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W o r k i n g P a p e r

A Typology of Technology Market Intermediaries

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Abstract

Technology Market Intermediaries (TMI) are currently emerging on the markets for technologies attempting to realize business opportunities and facilitate the technology and IP transactions supporting firms and other markets actors (e.g. universities). They aim to support open innovation, respectively facilitate more economically technology and particularly IP transactions. However, our understanding of TMIs and their roles needs to be considered incomplete.

In this paper I provide evidence on the growing number of TMIs and derived a conceptual basis for a further understanding of TMIs. The inherent difficulties of intellectual property monetization present a challenge for technology based enterprises and business opportunities for IP firms. Following a literature review, I develop a typology for TMIs. Having carried out a review of the literature I compiled a mix of primary and secondary data on about 70 TMIs. Applying the 'nine business model building blocks' from Osterwalder (2004) I identify 12 different TMI types which I then consolidate into sixe TMI archetypes using the framework for 'business models archetypes' of Herman and Malone (2003).

Introduction

TMIs are currently emerging on the markets for technology attempting to realize business opportunities and facilitate the technology and IP transactions supporting firms and other markets actors (e.g. universities) to support open innovation more economically facilitating technology and particularly IP transactions. Throughout this paper I develop a typology for Technology Market Intermediaries (TMIs).

I generate insights into TMIs acting on the markets for technology and derived a conceptual basis for a further understanding of TMIs. Having carried out a detailed review of the literature, based on secondary and limited primary data I develop a theory based typology for six TMI archetypes applying a two step approach: The 'nine business model building blocks' from Osterwalder (2004) in order to identify similar groups that could be clustered and the model proposed by Osterwalder (2004) to analyze fmy 'main pillars' in the companies characteristics. Throughout this exercise I gain insights into the variety of different funtions TMIs have on the markets for technology and various new ways how TMIs try to facilitate ETE transactions.

In the following section, I review recent developments of the markets for technologies, obstacles for efficient transactions, and present statistics on the recent emergence of TMIs. In the second section I review related literature on intermediaries. The third section outlines the applied methodology. In the fourth section I present my TMI typology as results from the study. The final section concludes this paper and highlight limitations.

The Growing Market for Technologies

Markets for technologies have existed even at the beginning of the 20th century (Lamoreaux/Sokoloff 1998). However, just recently the phenomena of open innovation (including external technology exploitation and acquisition) has started to attract attention from scholars, businesses and politicians likewise. This might be due to the recent growth of the markts for technologies in the 1990s, that has been observed from various smyces, especially in some high-technology areas. Arora, Fosfuri et al. (2001) compared estimates at an aggregated level from three different data smyces, which are subject to numerous caveats but which led to rather consistent results. Limiting their analysis to technological knowledge, their estimates indicated an annual worldwide market for technologies in the range of US$ 35-50 billion in 2000. Elton, Shah et al. (2002) and Kline (2003) estimated that the overall me patenting licensing revenues increased from below US$ 15 billion per year at the beginning of the 1990s to around US$ 100 billion a year in 2002. For the period 1994-1996 Gambardella, Giuri et al. (2006) estimated hat the size of the market for the EU-8 countries had increased from 9.4 billion euros to 12.7 billion euros from 1997 to 1999, and to 15.6 billion euros to 2002. Although still fairly small, the market size had thus grown from 0.16%, to 0.20% of GDP which corresponds to a total growth of 65% between the third and the first period. Moreover, Gambardella, Giuri et al. (2006) estimated that the potential market has grown from 14.8 to 24.4 billions. This market potential suggests that untapped opportunities exist for enhancing the market for patents in Europe and to increase the utilization of patents. For Germany as the largest European economy the Institut der deutschen Wirtschaft Köln (2006) estimated a potential market size of 8 billion euros. Further results from Sheehan, Martinez et al. (2004) indicate that a majority of companies expect an increased number of out-licensing deals in the future, while 54% of the respondents has experienced a growth of out-licensing in the past since the mid of the 1990s.

However, aside from the observed growth several scholars, e.g. Lichtenthaler (2006), Arora, Fosfuri et al. (2001) indicated that the market was and still is characterized by inhibiting obstacles that lead to high transaction costs, thus prohibit efficient transactions and result in market failure.

Obstacles to Efficient Transactions

Ford and Ryan (1977, p.370), as one of the pioneers in this research field, provided already almost 30 years ago a first attempt of an explanation why ETE opportunities are not realized by many companies. "This may be due to the supposed difficulties of handling the marketing of an intangible product compared with the tangibility of the normal manufactured product. It may also be caused by the difficulties of recognising a potentially marketable technology among those possessed (and taken for granted?) by the firm." Throughout the following years, little research was conducted in technology marketing or ETE. Teece (1986, p.303) noted that there are particularly "difficulties in pricing an intangible asset" which is not at least due to the unique nature of the good.

{Caves, 1983 #94} analyzing international technology transfer to foreign countries in terms of licensing provided an argumentation that the market for technologies licenses, like other markets for intangible knowledge, is "susceptible to market failures" resulting from five prevalent obstacles. At the time when they published their study, they had observed that typically only very few companies were willing to license a technology they possess, while on the other hand the demand of companies that feel a specific need for a certain technology was limited, according to Contractor (1981). These few available 'pairs' lead to small-numbers bargaining conditions on the market. Additionally, {Caves, 1983 #94} argued that the different parties involved in a transaction have asymmetrical access to knowledge about the technology, which leads to opportunistic behavimy. Furthermore, since technologies are usually transacted that still need certain developments until they can be fully utilized or a technology may not work properly at any new location for whatever reason (e.g. missing tacit knowledge) the technology's economic performance usually remains uncertain at the time of the transaction. Aside from these specific obstacles, {Caves, 1983 #94} argued that the actors involved in any transaction usually act risk averse. Since a transfer of a technology usually involves uncertainty whether the technology will perform as promised, a transaction may threaten the participants due to necessary financial investments. Finally, the preparation and contact costs involved in the transaction can be substantial. Referring to Teece (1977), {Caves, 1983 #94} stated that these costs might be between 2% and 59% (average 19%) of the recipient's total costs for the transfer. Thus transaction costs reduce the attractiveness to engage in any transaction additionally.

When the issue of technology trade received increasing attention by scholars at the end of the 1990s and early 21st century, some authors identified and discussed difficulties of technology trade in more detail. Throughout their study of technology trade, which was published in their influencing work, Arora, Fosfuri et al. (2001) identified various reasons, why markets for technology are inefficient. Major difficulties include the problems of valuing intangible assets without the presence of a market and absence of standard valuation approaches, the context dependency of each and every technology, the stickiness of information and the opportunistic behavimy of the market actors. As consequence of the presence of these difficulties high transaction costs exist for selling technologies that lower the profit opportunities for companies that are willing to conduct ETE.

In addition to the problems identified by Arora, Fosfuri et al. (2001), Lichtenthaler (2004) mentioned the OUH (only use here) syndrome that exist in several companies to a certain degree due to political discussions and interests of internal department in context of the resmyce allocation process. On the other end of the ETE process, the companies that should acquire technologies often fact the NIH (not invented here) syndrome which reduces the incentives to embed a technology into own products or processes that was e.g. invented by a competitor.

Studying the market for technologies, primarily in Japan, Chesbrough (2006, p.146) found that there is "no information standard for technology licensing and associated IP trade." According to Chesbrough (2006), this absence of a standard that fails to provide the terms and conditions for trading IP because it appears to be difficult to compile statistics on technology trade. Without these data, it is hard for companies to know what technology is available in the market and for what price ranges. Additionally,

it is very challenging to know how to value available technologies. Chesbrough (2006) lacks a systematic reporting of previous prices paid for external technologies.
Several other studies (e.g. Teece (1998), Teece (2000), Davis and Harrison (2001), Gambardella (2002), Chesborough (2003), Cesaroni, Gambardella et al. (2004), Escher (2005)) elaborate on certain difficulties for ETE and technology trade. Although, to my knowledge no systematic investigation of these problems has been carried out so far, which seems to me essentially when thinking about how to solve these problems. However, this issue is out of the focus of my study. Thus, of relevance to me is only the conclusion that "many imperfections inherent in the markets for intellectual property resulted in the absence of a well-defined demand and supply"[1] and lead to high transaction costs. These costs are today so high that the potential benefits from a monetary external exploitation of technologies is still not high enough for many companies to be an incentive to proactively pursue ETE, even in spite of the large potential for technology markets.[2]
The growth of these markets and the large expected potential led to an increasing awareness in the business community among patent lawyers from established IP law firms or general councils from large corporations, who started thinking about how to realize potential business oppotunities. The huge share of IP assets of the balance sheet from many corporations, further justifies that in the future will be room for nowadays emerging business models offered by TMIs. Gambardella, Giuri et al. (2006, p.V) further underlined that to overcome existing obstacles "standard contracts for technology trade, better means for matching technology demand and supply … and … intermediaries in technology trade would be typical means for achieving this goal."

The Raise of TMIs
Throughout a pre-study[3] I identified about 70 TMIs, with the majority being based in the me founded until December 2006. Starting from 1980, the number TMIs grew from 4 to 59 in 26 years. An approximated exponential curve fit indicates an annual growth rate of 8% as illustrated in Figure 1. Counting for 80% of the TMIs, me based firms clustered around two centres at the west and east coasts. While a considerable number of them are concentrated around and in the Silicon Valley at the west coast, another cluster is concentrated at the east cost including New York and Massachusetts. The TMIs that are not based in the me are mainly European and Canadian firms. In Europe the British and Germans encounter the majority. However, several TMIs hold regional offices in Europe, Japan, China and the East Asian Tigers.
However, as observed as well by e.g. the OECD, BMWI et al. (2005), TMIs[4] have existed already in the late 1800s and early 1900s. Patent agents and lawyers played an important role in technology markets by matching capital-seeking inventors with investors and by linking sellers of technological inventions with potential buyers who had the means to develop and commercialise them. Ford and Ryan (1977, p.377) used the term 'middlemen in technology marketing' for "agents or brokers who bring buyer and seller together but do not take legal title to the know-how. Normal fees are 1-3 % of selling price or a percentage of the royalties involved." However, according to OECD, BMWI et al. (2005) just recently TMIs have become more numerous and more diverse as demand for technology transfer and patent valuation have grown. As innovation processes have become more open and firms have begun to

[1] Cf. Lichtenthaler (2007, p.242)
[2] E.g. Chesbrough (2006) reports that some of he found in his study that in the me over "95% of issued patents are unlicensed, and over 97% never generate any royalties." See further e.g. Granstrand, Bohlin et al. (1992), Lambe and Spekman (1997), Durrani, Forbes et al. (1999) and Lichtenthaler (2005).
[3]
[4] The concept of intermediation can be traced back to Stigler (1951), who published a widely recognized paper on the division of labmy in markets and formed a theoretical basis for intermediation, although not explicitly using the terminology.

smyce more of their technology needs from external smyces, markets for technology have expanded, and with it the role of intermediaries. While in the past TMIs were often legally oriented firms (e.g. patent law firms) today TMIs develop new services taking a business approach.

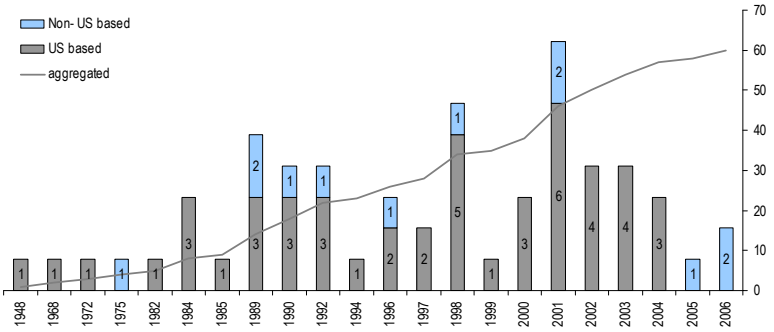

Figure 1 : Birth and growth of TMIs by year of foundation[5]

The EPO, OECD et al. (2006) drew attention as well to the raise of new business models for ETE stating that "the IP marketplace is nowadays in a probe and learn period where the number of intermediaries is rising." In this regard, the EPO, OECD et al. (2006) mentioned partnerships or technology pools to special purpose investments vehicles, auctions, publicly traded IP indexes as well as patent value funds which aim at taking care of IP logistics issues (e.g. finding and negotiating with potential licensees) whilst filling in the financial gap needed to allow the necessary managerial efforts preceding the commercialization of new products, i.e. identifying potential licensors, establishing contacts and negotiating with them up to the closing of a deal. According to the EPO, OECD et al. (2006, p.1) these new models "make one step forward towards the development of a market for IP transfers …[and]… contribute to the maturation of the IP market". Chesbrough (2006, p.3) found further "anecdotal evidence … that a small number of intermediary firms have arisen in recent years to assist in the process of identification, negotiation, and transfer of patents from one firm to another." However, aside from few studies, to my knowledge very little systematic research has been carried out on this 'recent' phenomena. Not at least, this might be due to the difficulties that I encountered trying to map the TMIs in my pre-study.

However, I would like to note that not all scholars have a positive opinion on recent development, i.e. the raise of TMIs. Lichtenthaler (2006, p.283) takes a sceptical view on the role of intermediaries because "it seems to be difficult to completely rely on the expertise of intermediaries in the markets for technology, whose facilitating role in technology transactions (...) has to be strongly questioned and whom might rather be used as a complement and not as a substitute of a firm's internal activities." Following Stigler (1951), Lichtenthaler (2006) argues further that it should not be taken for granted that intermediaries will solve all existing problems and inefficiencies in the market for technologies. In contrast companies might rather develop additional in-house competences. Additionally, Harhoff (2007) concluded with a sceptical view on current developments on the market for technologies questioning the many side effects related to the strategic behavimy or rather abuse of the system by firms including particular types of TMIs (e.g. patent trolls) that are currently observed by the EPO and other governmental bodies.

[5] I do not claim completeness of this sample, since the companies are so widely spread and the majority is small and the young market is currently undergoing large dynamics. However, probably I could claim that the sample includes the most important ones and has should cover at least 80-90% of the firms until December 2006 complying with my TMI definition.

I have proposed elsewhere ({Tietze, 2010 #1106}) an explanaition for the emergence of TMIs and have elaborated on how they impact the management of IP transactions. I have argued that the growth of the markets for technology together with the presence of obstacles leads to high transaction costs on the one hand but the large market potential on the other hand provides incentives for entrepreneurs to develop new models to facilitate market transactions by reducing transaction costs. This argumentation links to the theory of Coase (1937), Stigler (1951) and North (1996). Referring to transaction costs, a firm exists if the transaction costs are reduced compared to pure market coordination. Accordingly, an intermediary exists if its activities induce a reduction of transaction costs between the market actors, thus enhance the outcome of the market thus leading to further diversification of labor.
How the market for technologies will develop and which new transaction models will disappear respectively which will be come widely accepted remains to be seen in the future. This question is certainly of relevance but not the focus of this paper. I rather accept that nowadays TMIs as organizational innovation have become essential actors on the markets for technology. So far, at least to my knowledge, aside few practitioner papers[6], the academic community has not addressed these emerging business models in a systematic and sufficient manner. Although I understand that the prevalent dynamic in young markets might hinder systematic academic studies due to ever changing contextual factors, in the following I review the literature on intermediaries before I develop a possible taxonomy of new models that attempt to facilitate transactions.

Intermediaries – A Literature Review

As already mentioned, the intermediary concept emerged from the financial economics and not at least from the theory of disintermediation that was proposed Stigler (1951) following his paper on the 'division of labmy'. In the following I start with presenting briefly generic functions of intermediaries derived from financial economics by reviewing the results from Sauermann (2000). I then focus more narrowly on innovation processes and systems reviewing the results from Bessant and Rush (1995) and Howells (2006). Then I focus further on the functions of intermediaries involved in technology transactions reviewing three valuable studies[7] out of the scarce literature including Lien (1979), Czarnitzki, Licht et al. (2001), and Krattiger (2004).
Sauermann (2000) distinguished intermediaries according to their function and proposed fmy types of main functions, thus fmy generic types of intermediaries as commonly found in financial markets. According to Sauermann (2000), intermediaries can serve to develop organized markets and transaction systems (e.g. stock exchanges). He argued that on highly organized markets the share of variable transaction costs are usually lower than on markets with a lower organizational degree. However, a higher organizational degree itself causes additional costs, mainly fixed costs. Not at least the characteristics of the traded asset (e.g. degree of standardization, divisibility) as well as the market actors (e.g. the number of actors on the market and their professionalism and transaction frequency) determine the optimal degree as a trade-off between fixed and variable costs. Closely related to this issue is the configuration of a management system to administer these markets properly. Not until such a system for regulating credits and debits on accounts is established, a market can be enable decisions without prohibitive transaction costs via high information efficiency. Following this thought, intermediaries can act to integrate geographically disconnected markets. Efficiency gains results on the one hand from a lower degree of fixed organizational costs and on the other hand the higher degree of informational transparency and economics of scale and diversification. As a second function Sauermann (2000) defined the monitoring function as carried out by e.g. rating and news agencies. Economic transactions

[6] E.g. Millien and Laurie (2007)
[7] Further typologies can be found in Mittag (1985) and Fu and Perkins (1995). However, they merely overlap with the typologies presented in this paper, thus are not repeated here.

are usually associated with risk and uncertainty. However, an investor needs to assess and monitor the risk if she aims for a risk adjusted rent and wants to insure herself against negative incentives resulting from information asymmetry (monitoring costs). Referring to Eichberger and Harper (1997), Sauermann (2000) argues further that these costs can be extremely high especially for small investors due to the risk of partial market failure. Thus, intermediaries may specialize in the continuous monitoring of risks and opportunities. They might be able carry out these activities for significant lower costs by realizing economies of scale and learning effects. As a third function, intermediaries may carry out 'transformational functions' (e.g. as broker, investment banks). Banks, as an example for this function, may serve their clients to shift funds that are accounted for in the financial statement with certain properties into funds with other properties. E.g. Fabozzi, Modigliani et al. (1994) argues that debts might be activated so they can be accounted as own liabilities, particularly related to batch size, risk and terms. According to Sauermann (2000), as fmyth function intermediaries may integrate the abovementioned activities (e.g. investment banks, insurance companies) and offer a full service bundle to reduce the total costs. Intermediaries might integrate in order to avoid reduplication and incentives to produce higher quality through internalizing certain defects to create a stronger bargaining position against capital seeker.

In context of innovation processes and innovation systems, different roles of intermediaries were described in prior literature. Various authors however used different synonyms (e.g. third parties Mantel and Rosegger (1987), intermediary firms Stankiewicz (1995), bridgers Bessant and Rush (1995), superstructure organizations Lynn, Reddy et al. (1996), brokers Hargadon and Sutton (1997), McEvily and Zaheer (1999), Provan and Human (1999), and information intermediaries Popp (2000)). I do not review all these studies, but present results from Bessant and Rush (1995) and Howells (2006), two particularly interesting papers. Although focusing only on one particularly intermediary type Bessant and Rush (1995) conducted an analysis "examining the literature on innovation and transfer" and of some some specific cases that led to the identification of five dimensions that can be used for typologizing intermediaries. Howells (2006) proposal of a typology of innovation intermediaries is based on a literature review and case studies in the UK.

Bessant and Rush (1995) provided insights specifically in the role of consultants as a particular type of intermediaries with a variety of sub-types. Based on the elaboration of the characteristics of the technology transfer process[8], Bessant and Rush (1995) proposed, although not made transparent based on which systematic approach, needs for clients in the technology transfer processes where 'consultants' provide support. Furthermore, Bessant and Rush (1995) provide an overview of bridging activities that consultants might fulfil.

According to Bessant and Rush (1995), consultants support clients for a variety of generic purposes. To build up certain capabilities, consultants can advice and inform clients to enable the development of key management capabilities in identifying needs, exploring and selecting innovations, planning, implementation and project management. For 'institution building' these schemes also offer an opportunity for developing strategic capabilities across the supply side - for example, mobilising a critical mass of technological knowledge and skills in support of particular technologies. Consultancy services can further help to avoid failures. Providing targeted advice and direct technical and managerial support offered opportunities to reduce the incidence of costly failures of investments through transfer-

[8] According to Bessant and Rush (1995, p.98), consultants support the "multi-dimensional character of technology transfer" processes, which he defined "as non-linear, and characterised by multiple interactions, systems integration and complex networks." Thus, according to Bessant and Rush (1995, p.98) technology transfer is not an "instantaneous event but a time-based process involving several stages… [being a]…complex activity involving multiple actors". These transactions may not always take place on the "basis of one-to-one but may also be one to many or many to many". Furthermore, transactions "may not proceed directly but may often operate through various forms of intermediary."

ring better innovation management practice - for example in selecting appropriate applications of new technology and in project management. Consultants can provide innovation support through information and advisory service less expensive than their clients can do internally. Using consultants as intermediaries opens up the possibility of reaching user firms more directly than traditional financial support mechanisms which tended to lack focus and often failed to reach many potential users within a target group. Using consultants can enable a more decentralised mode of operation, involving less monitoring and control. Once the broad objectives of a programme were set out it could be largely self-managing, with overall monitoring and quality assurance provided by a small and specialist group, itself sometimes outside of government but contracted with the specific project monitoring role.
Bessant and Rush (1995) then provided an overview of specific functions of consultants linking these to the identified needs. Consultants support clients that feel a need for support to articulate demand for specific technologies and throughout the selection of appropriate options. Furthermore, consultants support clients in the identification of needs, the selection as well as the training and development of skills and human resmyces. Consultants further deliver financial support to make a business case serving as financial smyces (e.g. venture capital funds). Consultants further support clients in the identification and development of business and innovation strategies. Using examples of best practice consultants these can further provide education and serve as linker to external knowledge systems, e.g. identification of knowledge smyces regarding new knowledge for emerging technologies. Consultants finally serve as specialist resmyces and provide project management throughout the implementation of external smyces e.g. new technologies.
Drawing on the analysis, Bessant and Rush (1995) identified five dimensions that can be used for creating an 'indicative typology' of consultants. Firstly, consultants can offer services ranging from expert to process or secondly from sector specific to general. Thirdly, consultancy firms can be small 'one man shows' or large, multidisciplinary firms. Fmythly, they can apply specific technologies (e.g. total quality) or rather be generalists. Finally, their background can be rather traditionally or linked to fairly new phenomena (e.g. information technology).
From a review and synthesis of the literature Howells (2006) developed a typology and framework to map different roles and functions of the intermediation process within innovation and operationalized the typology within the context of the UK. Howells (2006) conducted a set of case studies in the UK that involved semi-structured interviews with managers in 22 organizations (plus eight subsidiary companies), based on specific project collaborations, together with overall strategies and work practices. Throughout the case studies, Howells (2006, p.720) applied the following definition for an innovation intermediary:

"An organization or body that acts an agent or broker in any aspect of the innovation process between two or more parties. Such intermediary activities include: helping to provide information about potential collaborators; brokering a transaction between two or more parties; acting as a mediator, or go-between, bodies or organizations that are already collaborating; and helping find advice, funding and support for the innovation outcomes of such collaborations."

When Howells (2006) conducted the case studies based on the above definition and the understanding of innovation intermediaries he had gained from the literature review, Howells (2006) however was surprised to find "considerably more functions than originally conceived." From his work he identified ten functions that included "new unrecognised or undervalued roles". These ten functions of intermediaries as identified by Howells (2006) are: (1) Foresight and diagnostics, (2) scanning and information processing, (3) knowledge processing and combination/recombination, (4) gatekeeping and brokering, (5) testing and validation, (6) accreditation, (7) validation and regulation, (8) protecting the results, (9) commercialisation, and (109 evaluation of outcomes.

Having identified possible functions of intermediaries as financial institutions and reviewed the role that intermediaries play in innovation processes and systems, I continue discussing specific functions of intermediaries for technology transfer.

Lien (1979) defined fmy functions of the "middleman" in the technology transfer process as follows. Intermediaries can determine specific opportunities in terms of specific needs - i.e. to be guided primarily by market "pull" rather than "technology push". Differently from traditional shopping, where the buyer chooses goods among the ones available on the shelf, intermediated transactions involve a detailed description of the clients needs. The need represents a client oriented transaction. Besides working as salesperson, when the client has a technology offer, the intermediate shall perform the procurement task for any identified need. As a second function Lien (1979) proposed, that intermediaries help to identify appropriate smyces of technical breakthroughs, scientific information, and other technological developments that will meet identified needs. Once clienta' needs are identified, the intermediary can make use of particular expertise and networking resmyces to address such needs; thus following an active approach instead of a passive one. Furthermore, according to Lien (1979), intermediaries build bridges between the smyces and the users. When two parties of the transaction are identified, the middleman links them through proper presentation, and explanation of how beneficial such transaction can be for both ends. Finally, beyond "building bridges", intermediaries encmyage appropriate linking mechanisms and provide other services, skills, and inputs to accelerate sound commercialization. In addition to the tasks of an agent or broker, intermediaries work as catalyst for transactions, providing specialized expertise of intellectual property in the form of supporting services.

Although their study primarily focused on university technology transfer in contrast to inter firm transfers, Czarnitzki, Licht et al. (2001) provided one of the few valuable typolologies of intermediaries involved in technology transactions. Czarnitzki, Licht et al. (2001) differentiated between direct and indirect transactions. Certain intermediaries support transactions directly. These include consulting and the research of certain information as well as providing training services to companies to build up own competences. Additionally, Czarnitzki, Licht et al. (2001) identified intermediaries that conduct own R&D and thus add value to a certain technology. According to Czarnitzki, Licht et al. (2001), these intermediaries participate in the direct transfer. Intermediaries that support transactions rather indirectly offer services related to the bridging of the supply and demand side, e.g. by providing commercial exploitation of R&D results, services for patent analysis and technology scouting.

Noteworthy to me seem further that based on their analysis of problems in technology transactions, Czarnitzki, Licht et al. (2001) were among the very few who proposed 'points of departure' for intermediaries, i.e. functions how these can help to develop the market for technologies, although primarily focusing on university technology transfer. Although their model is neither exhaustive Czarnitzki, Licht et al. (2001) nor very detailed and free of overlaps, it is however one of the very few and should be mentioned. According to Czarnitzki, Licht et al. (2001), in order to solve information asymmetries, intermediaries can provide platforms for technology owner to market their technologies, e.g. in the internet or on exhibitions. Intermediaries can further consult potential buyers regarding technologies offered on the market and monitor important trends and the demand for certain technologies. To overcome problems related to high costs for interested companies willing to acquire a technology intermediaries can act to bridge supply and demand, can carry out certain searches and prepare reports (e.g. due diligence) and offer possibilities for directly contacting companies (e.g. seminars, workshops, fairs). To reduce high transaction costs, intermediaries may offer consulting regarding contract design and project management. To reduce uncertainty regarding externalities intermediaries may facilitate the development of trust between the various actors, carry out 'specific' tasks trhoughout a transaction and offer financial support when spinning off companies. Regarding the reduced transfer possibility, intermediaries may offer training cmyse, create incentives, offer consultancy in innovation management and support the development of R&D labs.

In addition, Birkenmeier (2003), as one scholar having conducted research particularly on ETE, identified fmy main functions that intermediaries support.[9] Intermediaries can provide information services regarding technological applications, market data, industries, companies and competitors, regarding existing technological knowledge as well as certain funding smyces. Secondly, intermediaries consult companies regarding their innovation and technology management. Thirdly, intermediaries may support companies regarding patent applications, licensing contracts, entrepreneurship and human resmyce development. Finally, intermediaries support companies in their project management.
Aside from the very few systematic attempts to develop a typology some few other publications exist that rather provide lists of various intermediary types. In the following I just like to mention a few to illustrate the variety of existing intermediaries which illustrate as well the early stage of the market development. In this growth phase, new models are currently still emerging which have to stand up to the competition. Later on I might expect a consolidation phase in the market which might lead to a disappearance of some of these.
Krattiger (2004) provided a list with specific intermediaries without discussing their functions only providing some characteristics of each intermediary group. According to Krattiger (2004) intermediaries serve as royalty collection agencies, as various forms of clearing house (information, technology, open-smyce innovation), act as brokers and other types of facilitators, and provide IP management services (law firms and consultants). Furthermore, intermediaries can act as IP commercialization agents, merchant banks, or develop patent pools. From a practitioner point of view Millien and Laurie (2007) provided another collection of various intermediary types. These include patent licensing and enforcement companies, institutional patent aggregators/ IP acquisition funds, IP/technology development companies, licensing agents, litigation finance/investment firms, patent brokers, IP-based M&A advisory, IP auction houses, online IP/technology exchanges/clearinghouses, IP-backed financiers, royalty stream securitization firms, patent rating software and services, university technology transfer intermediaries, as well as some recently 'emerging business models' that include IP transaction exchanges/trading platforms, defensive patent pools, technology/IP spinout financing, and patent-based public stock indexes. To conclude, from the literature review, I propose the following definition for TMIs.[10]

"For profit, risk taking firms attempting to advance the MfTI through the development of novel models to facilitate transactions of intangible assets supporting innovation processes through the interaction with primarily technology based firms, predominantly without adding value or holding property of the asset."

I like to note, that my definition for the purpose of my study focusing on private firms and thus excludes government support vehicles and TTOs set up by universities due to the different nature of their governance and incentive structures. However, although this definition should be considered narrow it stil includes those often refered to NPE (non practicing entitities) but is not limited to them. This definition excludes 'traditional' patent law firms (PLF). The PLF concept is closer to the broker concept as discussed for instance by {Hargadon, 1997 #427}, i.e. firms that 'execute transactions for clients'. Although PLFs can be considered as KIBS and engage into transactions offering mainly case

[9] Birkenmeier (2003) does not provide a detailed explanation of how he developed this typology; neither does he provide any detailed explanations of these functions but the typology seemed noteworthy to me due to scarcy of available material specifically related to TMIs.
[10] This definition is based on the definition of intermediaries on financial markets proposed by Newman (1992, p.77): "enterprises in the business of buying and selling financial assets…They are not just middlemen like dealers and brokers whose main business is to execute transactions for clients…[They] do much more than participate in organized markets…[by] adding 'markets' that would not exist without them…[and] do take risks".

by case services (e.g. designing idiosyncratic contracts), I am interested in firms developing novel transaction models. However, I need to note that major PLFs have recently started to enlarge their portofolio of activities by adding management services. And continuously staff management positions. Those firms might be included in my definition, while I exlude PLF offering pure legal services (e.g. patent application and litigation support). [11]
Having reviewed the literature and derived a definition of TMIs, in the following I attempt to develop typology for TMIs. The following section presents the methodology I have applied for this approach.

Methodology
To derive a typology for technology market intermediaries (TMIs) I applied a three step approach. Firstly, from I compiled data on about 70 TMIs. These TMIs were identified through a pyramiding sampling (sometimes referred to as snowballing) approach interviewing experts at different occasions (e.g. IP auctions, conferences, workshops) from spring 2006 to summer 2007 asking for suggestions that suited my definition from above. I aimed to identify TMIs in Europe and the U.S. as both are leading countries for technology trade. The 70 TMIs received a questionnaire covering a wide range of questions regarding their business model. The questionnaire was divided into five sections. The first part of the questionnaire aimed on the general firm profile including year of formation, personnel, clients, and performance indicators (e.g. transaction closure ratio, percentage of cross-industry transactions, firm size, client profile, and year of formation). The second and certainly the most important section of the questionnaire concerned the business activities of the IP market intermediaries (activities, core services, usual type of transactions). Through the identification of their services and enabling activities I aimed to delineate the core of their business models. The third section of the questionnaire complements the previous in the delineation of the business model including transaction initiative, type of compensation, costs and related business. The forth section of the questionnaire provides addition information for the composition of the IP intermediaries business models covering trade channels including use of internet, channels per type and size of transaction. The last section of the questionnaire probes the challenges and trends of the IP market and perceived market development including growth potential, barriers, challenges and other key market players
However, the overall response rate of 15 % (Anadeus, Fairfield Resmyces, Inflexion Point, Invent Resmyces, IP Auctions, Plexus Ventures, Thinkfire, Tynax, Yet2.com) turned out to be insufficient to derive a typology. I followed up the non-responding firms with personal phone interviews. As it turned out that respondents where reluctant to reveal the requested, detailed data on their business models mainly due to the early stage of the market and the threat of imitation wherefore some TMIs decided not to participate due to confidentiality reasons.[12] Therefore, I decided to conduct the interviews more broadly if I found an TMI that was willing to report further insights into other firms on the market in addition to the own data for the questionnaire. From these interviews, each approximately 60min, I was able to obtail information on additional 15 firms. The low response rate and heterogeneous data collected might not be seen as a failure but rather another indicator of the characteristics of the IP intermediaries market. The gathered data provide a rare and valuable collection of information about such market and its players never seen before in the literature. Further data for the TMIs that did not repond nor wanted to participate in a phone interview was then collected from the TMIs websites to the extent possible.

[11] For instance, ZACCO, a northern-Europe leading IP firm, has recently started to adapt their business model. Zacco regards itself not anymore "as a traditional patent firm, but as a modern Intellectual Property Consultancy …[and]… offers a full range of portfolio management services, including validation of granted European patents" to its clients.

Following the data collection, I analyzed the business models that I identified applying the 'nine business model building blocks' from Osterwalder (2004) in order to identify similar groups that could be clustered. The model proposed by Osterwalder (2004) was used to analyze fmy 'main pillars' in the companies characteristics: their products, the customer interfaces, the infrastructure management and certain financial aspects. The first, concerns the firm's value proposition, meaning the range of products and services that create value for the companies' customers. The second pillar describes the interface between the firm and its customers, identifying who are the clients, which channels are used to reach them and how the relationship with them is characterized. The infrastructure pillar describes the activities, resmyces and competencies which enable the business case and the last pillar, financial aspects, depicts the firm's cash in and out flows.

I further analyzed the groups of similar types using the 'business model archetype' framework by Herman and Malone (2003) to develop a generic typology for TMIs that finally includes six different meta types of TMIs. Herman and Malone (2003) defined the business models consisting of two dimensions. The first dimension adresses the question of 'what the business model does' while the second dimension addresses the question of 'how the business makes money from its activities'.[13] The first dimension labelled 'degree of transformation' relates to the level an asset is transformed with the support of a firm and distinguish three cases. Certain companies do not add any value to an asset, e.g. by only linking a seller to a buyer. Other companies conduct own R&D, e.g. construct prototypes of a technology, thus add a significant value to the traded asset. The third case rather distinguishes the extent of the transformation between high and low. The second dimension labelled 'nature of the service' relates to the type of service that is sold. Herman and Malone (2003) distinguish fmy cases. Certain firms operate by obtaining ownership of assets, then perform certain activities and pass on the ownership to other entities. Other firms only make use of an asset without obtaining its ownership. Furthermore, other firms operate their business making use of only human resmyces, i.e. the knowledge and experience of their employees, without any close relation to a traded asset. Finally, certain firms provide solutions/platforms to clients which these use attract attention by other firms. These firms do not generate any revenues that are related to the asset but only from additional services related to the solution provided.

Along these two dimensions Herman and Malone (2003) defined six generic 'archetypes', although these are often combined by firms. However, having carried out an analysis of 500 firms (including over 450 of the Fortune 500) Herman and Malone (2003, p.19) came to the conclusion that "these [six] models can be used to classify all the different combinations that exist." According to Herman and Malone (2003), a company employs the **creator** model[14] if it acquires the ownership of assets (e.g. raw materials or components) from other firms and transforms them to a high degree (e.g. by assembling the components) in order to create a product or a service. The product or service may be physical, informational or financial (e.g. an insurance policy). A company employing the **distributor** model acquires ownership of assets and resells the product to another party, but transforms these only to a limited degree, e.g. by repackaging the product or providing customer service. A **broker** facilitates sales by matching buyers and sellers and also provides advice to either or both parties. Unlike a distributor, a broker does not take ownership of any asset being sold. A broker usually receives a fee from the buyer,

[12] The list of TMIs I have identified is available in the annex.

[13] Please note, that for detailed analysis of business models Herman and Malone (2003) suggested a more detailed list that defines sub-items of the major business activities (i.e. buy, make, sell, design, and manage). Details on this issue can be found in their paper.

[14] Note that due to the legal character of licening agreements, in this analysis we considered the transfer of licenses as the transfer of (at least part of the) ownership, instead of pure use of the asset.

the seller, or both often in the form of a commission based on a percentage of the sale price or the volume. A **landlord** does not sell, respectively resell the ownership of any asset but rather sells the right to make use of an asset. In this case the assets are commonly locations (e.g., a hotel room, apartment, or amusement park), events (e.g., a concert), or equipments (e.g., a rental car or recording studio). Depending on the kind of asset, the payments may be called 'rent', 'lease', 'admission' or similar terms. For selling the use of an asset, a landlord can transform the asset to a high or low degree. A **Contractor** usually provides services (e.g. consulting) for specific assets. Most services involve a combination of both human and non-human resmyces. If the service being sold involves more non-human resmyces the business model is classified as a Landlord rather than a Contractor. Payments are usually made in the form of a fee for service, often based on the amount of time the service requires. An **Attractor** attracts human attention for an asset by providing solutions/platforms for other firms to use. The attractor may devote significant effort to create or distribute these solutions/platforms for attracting buyer attention, but their smyce of revenue is disconnected from the asset (e.g. common in internet based businesses).

Results - A Typology of TMIs

The respondents suited the predicted profile of small firms ran by industry experts, that specialize in IP transaction, development and related services. Among the 9 responses there were firms dealing with patent licensing, brokering, auctions, exchange, funds and investment. The diversity of firm services provides a valuable range of information for the different business models. From the other side, it presents a challenge for generalization of specific measures (e.g. personnel background), since each model requires a different set of resmyces.

Applying the 'nine business model building blocks' from Osterwalder (2004), among the 70 TMIs I identified 12 different groups within TMIs have similar characterisitics regarding the fmy pillars. These 12 groups are presented in the following and include Licensing Agents, IP Brokers, IP Auctions, Online IP Market exchanges, IP-Backed Financing, IP Consulting, IP Outsmycing Services, Funded IP Aggregator, Litigation Finance Fund, Technology Transfer, IP Investment Banks, IP Development.

Licensing agents can be regarded as the most traditional type of TMI. Licensing agents are typically middlemen with the core competences being networking with expertise in the licensing process that requires legal know-how and a wide contact network. Their target customers can be either general or dedicated to a specific field, such as the semiconductor industry. Mostly a close relationship exists with clients with its duration depending on the revenue model. Such companies generate revenues either in a single fixed or success fee instalment or as a percentage of running royalties streams. Licensing agents usually act in the middle of the ETE process, during the marketing, networking and transaction phases. Their activities include the identification of potential partners for clients, packaging and the preparation of IP bundles, IP presentation, approaching other party, contacting other intermediaries, due diligence, and negotiations. Eventually the payment is performed through the IP firm. Clients may be either IP owners or licensees. Main cost drivers of licensing agents are expenses for own employees. These firms are usually small and ran by their principals. The lack of infrastructure found in large corporations is compensated by these firms with reduced operational costs. Transactions are preferably carried out via private sale engagements. An important distinction within the licensing business is the approach for the patent monetization. The first alternative is based on assertion, when companies push patent licenses to others using the threat of cmyt litigation as selling proposition. Such approach leads to a rather 'hostile' relationship between licensors and licensees, sometimes observed in recent years e.g. in the electronics and internet industries. Eventually a licensing initiative starts from the licensee. Then, usually licensees aim to establish and ensure freedom to operate and avoid infringement cases. This type of transaction can be referred as 'assertion approach'. The second approach for licensing is what IP professionals traditionally associate with technology transfer, which is typically employed in

the health care and pharmaceutical industries. In this case the patent owners seek licensing contracts as a means to take a technology to the market. There is no anticipation of litigation and the value is determined by the potential for future revenues. This type of transaction can be referred as 'business opportunity approach', and is closely related to patent brokering.

IP brokers and licensing agents are often subject of confusion, due to the close relationship between these two models and the fact that TMIs employ both simultaneously. The basic distinction between brokering and licensing is the ownership of the asset. Whereas licensing agents trade the right to the use of the asset, the broker sells the asset itself. One should note however that an exclusive licensing agreement can have a similar legal effect than the sale of a patent. While brokering is related to the technology transfer approach of licensing, it is hardly associated to assertion. Another difference between brokering and licensing is the relationship of the IP firms with their clients. While licensing agents might take a percentage of the running royalty payments and keep a long term relationship with their clients, brokers typically terminate the contractual relationship to the client after a transaction. Similarly to licensing agents, brokers act in the middle of the ETE process, during the marketing, networking and transaction phases. Their cost drivers are similar. Although the main trade channel of brokers is private sale engagement, they occasionally promote private auctions to leverage the price of the IP.

IP auctions relate to brokers in value proposition and target customers, but differ in terms of the trade channel, and core competences. The IP auction business model is characterized by the public offers of patent licensing or the asset as such, i.e. the patent, either live (a) or online (b). Differently from online patent exchange platforms, which only provide listing of needs and offers, IP auctions actually perform transactions. By conducting transactions in a pre-determined date, auctions provide a tool for companies e.g. willing to exploit their intellectual property quickly, for companies in financial difficulties or for selling of IP assets of bankrupt companies. Additionally, patent owners with reduced budgets for advertisement and networking can benefit from the infrastructure offered by IP auctions. While providing a fast and often effective solution, auctions have a significant disadvantage. In absence of many bidders patent owners might artificially reduce the market price of their assets. The auction's cost drivers include expenses related to marketing, human resmyces, IT infrastructure for online data rooms, and the actual event. Similarly to brokers, the compensation for the auction company might be through success and/or fixed fee.

The business model of **online IP exchanges** (market places) is characterized by the establishment of a platform for promotion of patent demand and supply. They are often called 'exchanges', although there are actually no transactions occurring through the websites. The fundamental model of an online exchange is based on a value configuration which includes marketing and networking activities only. Some online marketplaces combine their business model with brokering, consulting and outsmycing services. Online marketplaces share some characteristics with online auctions, such as trade channel and cost structure. The main difference between the two models is the extent of engagment throughout any transaction. The first simply lists the technology, with information such as price and terms delivered only after request. The latter explicitly manages transactions, with open price bidding. The revenue model of online exchanges is either based on fix membership and/or success fees. The first occurs when technology based enterprises pay to list their technology in the website. The latter is realized if the buyer and seller successfully complete a transaction. Differently from broker and agent models, the relationship with clients is performed remotely with reduced direct interaction.

IP-backed financing is a business model characterized by the use of IP to raise capital. These TMIs combine financial and IP expertise to provide IP owners the opportunity to raise capital without having to give away any IP or equity stake. The incentives include not only monetary but also accounting and tax benefits. Innovative IP-backed financial transactions are likely to undergo many changes until the market reach maturity. Each type of transaction could become a business model itself. Some ex-

amples include securitization of future royalty revenue streams, patent sale license-back (off-balance sheet loan), and collateralization (IP-backed debt). The IP-backed financing firm acts as a 'general' broker, linking the patent owner to the financing institution. The core competences which enable such transactions are financial and IP expertise, as well as good networking in both of those fields. Analytics, like patent valuation and market analysis, might be outsmyced to specialized firms.

TMIs offering **IP consulting services** deal directly with a technology based firm without any patent transaction. The usual number of involved parties is therefore limited to the client and the TMI. Such models are often used in combination with others in order to profit from the TMIs knowledge in the field. IP consulting is a particular application of this business model. It is characterized by the sale of expertise from a specialized IP firm to a technology based enterprise. The client typically owns a portfolio of patents and seeks support of specialists for analysis, management, and commercialization of their intellectual property. Traditional applications of such model include legal and IP strategy advising. IP consultants usually deal directly with their clients, providing support along the whole ETE process. Often the IP consultant appoints other IP firms to handle supporting services and commercialization. The cost drivers are basically expenses with human resmyces. Means for revenues are usually either a fixed fee my accounted hmyly.

IP outsmycing firms, similarly to consulting firms, provide services to technology based firms that seek management and monetization of patent portfolios. The major difference between these two models is the value proposition and configuration. While consultants sell only advice, outsmycing firms handle directly services that clients are unable or uninterested to perform themselves. Typically outsmyced services include patent and portfolio valuation, contract drafting, patent filing, and portfolio mining. Some firms even complete management solutions for their clients, where the IP owner simply develops the technology without any effort for either defensive, offensive use of the patents. Besides the value proposition and the configuration, IP consulting and outsmycing firms share similar characteristics. However, the latter might bear higher cost due to expenses in research and development of the tools (e.g. software) provided to their clients.

Funded IP aggregators employ a business model that is characterized by the acquisition of patents to build own IP portfolios, usually mainly consisting of patents. A portfolio can either be focused in a single technological field or encompass a wide range of technologies. Often these companies claim to profit from the development of a technology, however companies possessing patents in the same field of the aggregator's portfolio sometimes fear aggressive assertion 'attacts'. Aggregators might not directly acquire IP, but perform their acquisitions through brokers, auctions or private sales engagement. The revenue model is based on investments from other companies, commercialization or litigation. The investments might be motivated either by the assertion or the business opportunity approach. In the first case, technology based firms invest in a fund to acquire IP related to their activities in a defensive strategy. The funds offer protection from possible future litigation, seeking control of most of the patents related to a sensitive technology. In the second case investors are keen on the future potential of certain IPs and rely on the confidence that a strong portfolio is more valuable than the individual IPs separately. Funded IP aggregators usually raise money for IP acquisitions from other investors. A sophisticated set of valuation tools and networking expertise are indispensable competences for the proper spending of these investments. Those competences are also valuable when selling or licensing IP.

Differently from funded IP aggregators, **litigation finance funds** are not committed to the acquisition of patents. This business model is rather characterised by the union of investors that sponsor costly litigation suits in return of a share of the results. The litigation finance funds may deal on one side with TBFs facing thorough litigation suits. Such companies can refer to funds either when facing financial difficulties caused by legal costs or as resmyce to share the incurred risks. They can be either the infringer or the proprietor. On the other side litigation finance funds may deal with 'opportunistic'

investors without any interest in a particular IP as such, if they gain an appropriate return on their investments only when a case is won or a settlement is achieved. In case of a settlement, a licensing agreement is imposed to the infringer and the investors receive their share of the royalty revenue streams. Litigation finance funds rely particularly on legal and technical expertise to understand the probability of a success of a litigation case.

TMIs offering **technology transfer service** combine patent brokering, licensing and a set of supporting services to fully relocate the technology from one institution to another. This model can be often found to transfer technologies from universities and research institutes to companies. The transaction includes not only patents rights but often also knowledge, technological know-how and eventually tangible assets. Another type of technology transfer occurs between two companies, when even employees, laboratories and production facilities are relocated.

The business model of **IP investment banks** combines consulting, licensing, brokering, and financial services. The model's value proposition is to facilitate strategic and financial corporate operations involving IP. These TMIs usually adopt the business opportunity approach to enable the IP exploitation for their clients. The value configuration of IP investment banks involve composite transactions, which include licensing, patent sale, mergers and acquisitions, joint ventures, spin-offs, and IP-backed financing. Their clients are TBFs seeking strategic use of their IP. Companies sometimes spinn off non-core IP into a new firm to manage a particular technology as a core business. In a case where there is already a market player in the referred area, both companies might share the equity of the spin-off. The first contributes with the IP and the second develops and takes it to the market. In order to tailor such complex transactions IP investment bank have to combine financial and IP expertise with a wide contact network. Their revenue model is similar to brokers and licensing agents, i.e. might be a fixed and/or success or participation on the running payments of licensing agreements. The cost drivers are mainly human resmyces. Analytic services like IP valuation may be outsmyced.

<table>
<tr><td></td><td></td><td colspan="3">Degree of transformation</td></tr>
<tr><td></td><td></td><td>no</td><td>low</td><td>high</td></tr>
<tr><td rowspan="4">Nature of the service</td><td>Ownership of asset</td><td rowspan="4"><u>IP Brokers</u>
(Licensing Agent;
Patent Broker;
IP Auctions)</td><td><u>IP Distributors</u>
(Funded Patent Aggregator;
IP Investment Bank;
Technology Transfer Firm)</td><td><u>IP Creators</u>
(IP developmers)</td></tr>
<tr><td>Use of the asset</td><td colspan="2"><u>IP landlords</u>
(IP-Backed Financing; Finance Litigation Fund)</td></tr>
<tr><td>Human effort</td><td colspan="2"><u>IP Contractors</u>
(IP Consulting; IP Service Outsourcing)</td></tr>
<tr><td>Human attention</td><td colspan="2"><u>IP Attractors</u>
(Online Marketplace/ Exchanges)</td></tr>
</table>

Table 1 : Typology of TMIs based on Herman and Malone (2003)

Finally, **IP development firms** carry out activities that aim to increase the value of patents trying to realize synergy effects through the combining of complementing, but previously independent patents or by performing own R&D to further develop a technology. Once a technology reaches a mature level, the IP development firms negotiate licensing agreements with technology based firms to take the technology to the market. The IP development firms differ from outsmyced technology developers by the value configuration and revenue model. While the first develops IP without necessarily having a pre-defined client, the latter is hired to fulfil a specific technology need of a company. Furthermore,

the business model of IP development firms is typically associated with patent aggregation. These firms rely on technical and IP expertise to identify and acquire patents with high market potential from various smyces, including universities, research institutes, inventors, and TBFs.

Because the market for technologies is still unmature and emerging, in the future I will see some of the exisiting business models surviving, some disapearing and new ones emering. Thus, having identified and presented the above mentioned business models that are currently exisiting, in a next step I applied the framework for 'business models archetypes' of Herman and Malone (2003) to develop a sustainable typology on a higher level of abstraction that is suitable to include existing as well new business models.

Applying this approach, I was able to consolidate the 12 TMI types presented above into the six archetypes that facilitate ETE. Table 1 provides an overview of the TMI types presented above. Licensing agents, patent brokers and IP auctions act as intermediaries in the ETE process without adding any value to the patents, thus can be consolidated into the category of IP brokers. Funded Patent Aggregators, IP Investment Banks and Technology Transfer Firms combine patents into bundles and prepare these for commercialization, but add-little value to the IP by transforming them only to a limited degree. These types thus can be consolidated into the archetype of IP distributors. IP development firms perform own R&D in order to further develop IP they had acquired from clients, e.g. develop prototypes or to develop IP on their own. Thus these TMIs transform the IP to a high degree. These IP developers suit the archetype of a creator, thus can be called IP creators. IP-backed financing firms as well as finance litigation funds sell the use of IP as a means for ETE. Doing this, these TMIs transform the IP at least to a certain degree and thus can be consolidated as IP landlords. TMIs that offer IP consulting and outsmycing services do not deal directly with the IP assets, but rather sell their competences, i.e. human resmyces in the form of expertise and labmy, thus can be consolidated as IP contractors. Online market exchanges provide web based software solutions, i.e. web portals for their clients to advertise IP. Using these platforms, online market exchanges support their clients to catch the attention of potential buyers, thus can be regarded as IP attractors.

Conclusions

Throughout this paper I have attempted to generate a deeper understanding of whether and how new models currently offered by TMIs can facilitate ETE. In a first step I have tried to gain insights into TMIs acting on the markets for technology. Throughout the first part of the paper I provided new evidence on the growing number of TMIs and derived a conceptual basis for a further understanding of TMIs. The inherent difficulties of intellectual property monetization present a challenge for technology based enterprises and business opportunities for IP firms. Trade barriers like unreasonable seller expectation and uniqueness of the asset were among the challenges identified by the market players. Each IP firm specializes on the solution of specific problems induced by IP monetization. Such firms often provide a wide range of services to benefit from synergy effects of their resmyces and expertise.

Having carried out a review of the literature, reflecting on my first insights into the new models offered by TMIs, I saw that TMIs significantly change the direct seller and buyer relationship as common in 'traditional' ETE transactions towards indirect relationships. In their function of linking buyers and sellers supporting ETE transactions, based on secondary and primariy empirical data applying the 'nine business model building blocks' from Osterwalder (2004) I was able to identify 12 different TMI types which I then consolidated into sixe TMI archetypes using the framework for 'business models archetypes' of Herman and Malone (2003). Throughout this exercise I was able to gain insights into the variety of different funtions TMIs have on the markets for technology and various new ways how TMIs try to facilitate ETE transactions. However, the TMIs I investigated hardly employ a single business model, but rather combine different alternatives to better serve their clients. Typical mixed models

include the combination of Licensing Agent with Patent Broker and IP Consulting with Outsmyced Services. Examples of more complex mixed models are IP Investment Bank and Technology Transfer.
My study bears various limitations. Considering the fact that the markets for technologies are still in the development phase, the results of this research represent a first pursue to map the players and their activities. The market dynamics might change the picture rapidely, wherefore this typology should not be taken for granted over time. Currently, the intermediaries attempt to increase their revenues and investments by offering a broad range of products. Once such companies reach the maturity phase in their lifecycle, it is most likely that they will identify their core services narrowing their portfolios to the ones matching their core competences and the market needs. When the IP market reaches certain equilibrium, unquestionably there will be changes in the overall scenario. Nevertheless, even if the key players are replaced by newcomers or switch to innovative new business activities, the proposed models will remain representing the characteristic market behavior, peculiarities and type of transactions.
The selection of the sample also limits the extent to which my findings can be generalized. The sample was small and no intra-corporation technology transactions were included. Furthermore, individual licensing agents were also excluded. Such agents might be key players in the IP market depending on the industry. Nevertheless mapping all of them would be an unreasonable goal.

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Annex –TMIs identified for this study

1790 Capital Management
5i Principles Group
5iTech
Acacia Research
Acorn
Alliacense (TPL Affiliate)
Altitude Capital Partners
AmberWave
Anadeus Ltd
Analytic Capital
Applied Minds
ARM (UK)
Blueprint Ventures
Bramson & Pressman
BTG
Chipworks
Competitive Technologies – CTT
Cordis
DEKA
Element Asset Mgmt
Fairfield Resources
Free Patent Auction
General Patent
Iceberg (UK)
Inflexion Point
Innocentive
Intellectual Ventures
InterDigital
Invent Resources
IP Auctions
IP Auctions GmbH (IPA)
IP Capital Group
IP Group plc
IP Value
IPAC
IPB AG
iPotential
Maxiam
MIPS
MOSAID
New Venture Partners
NineSigma
NW patent funding
Oasis
Ocean Tomo
OnSpec Electronic
PatentBridge
Patentesque
Plexus Ventures
Pluritas
PLX
Poskanzer & Associates
Qed
Rambus
Rembrandt IP Mgmt
Semiconductor Insights
Sherwood Partners
Taeus
Technology Option Capital
Tessera
Texelerate
Thinkfire
TPL Group
TPL, Inc
Tynax
UCC Capital
UTEK/EKMS
Walker Digital
Yet2.com
Your Encore