



BRIE Working Paper

2017-3

**What Is the Core Tech of a Company Worth?  
It Depends Who Is Asking!**

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August 2017

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### **Abstract:**

Patents and brand names are only two examples of a broad category of disembodied assets from which firms derive revenue, referred to as “intangible assets.” Intangible assets pose a challenge for traditional financial valuation models for many reasons. Because intangible assets lack physicality, companies can easily transfer them internally from one subsidiary to another and among different countries. Aside from this difficulty in precisely determining their financial value, companies can use intangible assets as a profit-shifting tool in tax-planning schemes. In the course of their daily business, companies do not need to quantify the precise contribution of intangible assets to their business success. However, transfers of intangibles to other tax jurisdictions or to other companies force the question of the financial valuation of intangible assets. Likewise, when companies fail, the damage can be limited if they own intangible assets that can be

sold in the market.

As for the financial valuation of intangible assets, two categories of actors are distinguished by the difference in their approach. The first is market observers, who take action and advise decision-making by market players. Among such market observers are regulators, courts, financial consultants, tax advisors, and policy makers. The second is market players, who take part in transactions involving transfers of intangible assets. Market players buy or license patents from other players. They can also acquire financial exposure to intangible assets indirectly by investing their funds in companies and start-ups that are focused on intellectual property (IP).

The approach to valuation by market observers frequently relies on the cash-flow discount model, a financial model commonly used to value securities traded on a stock exchange. However, market players either ignore the cash-flow discount model or resort to it reluctantly; rather, they tend to rely on a holistic approach. In a holistic approach, patents can be worth more because of their right to exclude competitors than because of the future cash flows they are expected to generate. Strategic competition considerations dominate the market in intangible assets, based on which market players attribute value to these assets. In this approach, one estimate of the value assigned to intangible assets can be derived from the valuation of companies as a whole when investors hold a financial stake in them.

The discounted cash-flow approach favored by market observers seemingly based on a rigorous methodology. The holistic approach, by contrast, depends on the insight of specialists, including their assessment of a firm's corporate strategy as a whole. This approach has the advantage of capturing the consensus expectations of the entire

financial investor community. To illustrate the implications of these different approaches, we contrast their results through the examples of Microsoft's and Facebook's tax-related transfers of intangible assets.

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## Introduction

Intangible assets—such as patents, brands, client lists, and knowhow that are not physically located anywhere—raise a number of concerns when assessed using traditional financial valuation models. Patents are not the only intangible asset category in which companies invest; however, they are often used to illustrate the difficulty of placing a value on intangible assets. The development of innovative assets is characterized by relatively long time horizons and high uncertainty about future payoffs. Over the period of investment, firm insiders have indications of the likely return on the research, development, and commercial efforts. Although not particular to intangible assets, the asymmetry of information between firm insiders and external investors is one obstacle to the existence of an organized market in intangible assets. At the same time, the absence of an organized and transparent market prevents a price comparison that could reliably determine the financial value of intangible assets. Another characteristic invoked to explain the difficulty of valuing intangible assets is their alleged unique nature. Even if a market for intangible assets could be identified, the price of one patent might give no indication as to the price of another. Indeed, from a legal perspective, in order for a patent to be granted, the applicant has to demonstrate an “inventive step”; therefore each patent protected by a legal claim is expected to be unique.

Nevertheless, intangible assets have to be valued in a number of business situations. Their value is estimated for accounting and tax purposes and, more indirectly, when securing financing. From the perspective of fund providers, intangible assets can be the most valuable assets at technological start-up companies.

As an asset class separate from the value of a firm as a whole, intangible assets are valued by consultants and public authorities, such as regulators, tax officials, and the courts in cases of litigation. These actors make decisions and advise on decision making by observant market players, without taking a financial stake themselves. One valuation method that in practice is favored by market observers is an income method that relies on a discounted cash flow (DCF) model. The income method consists of estimating the future net cash flows expected to be generated by the intangible assets. In order to express future cash flows in terms of their present value, a discount rate is used. This discount rate should reflect the risk associated with the investment in intangible assets. The DCF is frequently used in market finance. Intangibles are also valued by market players, who, unlike market observers, disburse funds in return for the right to receive future payments.

Intangible assets can be exchanged in the market among market players as standalone assets: for example, a firm can buy a patent to be used in the products it manufactures. The market for standalone intangible assets has a limited number of players, if a market exists at all.

In the case of patents, in particular, a secondary market (a market in which patents are bought by firms, rather than developed from scratch) has increased in importance in recent years. Players in this market are principally existing firms that deploy intellectual property (IP) in the course of their business. In this context, the licensing conditions and the sale of patent portfolios seem to reflect strategic considerations and market positions of individual patent owners. A category of actors referred to as “patent trolls,” which buy patents to derive profits from litigation or licensing agreements with



operating companies, also participate in this market, but they remain specialized market players, as opposed to being general financial investors.

In contrast to the market in intangible assets sold on a standalone basis, intangible assets are indirectly valued in the market for funding. The players in this market are financial investors. As in the case of players in the market for standalone intangible assets, the value of intangible assets to financial investors is difficult to disentangle from the strategy and the value of a firm as a whole. Financial investors focusing on innovative firms, such as venture capitalists in the Bay Area, assess the value of intangibles because technological start-ups, in particular software start-ups, may not own any material assets other than their IP. When determining the conditions under which venture capitalists provide financing, financial investors implicitly assign a value to the overall stock of intangible assets of the start-ups. This remains true for larger companies: the implicit value of all intangibles of a company could be derived from overall valuation of the firm on the stock exchange—that is, their market capitalization.

Differences between the DCF method and the holistic approach affect the outcome of the valuation exercise. We present a comparative analysis, illustrated by an assessment of the intangible transfers to low-tax jurisdictions by Microsoft in 2005 and Facebook in 2010. In the case of Microsoft, methods based on the market valuation of the company result in materially higher estimates of the value of intangible assets, compared to the outcome accepted by market observers (in this case, the US Internal Revenue Service [IRS]). In the case of Facebook, outcomes of the two methods differ to a smaller degree; nevertheless, the valuation used for tax purposes is at the very low end of the valuation implied by the market value assigned to the company by market players.

## ***1. Intangible assets: the key resource of every firm***

An intangible asset, like all other firm assets, is a resource with expected future economic benefits. Intangible assets are most commonly defined in opposition to tangible assets, associated with more traditional means of production, such as factories, land, offices, stocks of goods, and servers in data centers. Intangible assets are further distinguished from financial assets, such as loans and cash.

In a positive definition, intangible assets include all forms of IP. Patents are textbook examples of intangible assets. However, intellectual rights protected by the law also include copyrights, trademarks, business secrets, and web pages. In terms of relative importance, commercial intangible assets, such as brands, are key in consumer businesses, and their financial value reported by companies often, in aggregate, exceeds the value of intangibles derived from fundamental research and innovation.<sup>1</sup> Client lists and client data more broadly are intangible assets that seem to present the greatest potential growth in value in the Internet of Things economy.

Accounting rules require that, for assets to be reported as intangible on the balance sheet, they have to be identified separately from the firm.<sup>2</sup> This accounting requirement excludes a category for intangible assets, which are acknowledged in economics and in business to represent important value for the firm, such as know-how and processes as well as human capital, a key asset in the case of start-ups, in particular.

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<sup>1</sup> See, for example, the acquisition valuations of Skype and Whatsapp below.

<sup>2</sup> They also require that the firm has a degree of control over the asset; for reference, see International Accounting Standards (IAS) 38, <http://www.ifrs.org/issued-standards/list-of-standards/ias-38-intangible-assets/>.

The valuation of intangible assets can take place in commercial transactions in the market for intangible assets whenever a price is determined between two market participants. Outright sales of intangible assets on a standalone basis occasionally take place. For example, a company may sell a portfolio of patents in negotiations with another company. Another example is the liquidation of a failed business, in which individual assets such as client lists could be sold to strategic buyers. In fact, companies or investors that have no strategic interest in the market of the failed company would find little value in a clients' list or an existing web site. The market for intangible assets is not liquid, and observers agree on this; it is also not a transparent market, as companies are required to disclose information on their intangible asset transactions only in certain cases.

As in the case of transactions between market participants, the valuation of intangible assets by market observers, such as regulators, consultants, and tax officials, is in principle not subject to any public disclosure. To the contrary and to the extent that this valuation is part of the discussions with the tax authorities, it might be covered by a tax secrecy requirement. Examples of the valuation of intangible assets are therefore not easily available to the public. The discussion below covers two cases in which the valuation of intangible assets is offered by tax advisors at two technology firms in the context of tax planning. This information became public in a Senate hearing on tax avoidance in the case of Microsoft and in the course of an ongoing US tax court proceeding in the case of Facebook.

## ***2. Market observers favor an income method that relies on a future discounted cash flow (DCF)***

### **Systemic use of the DCF**

The valuation of intangible assets by market observers, as opposed to direct market participants, frequently relies in practice on the income approach. This is acknowledged and explained in testimony before the Senate by William Wilkins, representing the IRS, in a 2012 hearing on tax avoidance schemes, citing Microsoft as one example:<sup>3</sup>

When the rights of a business' core intangibles are shifted off- shore, enforcement of the arm's-length standard is challenging for two basic reasons. First, transfers of a company's core intangibles outside of a corporate group rarely occur in the market. So comparable transactions are difficult, if not impossible to find. So the IRS has had to resort to other valuation methods which are often referred to as "income-based methods," and these are fairly common valuation methods.

Under these types of methods, the IRS typically has to conduct an ex ante discounted cash flow analysis. Now, this means that we are required to evaluate the projections of the anticipated cash flows the taxpayer used in setting its intercompany price. Then we must further evaluate how the taxpayer discounted those projected cash flows, depending upon the risk associated with earning those cash flows.

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<sup>3</sup> Hearing before the Permanent Subcommittee on Investigations of the Committee on Homeland Security and Governmental Affairs of the United States Senate, 112th Congress, 2nd sess., September 20, 2012. Summarized in [https://www.hsgac.senate.gov/subcommittees/investigations/media/subcommittee-hearing-to-examine\\_billions-of-dollars-in-us-tax-avoidance-by-multinational-corporations-/](https://www.hsgac.senate.gov/subcommittees/investigations/media/subcommittee-hearing-to-examine_billions-of-dollars-in-us-tax-avoidance-by-multinational-corporations-/).

This is where our economists and other valuation experts will come in to assist us, and as you might imagine, evaluating the underlying assumptions made by the taxpayer with respect to its future cash flows without the benefit of any hindsight under the ex ante approach is not an exact science, and it can be a difficult exercise.

The second but related reason that this area is particularly challenging for us is because when you are talking about the business' core intangible property rights, by their very nature these assets are so-called risky assets, if you will. So projecting cash flows from these types of assets and the appropriate discount rate requires an inherently challenging assessment of the underlying risk and how and by which party that risk is borne. And these obviously can be very difficult assessments to make, at least in some cases.

As explained in the extract, a financial valuation of intangible assets using the DCF is established using the following formula:

$$DCF = \sum_{t=0}^n \frac{CF_t}{(1+r)^t}$$

with  $CF$  representing the net cash flow expected in period  $t$ , such as licensing fee income, and  $r$  representing the discount rate. In practice, the period over which cash flow amounts are projected is often limited to five years, and an estimate of the final value of the asset in period 5 is added. This estimate relies on a growth rate assumption combined with the discount rate. Therefore numerous input values are required for the formula to produce an outcome.

The DCF is not the only model used to value intangible assets, but it is the prevalent model, as explained in Wilkins’s testimony. The DCF model can be combined with other methods—for example, acquisition costs used frequently for client data.

Moreover, asset transfers can be only partial and structured in complex ways. One way of transferring intangible assets used primarily for tax purposes to a jurisdiction outside the United States is a “cost-sharing agreement” (CSA). Under such an agreement, the transfer of existing intangibles is compensated for with a “buy-in” payment that requires valuing the underlying assets at the moment of the transfer. The intangible assets covered by the CSA will be further developed jointly by the US parent and the foreign subsidiary, and the latter might limit its participation in the CSA to a financial contribution covering a portion of the associated R&D costs.

All such tax arrangements are private and in principle involve only the IRS and a multinational company. In some instances, the information on the valuation of intangibles has been disclosed. The outcome of the valuation in the context of Facebook’s and Microsoft’s transfers of intangible assets to foreign tax jurisdictions is described based on available information, as follows.

### Examples of outcomes

- Facebook

In the context of the US Tax Court proceeding, a copy of a notice of deficiency issued by the IRS to Facebook for fiscal year 2010 was released by the media. In the notice, the IRS states the following considerations with respect to Facebook:

You transferred intangible property effective September 15, 2010 to Facebook

Ireland Holdings Unlimited. ... You agreed to form of payment in annual contingent amounts for the transferred intangible property. You also determined an approximate net present value (NPV) of \$6.7 billion for the transferred intangible property.

Pursuant to Section 482, we have determined that the NPV of the transferred intangible property is \$13,883,630,000.<sup>4</sup>

It has been reported that the valuation of \$6.7 billion presented by Facebook was established by its tax consultant, Ernst & Young.

The petition by Facebook submitted to the court on October 11, 2016, as relayed in documents released by the media<sup>5</sup>, describes in detail the transfer of intangible assets. In the context of the transaction, Facebook's intangible assets were separated by the company into three categories, two of which were transferred to the firm's Irish subsidiary.

According to Facebook's petition, in the 2010 agreement the company transferred the "Facebook Online Platform" to the Irish subsidiary, including the right to use the company's hardware and software, and in the agreement "Facebook concluded that the net present value of Facebook US [patent] property as of September 15, 2010, was

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<sup>4</sup> Notice of Deficiency dated 26 July 2016, Explanation of Adjustments Tax Year Ending December 31, 2010, in Exhibits of the Petition by Facebook Inc & Subsidiaries to the United States Tax Court of 11 October 2016.

<sup>5</sup> A copy of the Petition by Facebook Inc & Subsidiaries to the United States Tax Court of 11 October 2016, can be for example found under <http://mnetax.com/wp-content/uploads/2016/10/facebookpetition-1.pdf>; further related media reports include: Reuters 'U.S. tax agency investigates Facebook's Ireland asset transfer' of 7 July 2016, <http://www.reuters.com/article/us-facebook-tax-idUSKCN0ZN1IU>; Washington Times of 30 July 2016 'Tax bill could force Facebook to pay IRS billions' <http://www.washingtontimes.com/news/2016/jul/30/tax-bill-could-force-facebook-pay-irs-billions/>.

\$1,685,644,726."<sup>6</sup> A second element that Facebook transferred was the "User Base." According to the petition, "Facebook concluded that the net present value of the User Base in Facebook Ireland's territory as of September 15, 2010, was \$4,078,192,896."<sup>7</sup> Third, Facebook indicated that it had transferred "Marketing Intangibles" to its Irish subsidiary, which included the right to use the Facebook brand. For this third category of intangible, the Irish subsidiary would pay "an annual continent royalty of one percent of Facebook Ireland's revenue."<sup>8</sup>

The transfer of intangibles is structured in a complex way. From the documents released by the media<sup>9</sup>, the IRS's reference to an amount of \$6.7 billion corresponds to the value that would have been assigned by Ernst & Young to the right of non-US territories to use the user base and the online platform transferred to the Irish subsidiary. It could be inferred from a reference to an NPV that the valuation was based on discounting expected future payments, although the reference does not exclude possible different methods that could have been used. This outcome is compared with a market implied valuation in section.<sup>4</sup>

- Microsoft

In the case of Microsoft, the company transferred intangible assets to Puerto Rico and

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<sup>6</sup> Petition by Facebook Inc & Subsidiaries to the United States Tax Court of 11 October 2016, para. 5.a.23.

<sup>7</sup> Petition by Facebook Inc & Subsidiaries to the United States Tax Court of 11 October 2016, para. 5.a.29.

<sup>8</sup> Facebook further states in the petition that the transfer in 2010 followed a first transfer agreement on January 19, 2009, which transferred the right to use the "Facebook System," in particular the right to maintain and monetize the users of Facebook. This first agreement was replaced by the 2010 transfer agreement.

<sup>9</sup> Reuters 'U.S. tax agency investigates Facebook's Ireland asset transfer' of 7 July 2016, <http://www.reuters.com/article/us-facebook-tax-idUSKCN0ZN1IU>.



other foreign subsidiaries in the form of a CSA. The 2012 Senate hearing contains the following information on the conditions of the transfer.

When entities first join a cost share arrangement they must make a “buy-in” payment spread out over several years, to compensate the rights holder for the value of the intellectual property that has already been developed. The approximate buy-ins for each entity were: Microsoft Asia Island Limited (MAIL) \$4 billion; Microsoft Operations Puerto Rico (MOPR) \$17 billion; and Microsoft Ireland Research (MIR) \$7 billion.

In response to the elimination of Section 936, Microsoft established a new Puerto Rico CFC, MOPR, in 2005. A brand new facility was built for MOPR, and the entire staff from the old Puerto Rican facility, as well as some equipment, was transferred to MOPR. The new CFC entered into a cost share agreement with the US group to produce and sell retail products in the North and South America beginning in 2006. A buy-in payment was paid by MOPR to the US group in order to compensate for the existing value of Microsoft’s intellectual property. This buy-in was calculated based on an actual value theory, and paid over 9-10 years based on actual revenues. MOPR also pays 25% of Microsoft’s global R&D annual expenses, a reflection of the percentage of global sales attributable to the Americas region.<sup>10</sup>

This outcome of the valuation established for tax purposes is compared to a market

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<sup>10</sup> Hearing before the Permanent Subcommittee on Investigations of the Committee on Homeland Security and Governmental Affairs of the United States Senate, 112th Congress, 2nd sess., September 20, 2012. Summarized in [https://www.hsgac.senate.gov/subcommittees/investigations/media/subcommittee-hearing-to-examine\\_billions-of-dollars-in-us-tax-avoidance-by-multinational-corporations-/](https://www.hsgac.senate.gov/subcommittees/investigations/media/subcommittee-hearing-to-examine_billions-of-dollars-in-us-tax-avoidance-by-multinational-corporations-/).

implied valuation in section 4. The methodological framework of the NPV approach used by consultants and the tax administration is examined below.

### Methodological framework of the DCF

The background and methodological framework of the DCF could shed light on its use in the valuation of intangible assets and its appropriateness for this use. The concept of the present value of future cash flows was first developed by Fibonacci in his 1202 book *Liber Abaci*. In *Liber Abaci*, present value was obtained by multiplying future payments by a discount factor fraction, and the further in time a payment occurred, the smaller the discount factor and therefore the lower the present value of the payment. This method allowed Fibonacci to compare two sets of payments that add up to nominally the same amount but are paid out at different points in time.

The introduction of the DCF method as a tool to value securities on the stock exchange dates back to the 1930s and was initially publicized by John Burr Williams in 1937 in his book *The Theory of Investment Value*.<sup>11</sup> Williams's book aims to provide an analytical framework for long-term investors, as an alternative to the then-prevalent approach of market participants based on predictions of market sentiment, which Williams refers to as the "market mind." Williams distinguishes market speculators who invest for a short-term profit, which will depend on the market price. He defines an investment value for long-term investors, which is defined as a distinct from the market price. Long-term investors (who hold a stock forever in his theory) are not affected by price fluctuations, only by future dividends. Because long-term investors and short-term speculators trade

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<sup>11</sup> Williams refers to Robert F. Wiese for the investment value of a stock as the present worth of all future dividends, Wiese used this approach in his article "Investing for True Values," *Barron's*, September 8, 1930, to find the "proper price," Williams refers to the "investment value" and not a price.

among themselves, future cash flows affect market prices.

Separate and distinct things not to be confused, as every thoughtful investor knows, are real worth and market price. No buyer considers all securities equally attractive at their present market prices whatever these prices happen to be; ... If he does buy, and buy as an investor, he holds for income; if as a speculator, for profit. But speculators as a class can profit only by trading with investors, to whom they can sell only income; therefore in the end all prices depend on someone's estimate of future income. (*Theory of Investment Value*, chapter 1 page 3)

If the buyer is a speculator ... investment value is only one of several things considered by a speculator. But even a speculator should not confuse salability with cheapness, any more than he should confuse popularity with cheapness. Just as market price determined by marginal opinion is one thing, and investment value determined by future dividends is another, so also salability is one thing and cheapness another. (*Theory of Investment Value*, chapter 5 page 61)

Williams's approach was designed for stocks and bonds, because investors in the market had a long-term approach and influenced prices in the market, so it was reasonable to value stocks at the present value of future cash flows.

A valuation of an intangible asset, such as a patent or a trademark based on DCF, can be viewed by analogy with the valuation of stocks, if the market in intangible assets could be compared to the stock exchange. The DCF method relies on some of the

characteristics of the stock exchange, such as the presence of speculators alongside long-term investors, which influence the price.

However, the market in intangible assets sold on a standalone basis is not a liquid market. As indicated by Williams, the absence of liquidity does not by itself exclude the influence on prices by long-term players who base their decisions on future cash flow considerations. This influence could drive the prices toward the “investment value” of the assets. To analyze the price setting dynamics, the next section describes the players in the market for intangible assets and their approach to financial value.

### ***3. Market players determine a price based on strategic considerations inextricably linked to their core business***

#### **Strategic games on the patent market**

An organized market does not exist in any category of intangible assets. The most commonly exchanged category of intangible assets comprises patents.

Licensing that gives rights to cash flow generated by patents is discussed below, after an analysis of the exchange of patents as property rights in the market. Patents are the results of internal R&D efforts, and after a patent is granted, the possibility of exploiting the underlying innovation becomes a legal and transmissible right. Such rights can be sold on a market, referred to as a secondary market, to third parties that did not contribute to the development of the patent. The secondary market in patents existed in the past in a limited form, however, it has gained importance in recent years. One factor that could explain the emergence of a more active secondary market is the prevalence of consumer products that combine many patents—in particular, mobile phones. Large

transactions on the patents' secondary market were initiated by and took place among established sophisticated players, such as Apple, Microsoft, and Google.

The main market players producing complex hardware devices—such as laptops but mainly mobile phones, which require thousands of patents—are interdependent. The requirements for the business operations of the companies active in such product markets to obtain a license in order to be able to operate, while holding patents that their competitors need, lead patents to be used as strategic assets in the players' competitive positions. Rather than their possible financial benefits in terms of future cash flows, patents are valued by these players for the right to exclude others, granted by a public authority.

In order to avoid lock-out situations, standardization organizations of industry representatives require holders of patents that are essential to comply with a production standard (referred to as “standard essential patents”) to allow access to their technology and accept the licensing of this technology at a reasonable price (fair reasonable and nondiscriminatory [FRAND] terms). This requirement can be enforced in courts.

The ability to enforce the exclusionary rights of a patent holder in court through litigation is specific to legally protected IP, such as patents, trademarks, and copyrights. Operating companies have a choice between negotiating a license for a patent (or buying the patent), opting for an alternative technology, or infringing the patent. When litigation ensues, infringing a patent has a financial consequence determined by courts in the form of damages, and the court can order an injunction. Injunctions are not systemic, and, in their absence, the consequences of litigation might be the same for a

standard essential patent and a nonstandard essential patent. In this context, infringing a patent can be a rational business strategy. Because of the role of an arbiter in litigation, courts influence the value to market players of holding a patent.

Studies and research about the financial value of patents often make reference to the damages awarded in past litigation, and in turn judges refer to the market price of licensing and patents when awarding damages. In reality, in situations in which other patents are needed to sell a product, a standalone patent would generate no cash flows to an investor who does not have the right to use the other patents, except in an offensive litigation strategy.

In fact, along with the emergence of a secondary market in patents, a new category of investors has taken advantage of the negative rights of patents, rather than the positive right to use the underlying innovation. “Nonpracticing entities” (NPEs), also referred to as “patent trolls,” invest in standalone patents, which can be used to litigate with operating companies that use the underlying technology. NPEs can either license their patents or litigate in cases in which companies were not aware of infringing an existing patent. The NPEs have raised policy concerns, and a series of recent developments has damaged their business model. In particular, the Leahy–Smith America Invents Act (AIA) on 2011 established a quick procedure to assess whether an existing patent is valid, allowing defendants in litigation to seek the invalidation of a patent right held against them. NPEs have caused more concern in the United States than Europe possibly because in the United States both parties to litigation have to cover their legal costs, whereas the prevailing practice in Europe is that the losing party covers all costs, which makes NPE offensive litigation strategies potentially more onerous. Further, the 2014

Supreme Court decision *Alice Corp. v. CLS Bank International* indirectly limits the ability to patent software in the United States<sup>12</sup> and therefore also the validity of patenting existing software. This has caused a perceived loss in financial value of existing patent portfolios.

Among established actors, prices for patents are set in strategic negotiations, which focus on considerations of access to markets and market shares. Because of the interdependence between the existing operating entities, whose business requires access to many patents of their competitors, licensing of key technologies often takes the form of a cross-licensing agreement. In such negotiations, the size of the portfolio of the patents of each party will be a factor that confers the players with a relative negotiation advantage or disadvantage. The existence of an established licensing program with a long track record of successfully monetizing the firm's patent portfolio will enhance the firm's negotiating position. Another asset in negotiation is a high ranking of the firm by the Institute of Electrical and Electronics Engineers (IEEE), a professional association that ranks patent portfolios by value.<sup>13</sup> The ranking plays a signaling role as to the comparative strength of the parties in the market. These factors are focused neither on the future cash flows deriving from a specific patent nor on the characteristics of a specific patent, such as the likelihood that the claims included in a patent can withstand litigation.

In some cases, large patenting companies also engage in active patent buying, in anticipation of an increase in the price of patent portfolios. Such an increase could be

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<sup>12</sup> The European Patent Office has never allowed patents on software.

<sup>13</sup> As an illustration, in 2016, the top-ranked companies across all industries were Google, Apple, and Qualcomm.

expected for two main reasons. Chinese technological companies, whether established large players on the domestic market or innovative smaller companies, that look to expand abroad need to have access to licensing agreements with the companies that hold patented rights to the technology used in the respective industry in the United States and Europe. New entrants to these geographic markets, which are now divided mainly among the existing US and European players, cannot negotiate competitive licensing conditions if they cannot offer reciprocal agreements to license technology that the existing players need to operate (or offer another advantage to their negotiation partner). Therefore Chinese companies engage in large deals to acquire patent portfolios; for example, in 2016 Xiaomi acquired a large patent portfolio from Microsoft in a context of a partnership agreement. More existing technology companies, including companies that traditionally operated as original equipment manufacturers (OEMs) for American technology companies, can be expected to build up their own patent portfolios internally, as well as acquiring existing US patents in order to access product and geographic markets that offer higher profit margins than their home market.

A second prospective development in the market for patents is related to young innovative companies, which in their early years of existence prioritize operating and capital expenses over investments in patenting fees, which can be considerable for a start-up.<sup>14</sup> In 2015 Foresight Valuation Group, a consulting firm, estimated that 30% of US unicorns (companies that are valued at more than US\$1 billion but not listed on a

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<sup>14</sup> The cost of a patent filing in the United States for a small company depends on the complexity of the filing, around US\$20,000, and typically requires around two to three rounds of exchanges with the USPTO, each round having around US\$5,000 to US\$15,000 in legal costs.



stock exchange) hold no US patents, and 62% have fewer than 10 patents issued or pending. The unicorn companies represent future demand in the market for patents because the absolute size of their patent portfolio might be a key determinant in the negotiations with other technological companies on licensing and cross-licensing.

As regards prospective supply in the patent market, established companies are under some pressure to “monetize” their patent portfolios, through licensing agreements or even sales. Companies that own large patent portfolios entrust them to a dedicated internal IP department with separate lines of reporting. The profitability of the IP departments within companies deserves some consideration. The management of such companies should in principle acknowledge that the profit and loss (P&L) statements of such IP divisions need not aim to be positive, as the payment of filing and maintenance fees for patents used in the core business is ensured by the IP department. Companies nevertheless seek to optimize their costs, and the sale of unused patents can have a positive financial impact not only because of the positive proceeds from the sale but also because it alleviates the company of paying the periodic maintenance fees.

Some companies have historically accumulated large patent portfolios based on the needs of their core business but are no longer able to maintain their profit margin and market shares. The monetization of their patent portfolios allows them to compensate to some extent for the poorer profitability of the core business. SONY, Panasonic, and Toshiba are among those using such a strategy. The approach to monetization is individual to each player. For example, Adobe representatives say it has no active monetization strategy, but it maintains a large patent portfolio to give the company “options” in the future, as insurance against hostile litigation strategies by other players.

The pharmaceutical and biotechnology sectors stand out in the discussion on patents because one patent in these sectors can represent an entire market in the underlying product and players need not obtain patent rights from competitors. In these circumstances, the DCF is more likely to be used by actual market players when allocating research budgets. Nevertheless, even in this sector, patents can also be valued more for their right to exclude others than for future cash flows. One practice in this sector is patenting “around” a valuable patent so as to protect the market for the related drug after the expiration of the initial valuable patent. For this reason, companies might include in their portfolio patents that do not generate cash flows and might never be used because they overlap other products but still have a strategic value for the firm.

The emergence of an active patent market created opportunities for patent brokers, who intermediate transactions among interested parties. Yet the market is not regulated, and information about the transactions is available on a voluntary and occasional disclosure basis. The Richardson Oliver Law Group (ROL), a patent strategy consulting group, tracks the broker market in patents and more broadly the patent market, including private deals. It estimates that the secondary market in patents could be valued at USD 1.7 billion in 2015 and USD 2.3 billion in 2016 based on the asking price.<sup>15</sup>

Patents are sold in all sectors. Electronics and software account for most patent sales. In terms of value, pharmaceutical patents command high figures even for individual

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<sup>15</sup> These estimates are based on reports by brokers provided to the ROL Group and on monitoring the registered owners of patents, using the USPTO database; the price of patents sold in this case is based on the price for which the patents were previously offered, as there is no obligation to disclose the actual price.

patents, as a patent can represent an entire product market (although multiple patented products are increasingly frequent in the pharmaceutical industry as well). This is to some extent illustrated by correspondingly large infringement fines in this sector. , The largest patent infringement fine to date was imposed in 2016 in the pharmaceutical sector: Gilead was ordered by a federal jury to pay Merck USD 2.54 billion, calculated as 10% royalties on the sales of two drugs, for infringing Merck's patent on them.

Patents are mostly sold in packages, confirming that patent sales occur as part of broader corporate strategies, rather than being valued primarily for each individual underlying innovation. On the brokered patents market tracked by Intellectual Asset Management (IAM) magazine and ROL, in 2015, patent packages (containing more than one patent) accounted for more than 80% of reported brokered patent sales, with an average of 15 patents per package.

The DCF model based on future royalties is not a favored method among brokers in the patent market either. Regarding price advice by patent brokers to their clients, a report on the brokered patent market indicated that "to provide market pricing based valuation—if you know the asking price of an average patent, you can build the model to price a specific patent. Importantly, this avoids having to determine an imputed royalty rate for the valuation."<sup>16</sup>

### Licensing payments

The DCF method relies on discounting future payments to arrive at the present value. License payments are future cash flows of an intangible asset, so the price of the asset

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<sup>16</sup> "The Brokered Patent Market in 2015: Driving off a Cliff or Just a Detour?" *IAM* (January/February 2016).

and the level of the license fees should therefore be two sides of the same coin, for a given discount rate.

However, as described above, future cash flows derived from patents do not seem to be a determining factor in setting the price of the patents in the market. Rather, strategic considerations about market power and the threat of litigation prevail. Cross licensing is necessary in many technology industries characterized by an environment of “co-opetition.” Compared to the market for patents exchanged outright, the licensing market has a long track record.

Some licensing agreements are subject to disclosure obligations by companies, and the disclosed data are aggregated by commercial data providers. The Securities and Exchange Commission (SEC) requires listed companies to disclose their material agreements in Form 8-K. Licensing and franchising are accordingly disclosed by companies. However, the qualification as “material” leaves management some room for discretion and does not result in the systemic disclosure of all licensing contracts.

Professionals in different industries point to numerous factors that affect licensing rates. In the various technology industries characterized by cross licensing, the relative negotiation power of the players and their sophistication are key in determining licensing rates. For example, established players in the cell phone market are considered sophisticated players. Established players with a long track record and a large patent portfolio that take advantage of a licensing program often see greater profit opportunities in licensing negotiations with younger companies in adjacent or new industries, such as drone manufacturing. As in the market for outright patent sales, licensing fees are affected by factors other than the intrinsic value of the underlying

innovation.

Considerations regarding the profitability of the licensee can also be determinants in setting the level of royalties, in particular in industries that require capital investments from the licensee, such as the energy industry. Established licensor companies aim to leave the licensee with an attractive profit margin, in order to ensure that both parties have an interest in developing their partnership further.

- Variety of payment structures in licensing agreements

The complex dynamics of the licensing negotiations translate into a variety of remuneration structures among licensing contracts. A common way of setting royalties is a percentage of sales.<sup>17</sup> Industries in which products combine thousands of patents are characterized by “royalty stacking.” When royalty rates in such industries are negotiated, individual licensing agreements are a proportion of the aggregate royalty payment by the product manufacturer to different market players. One starting point used by negotiators is 1% of sales. However, when negotiations involve several players, agreements with one party can be held as precedents and floors of royalty levels negotiated in subsequent agreements. For this reason, different contract structures can be used to render the substance of the agreement less transparent to other market players. For example, a royalty contract can stipulate a lump sum amount, rather than a royalty expressed as a percentage of sales, even if the lump sum amount was determined in the negotiation based on percentage rate, combined with projected

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<sup>17</sup> Based on data reported on commercial databases, median royalty rates vary slightly among sectors, with a range broadly from 5% to 6% of sales; restoration, semi-conductors, energy sectors tend to have among the lowest royalty rates with a median below 5% and entertainment, broadcasting and software patents tend to be associated with the highest median rates of around 10%.

product sales levels. In the mobile phone market, the market most affected by royalty stacking, the practice has shifted from licensing agreements set as a percentage of sales to dollar-per-unit contracts—for example, 50 cents per unit. This is appreciated by product manufacturers when modeling their cost structure in financial forecasts.

Finally, different license fee structures are favored by different market players. Large established players with excess cash may prefer a lump sum payment (rather than annual or even a single payment for a multiyear licensing period) because it simplifies reporting requirements and budgeting. In fact, for royalties set as a dollar amount per unit or as a percentage of sales, the royalty payment calculation requires periodic reporting on the sales figures to be indirectly exchanged with the licensor. At the other end of the licensee spectrum, cash-strapped start-ups display a preference for royalties set as a percentage of sales, which are therefore also conditional on the success of the product and the start-up itself.

- [Licensing rates in tax-driven transactions](#)

In tax-driven structures, royalties are often structured as residual profits. Although the royalties calculated in this way may represent the vast majority of the company's profits, the reference to a residual profit might incorrectly imply that such royalties comprise a small proportion of profits. Rather, the term "residual" refers to the method of calculating the royalty as equal to all the profit that remains with a company after other costs have been taken into account.

In a residual royalty agreement, a subsidiary of a multinational group would report—in jurisdictions where it does not own IP but uses group IP—a profit based on a fixed

percentage of a performance indicator, often sales or operating expenses. The P&L accounting of the subsidiary contains all the relevant items, such as sales, costs of goods sold, operating expenses, and interest expenses. In order to ensure that the difference between income and expenses is equal to the predetermined level of profit, an intragroup royalty charge is calculated as an adjustment variable, rather than a percentage of sales or a fixed amount. This way of setting a royalty, which is then paid to a subsidiary of the group typically located in a low- or no-tax jurisdiction, can result in large variations of the payment amount from one accounting period to another. Despite the diversity of remuneration structures in the licensing market, IP professionals are not familiar with and do not use this method of structuring a royalty agreement.

- Profitability levels and licensing rates

Studies indicate possible patterns in the royalty levels. In particular, academic research seems to show that royalty rates are adapted to the profitability of the underlying businesses. Profit-sharing analysis is reportedly used by companies when setting royalty levels.

More specifically, academic research helped publicize a “25% rule,”<sup>18</sup> whose use has also been acknowledged, although not systematically endorsed, by the courts in IP litigation. The rule in its initial announcement in 2002 refers to 25% of the operating margin of the licensee.

A number of later studies confirm the rule in different forms as well as a relationship

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<sup>18</sup> R. Goldscheider, J. Jarosz, and C. Mulhern, “Use of the 25 Per Cent Rule in Valuing IP,” *Les Nouvelles* 37 (123) (2002).

between the royalty levels and profitability. For example, regarding publicly reported royalty rates used by the authors, a study of royalties at the industry-based level concluded that "25 percent of gross margin serves as an upper bound for teleport rates, while the 25 percent of EBIT [earnings before interest and taxes] margins provides a lower bound."<sup>19</sup>

Such licensing agreements might cover not only patent contracts but intangibles overall.

### **Increasing relative value of marketing intangibles and client data**

IP professionals point to an increase in the importance of marketing intangibles, such as brand names, which overtake in relative importance the value of the patent portfolios of firms.<sup>20</sup> IP brokers report that transactions in trademarks are not frequent but do occur in the market. Further, given the cost of filing for patents and the subsequent fees, trade secrets that also benefit from legal protection are in some cases an alternative to patents. Also advantageous in terms of financial costs, trade secrets, unlike patents, do not require their owner to disclose information about the invention publicly.

Client data make up an important new category of intangibles. As machine learning is inherently data intensive, the rise of the Internet of Things could spur a market in the exchange of client data. Companies developing big data can have a preference for data collected in-house and invest in their own capacity to collect data. Companies refer to data protection regulations, which do not allow data to emerge as a traded asset

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<sup>19</sup> Jiaqing "Jack" Lu and Jonathan E. Kemmerer, "Profitability and Royalty Rates across Industries: Some Preliminary Evidence" (KPMG and Global Valuation Institute, 2012).

<sup>20</sup> An illustration of this reported shift is mentioned below in the section on allocation of the purchase price to different category of intangibles in the acquisitions by Microsoft and Facebook.



category—in particular, the European General Data Protection Directive (GDPR).

However, IP lawyers who specialize in technology do not seem to recognize the GDPR as a real obstacle in data transfer and processing by large US technology companies and therefore it may not be an obstacle to data transfers to third parties.

Intangible assets that cannot be transferred on a standalone basis can be transferred in the context of company acquisitions, which represent a practical limitation to any regulatory restrictions in this field. Because of this ability of a market player to acquire intangible assets indirectly through a company acquisition, the capital market and the market for funding IP-intensive companies is analyzed as an alternative to the market in intangible assets traded on a standalone basis. This is even more relevant, as some assets, such as organizational knowhow, cannot be transferred on a standalone basis.

#### ***4. Financial investors indirectly determine a market value for intangible assets***

Creditors and capital providers of a corporation have a legal claim on the assets of the company in case of bankruptcy or dissolution and have an indirect claim on the cash flows generated by the assets on a going-concern basis. Therefore the valuation of IP-intensive firms by financial investors can provide information on the value they indirectly assign to the intangible assets.

#### **Venture capitalists**

Start-ups are young companies with simple business models (contrary to established companies, which may have diversified into several business segments) and a simple asset structure, consisting primarily of intangible assets. Such assets might not be

patents or trademarks, as start-ups do not systematically invest in legal protection of their intangibles (as discussed above). Start-ups are funded by specialized investors, such as venture capitalists (VCs) and business angels, through shares and hybrid (convertible) loans. A key factor in VC decisions to fund a start-up is the quality and aptitude of the management team. VCs are capital investors in companies with a relatively high failure risk (high beta) and little or no collateral. In such cases, the application of DCF is not straightforward, as start-ups raise first rounds of funding at a pre-profit stage and occasionally even at a presales stage. In fact, VCs do not systematically use DCF. Key quantitative metrics in the valuation of start-ups are sales and the number of users. Although the multiples at which the companies are valued vary, strategic buyers might invest at multiples above 10 times annual sales. Profits are not systematically considered in valuations. In network industries, sales and the number of users seem to capture the potential market position of the company most appropriately and therefore to evaluate their likelihood of success best. Although debt funding is less common in start-up funding, some investors, such as Western Technology Investment, specialize in debt instruments and co-invest in start-up alongside VC investors. In this context, debt investors have a first-lien claim on the possible proceeds from a liquidation. Therefore debt start-up investors closely consider the value of the assets of start-up companies individually. The value is estimated based on past experience in realizing the assets of failed start-ups. In case of failure, intangible assets, such as client lists, are sold through private deals with companies operating in the same market as the unsuccessful start-up.

The DCF model is not used to value intangible assets. Investors proceed by pattern recognition, rather than by using any formulaic approach in this context. Gross margins

are a reference points when considering the value of IP in licensing transactions, which results in differences in IP values and royalty rates in the hardware and software technology segments.

The market in companies that fund start-ups to some extent could be an alternative to the market in intangible assets sold standalone. This is supported by recent developments in the business models of some NPEs (patent trolls). The establishment of a rapid procedure to invalidate patents under the AIA and recent court decisions broadly unfavorable to NPEs challenge the business model of NPEs, which relies on litigation with operating companies. Some NPEs have announced that they will no longer actively acquire patents, including Intellectual Ventures, a prominent NPE player in the patent market. Another large NPE, WiLAN, announced a new strategy to invest its patents in start-up companies together with a new strategic partner (the company also changed its name). This adaptation of the business model of some NPEs indicates the possibility of a skill transfer from the investors in standalone IP to investors in the capital of IP-intensive start-ups.

### **Aggregate intangible value derived from the stock market valuation**

A second category of financial investors comprises stock market investors in listed companies. The market for capital at publicly traded companies is liquid and is not limited to strategic players and investors with privileged information. Therefore financial valuation models such as DCF can be applied with the fewest methodological concerns. However, this does not mean that DCF is the most appropriate model. The use of DCF by stock markets has been combined with a multiples analysis and relative value approaches, put forward in particular by Benjamin Graham in his book *The Intelligent*

*Investor*.<sup>21</sup> Graham and his well-known follower Warren Buffet advocate the use of ratios of the market value, such as price to earnings and price to sales, to guide investment decisions. A key metric advanced by Graham is the market price of shares compared to the book value of shares (the price-to-book ratio), along with the price-to-earnings-per-share ratio.

When the market value of a firm cannot be attributed to tangible and financial assets, it is attributed by default to intangible assets. The difference between the book value of equity (net accounting assets) and the market valuation is considered a measure of the importance of the intangible assets. For example, in his book *Intangibles: Management, Measurement, and Reporting*, Baruch Lev explains

the mean market-to-book ratio of the Standard and Poor (S&P) 500 among the largest 500 companies in the United States has continuously increased since the early 1980s, reaching the value of ~6.0 in March 2001. This suggests that of every six dollars of market value, only one dollar appears on the balance sheet, while the remaining five dollars represent intangible assets.<sup>22</sup>

In terms of the price-to-book ratio, Graham warns investors against buying the stocks of companies with a ratio above 1.5, acknowledging that higher levels might be justified in a detailed assessment. As reported by Lev, the price-to-book ratios have increased from the levels that prevailed when Graham issued this recommendation, possibly reflecting the increased significance of intangible assets in a firm's business model. However, the

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<sup>21</sup> Harper & Brothers, 1949.

<sup>22</sup> Brookings Institution, 2001, page 8.

median level of the S&P fell from the level reported by Lev following the dot-com bubble and in 2009 fell below 2 during the financial crisis, and it remains below 3.

The market valuation minus the book value of equity<sup>23</sup> is one uncontested measure of the aggregate market value of intangible assets.

Figure 1. Equalities resulting from the definition of intangible assets:

$$\begin{aligned} (1) \text{ Market Capitalisation} &= \text{Net Assets} \\ &= \overbrace{\text{Assets} - \text{Liabilities}} \\ &= \overbrace{\text{Intangible Assets} + \text{Tangible Assets} + \text{Financial Assets}} - \text{Liabilities} \end{aligned}$$

$$(2) \text{ Intangible Assets} = \text{Market Capitalisation} - \text{Tangible Assets} - \text{Financial Assets} + \text{Liabilities}$$

As an illustration, the market value of the intangible assets of Microsoft and Facebook at the moment of their respective transfers to favourable tax jurisdictions is calculated below.

- Microsoft

To illustrate these points, the aggregate market value of the intangible assets of Microsoft when existing assets were transferred to its Puerto Rico entity in 2006 can be calculated, using end-2005 market and book values, as follows.

The market capitalization of Microsoft totaled USD 233,926 million based on the December 31, 2005, closing price, representing the market price of the company's net

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<sup>23</sup> Some intangibles may be reported on the balance sheet, therefore the book value used is the tangible book value.

assets. The total balance-sheet assets of the company were USD 67,257 million.<sup>24</sup> The goodwill<sup>25</sup> reported on the balance sheet was USD 3,553 million and net intangible assets at USD 466 million, and the book value of tangible and financial assets was USD 63,238 million. Liabilities totaled USD 23,049 million. The market value assigned by investors to the aggregate intangible assets of the company at the end of 2005 was USD 193,737 million.

- Facebook

Transfers of intangible assets to favorable tax jurisdictions might take place before the initial public offering (IPO) of a company, as in the case of Facebook. However, beginning with the first round of funding, investors assign a value to the company, which can be used as a reference to divide the indirect value investors assign to the aggregate value of all intangible assets, by analogy to the value implied in the market capitalization. In their valuations, VCs in the Silicon Valley are seen as overvaluing companies in the first rounds of funding, therefore valuations of intangibles derived from VC valuation might be high.

Near the date of the transfer of Facebook's IP to Ireland, the following valuation information on private investment in Facebook pre-IPO was reported: in October 2007 Microsoft invested USD 240 million in Facebook with a valuation of USD 15 billion, in May 2009 Digital Sky Technologies invested USD 200 million in the company with a valuation of USD 10 billion, and in January 2011 Goldman Sachs invested USD 450

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<sup>24</sup> Accounting figures used in this paragraph are in the quarterly report 10-Q MICROSOFT CORP, for the period ending 31 December 2005, <https://www.sec.gov/Archives/edgar/data/789019/000119312506012779/d10q.htm>.

<sup>25</sup> Goodwill comprises the price paid for acquisitions beyond the book value of the acquired companies.

million in Facebook with a valuation of USD 50 billion.

The balance-sheet assets of Facebook on December 31, 2010, totaled USD 2,990 million.<sup>26</sup> Goodwill and intangible assets of USD 96 million were reported on the balance sheet. Liabilities totaled USD 828 million, resulting in net tangible book value of USD 2,066 million. At the end of 2009, the net book value was USD 868 million.

Assuming that the valuation of the company between May 2009 and January 2011 varied between USD 10 billion and USD 50 billion (the values assigned by investors on the respective dates, described above), the value of the aggregate intangible assets would have increased from USD 9,132 million (based on the 2009 book value available in May 2010) to USD 47,934 million (based on the 2010 book value referenced for the January 2011 valuation).

This range of values is very wide, reflecting in part the rapid increase and volatility in the value of successful start-up companies. A value in between valuation points could be interpolated using a key performance indicator relevant for the business, which could be in the case of Facebook the active users or the revenue figures, reported quarterly for this period, which would bring the implied valuation closer to the upper end of the range.<sup>27</sup> However, the valuation by Goldman Sachs postdates the transfer of the assets. If a transfer price for IP were based on the value of intangibles implied in the funding valuation, the transfer terms could contain a corrective mechanism based on the next

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<sup>26</sup> Accounting figures used in this paragraph are in Registration statement S-1/A, Facebook Inc, of 17 May 2012 <https://www.sec.gov/Archives/edgar/data/1326801/000119312512034517/d287954ds1.htm>.

<sup>27</sup> At the end of March and June 2009, Facebook reported 197 million and 242 million active users, respectively. At the end 2010 and March 2011, active users numbered 608 million and 680 million, respectively.

significant round of IPO funding. This mechanism would address the valuation uncertainty inherent to a start-up business.

As described above, the transfer of Facebook's IP to Ireland took place in September 2010 at a valuation of USD 6.7 billion. The implied market value of Facebook intangibles described above might not be directly comparable to the value of the intangibles transferred, in this case to the Irish subsidiary. First, only intangibles relating to non-US markets were transferred.<sup>28</sup> Second, when the broader meaning of intangible assets is considered, including goodwill, not all such intangibles can be transferred. Third, the Facebook transfer was structured in a more complex way, and marketing intangibles are not included in the USD 6.7 billion valuation; the information available about the precise scope and conditions of the transfer is insufficient for conclusive considerations.

The overall valuation of intangible assets implied in the market (or private investor valuation) includes intangible assets that are only valuable for the company as a going concern and cannot be sold in case of a liquidation. Such assets are reported as goodwill, recorded in cases of acquisitions at a price above the net value of assets, while internally generated goodwill is not recorded on the balance sheet. Goodwill captures, in particular, intangibles such as organizational efficiency and the quality of human capital, which is key in the valuation of start-ups. However, these intangibles might not be transferrable to a foreign entity in the same way that a legal title can be transferred. A relatively recent accounting requirement concerning business combination provides information about intangible asset classes separate from goodwill that can be identified

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<sup>28</sup> In 2011 about half the revenues were generated in the United States, for which IP rights have not been transferred to Ireland.



and controlled by the company. This new requirement indicates which portion of the intangible assets can be transferred or off-shored to other entities because it can be identified separately from the overall company's goodwill.

### **Value assigned to identifiable and transferrable intangible assets**

Beginning in 2005, the International Accounting Standards Board (IASB) requires, in acquisitions, that companies attribute the excess price paid for the acquisitions above the net book value of assets to either identifiable intangible assets categories or overall goodwill.<sup>29</sup> The way in which this attribution should be done is not prescribed in detail by the IASB and might include some discretion by management.

The consequence of the attribution is that the portion of the purchase price attributed to individual asset categories will be amortized over subsequent accounting periods, whereas the remaining goodwill will be valued based on an impairment test and will give rise to a charge in future accounting periods only in case of negative business developments. The management has no immediately identifiable interest in attributing the purchase price to one category or another. Companies might have individual preferences in terms of the predictability of their financial statements. However, this assessment does not seem to have any systemic bias.<sup>30</sup> Therefore the attribution of the purchase price to different categories of intangible assets could indicate management's

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<sup>29</sup> International Financial Reporting Standards (IFRS) 3 Business Combinations.  
<http://www.ifrs.org/issued-standards/list-of-standards/ifrs-3-business-combinations/>.

<sup>30</sup> For example, Niclas Hellman, Patric Andersson, and Emelie Fröberg, in their article "The Impact of IFRS Goodwill Reporting on Financial Analysts' Equity Valuation Judgements: Some Experimental Evidence," *Accounting & Finance* 56, no. 1 (March 2016), interview analysts and establish that under pressure they would give higher valuation to a company that attributes a larger portion of the purchase price to goodwill, which seems to indicate that the analysts do not have a preferred view when assessing the situation under no pressure.

best estimates.<sup>31</sup>

Tables 1 and 2 detail Microsoft and Facebook’s acquisitions of technology companies. In the case of Microsoft, extensive historical data are available, whereas Facebook was subject to comparable disclosure obligations only after its IPO.

- Microsoft

On average, for the transactions reported as material by Microsoft since 2002, 27% of the excess purchase price was attributed to individual intangible asset categories<sup>32</sup>.

Table 1. Allocation of the excess purchase price in acquisitions by Microsoft (in USD million)<sup>33</sup>

Year of acquisition	Company acquired by Microsoft	Purchase price	Goodwill	In process			Technology		Other intangibles	%acquired intangibles attributed
				Marketing related	research (expensed)	Customer relationships	intangible assets	Contract based		
2002	Navisio	1,465	1,197						169	12%
2002	Rare	337	281						75	21%
2003	Placeware	202	180						30	14%
2006	21 entities	689	592				125		26	20%
2007	13 entities	1,340	983				170		84	21%
2007	aQuantive	5,900	5,200		24	476	327		112	15%
2008	FAST	1,300	981		35	27	134		70	21%
2011	Skype	8,00	7,100	1,249		114	275	10		19%
2012	Yammer	1,100	937						178	16%
2014	Nokia Devices	9,500	5,458	157		359	2,493	1,500		45%
2015	Mojang Synergies	2,500	1,800						928	34%

<sup>31</sup> It is possible that some of the estimates are based on a DCF approach.

<sup>32</sup> Based on an acquisition price –weighted average.

<sup>33</sup> Based on values reported to the Securities and Exchange Commission (SEC) as recorded in the respective 10-K reports of MICROSOFT CORP.

In the case of Microsoft, absent details on the exact scope of the intangibles transfer in the 2005 transaction with Puerto Rico, it seems nevertheless challenging to reconcile the aggregate payment for the transfer reported at USD 17 billion paid over time with the valuation of the intangible assets of Microsoft derived from the market valuation of the firm. In aggregate, the intangible assets were valued at USD 194 billion at the end of 2005, based on the market valuation of the firm. If the proportion of identifiable intangible assets over the total intangible assets of the companies acquired by Microsoft could be considered as representative for the business in which Microsoft operates, the average of 27% could be used to estimate for illustration purposes a possible proportion of the identifiable intangible assets of Microsoft as a whole. If 27% of the acquisition accounting by Microsoft is used as the maximum assets that could be identified as separate from goodwill and possibly transferrable, such intangible assets potentially transferred would have amounted to around USD 52 billion. Even aggregating the buy-in payments over time to the Puerto Rican, the Singaporean, and the Irish subsidiaries of Microsoft (described above), the valuation agreed to by the IRS would be at most USD 28 billion. Further, if a large portion of intangible assets, in particular goodwill, remain with the parent company because it is not identified as a separate asset from the firm, it is unclear why the benefits of the intangibles that remain at the level of the parent company would not be remunerated by the foreign subsidiaries.

- Facebook

In the case of Facebook, based on the five material transactions that the company reported, 16% of the excess purchase price is allocated to specific intangible assets categories, based on a purchase price-weighted average. However, the Whatsapp

acquisition dwarfs the others in terms of purchase price, and the arithmetic average of 25% can be considered as reflecting all the transactions.

Table 2. Allocation of the excess purchase price in acquisitions by Microsoft (in million USD)<sup>34</sup>

Year of acquisition	Company	Purchase price	Goodwill	Tradename	Acquired technology	Acquired			% acquired intangibles attributed
	acquired by Facebook					users	Other	IPR&D	
2012	Instagram	521	433	64	74				24%
2012	Several acquisitions	87	72	8	20				28%
2013	Several acquisitions	363	252	41	94				35%
2014	WhatsApp	17,193	15,342	448	288	2,026	21		15%
2014	Oculus	1,853	1,533	113	235		19	60	22%

\*In 2015 Facebook acquired several businesses, whose aggregate assets consisted mostly of land; that acquisition is not reported in the table because of this difference in the structure of the assets acquired.

If the lowest valuation level of the intangibles of Facebook in May 2009 was retained as a reference, totaling USD 9,132 million, it would not conflict with the proposed valuation by Facebook in the IRS dispute of USD 6.7 billion, and only a small portion of 16% of the USD 9,132 million would be subject to transfer to a foreign jurisdiction. This illustration is based on the assumption that proportion of identifiable intangible assets over the total intangible assets of businesses acquired by Facebook could be considered as representative for the business in which Facebook operates.

## Conclusion

The market for intangible assets is complex. Two different approaches to the financial

<sup>34</sup> Based on values reported to the Securities and Exchange Commission (SEC) as recorded in the respective 10-K reports of Facebook Inc.

valuation of intangible assets can be distinguished. The first approach is characteristic of market observers, defined as actors who make decisions based on observing market players, such as regulators, consultants, courts, and tax administrations. This category of actors favors the DCF approach, focusing on future income derived from intangible assets. Although this approach is based on a rigorous methodology, its use requires the choice of several parameters (amount of cash flows, discount rate, final value) that leave great room for discretion.

A second category of actors consists of market players, who disburse funds to acquire intangible assets. The market in intangible standalone assets is dominated by strategic players who often value intangible assets solely for their future financial benefits.

Therefore they do not systematically, if at all, use the NPV approach based on DCF.

Instead, they use the second, holistic approach to the value of intangibles in a company's corporate strategy as a whole. A holistic approach is also used by financiers who invest in shares of IP-intensive companies on the stock exchange. One financial value estimate of the intangible assets stock of each company can be derived from the financial valuation of the company by market players.

The NPV calculation (which typically relies on DCF) used in two cases (Microsoft and Facebook) of transferring intangible assets for tax purposes results in lower outcomes than the outcome derived from the financial valuation by market players of the companies that own these intangible assets.