windows client operating systems	Conditional Restricted IP
MIT, Max-Planck-Gesellschaft zur Förderung der Wissenschaften e. V., The Whitehead Institute for Biomedical Research, University of Massachusetts,	2006	11 / patents	RNA sequence-specific mediators of RNA interference	Conditional Restricted IP
Monsanto	2014	N/A / patents	Patented seed and traits	Conditional Restricted IP
Myriad Genetics	2014	N/A / patents	Healthcare	Conditional Restricted IP
Toyota	2015	5680 / patents	Fuel cell stacks, high-pressure hydrogen tanks, fuel cell system software control, hydrogen production and supply	Conditional Restricted IP
Gatespace Telematics, IBM, Nokia, ProSyst Software, Samsung	26.07.2006	N/A / patents	OSGi Service Platform Release 4	Open IP
GreenXchange (standard option)	N/A	N/A / patents	'Green' technology	Open IP
IBM	26.09.2006	100+ / patents	Business-methods	Open IP
Alcatel-Lucent, Ericsson, NEC, NextWave Wireless, Nokia, Nokia Siemens Networks and Sony Ericsson	14.04.2008	N/A / N/A	3GPP Long Term Evolution and Service Architecture Evolution (LTE/SAE)	Priced IP
Ericsson	12.01.2012	N/A / patents	Mainly wireless technology	Priced IP
Ericsson	27.11.2012	N/A / patents	Informationn technology	Priced IP
Ford	28.05.2015	1650 / patents (650 granted, 1000 pending applications)	Electric vehicles and related technologies	Priced IP

Organisations	Date	Number / type of IPRs	Area of technology	Type of IP Pledge
GreenXchange (standard plus option / payment only)	N/A	N/A / patents	'Green' technology	Priced IP
Microsoft	03.12.2003	N/A / patents	Clear Type Technology and FAT File system	Priced IP
Microsoft (Open Source Compatibility)	21.02.2008	N/A / patents	Technologies relating to Microsoft's 'Open Protocols'	Priced IP
NTT DoCoMo, Ericsson, Nokia, Siemens, Fujitsu, Matsushita Communication Industrial (Panasonic), Mitsubishi Electric, NEC and Sony Corporation	06.11.2002	N/A / patents	W-CDMA technology	Priced IP
Microsoft (Free for windows-based application developer)	03.12.2003	N/A / N/A	Technology relating to web standards	Restricted IP
Sun Microsystems	31.01.2005	1600 / patents	Technology relating to Sun OpenSolaris	Restricted IP
www.thepatentpledge.org	Status: November 2018	N/A / patents	Software	Restricted IP