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STEP REPORT 17-2003

TITLE

IP-Valuation as a Tool to Sustain Innovation

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CLIENT(S)

Norges forskningsråd, IE

REPORT NO. STF38A03817	CLASSIFICATION Unrestricted	CLIENTS REF.	
CLASS. THIS PAGE	ISBN 82-14-03210-5	PROJECT NO. 156404/260	NO. OF PAGES/APPENDICES 17
ELECTRONIC FILE CODE Document3		PROJECT MANAGER (NAME, SIGN.) Eric J. Iversen	CHECKED BY (NAME, SIGN.)
FILE CODE	DATE 2003-04-09	APPROVED BY (NAME, POSITION, SIGN.)	

ABSTRACT

In recent years, a variety of interests have argued that improved standards are needed for valuing intangible assets. Although there is agreement on this general point, there is persistent divergence among accountants, investors and analysts, economists and other proponents about what intangibles to measure, why to measure them, and how to measure them. This project attempts to lift the question above these divergent perspectives and argues that the larger concern involves how the valuation and capitalization of intangible assets can promote and sustain innovation processes in the economy. This report is based on a position paper presented at the UNECE High Level Task-Force on Valuation and Capitalization of Intellectual Assets, and is supplemented by a commentated presentation of the taskforce's first meeting. (viz. attachments)

It was supported by project Norwegian Research Council, project 156404/260, with contribution from the Norwegian Patent Office for travel costs.

Project title (original): Verdsetting av immaterielle eiendeler: forberedelse til konferansedeltagelse, oppsummering og analyse

KEYWORDS	ENGLISH	NORWEGIAN
GROUP 1	Industrial Management	
GROUP 2	Innovation	
SELECTED BY AUTHOR	Valuation of intellectual assets	Verdifastsettelse av immaterielle eiendeler
	IPRs	Patentering
	Innovation	Innovasjonsprosesser

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1 Introduction

The creation of new knowledge, its commercialization, and the ability to appropriate the economic benefits have increasingly become a competitive factor both for firms and, indeed, for economies. Therefore initiatives that improve the conditions for the generation, the diffusion, and the exploitation of new knowledge in the economy are increasingly sought after. In this light, this paper considers how more efficient methods to value and capitalize intellectual assets might contribute to chief policy-objectives of promoting and sustaining innovation in the changing environment.

The report starts by exploring the role intangible assets play in the emerging 'market for knowledge'. This theoretical discussion lays the basis to consider the need to improve conditions for valuation and capitalization of intellectual assets. The report then presents a brief survey of intangible valuation approaches. Finally, the report considers evidence of difficulties among smaller Norwegian actors in capitalizing on their intellectual assets, before deriving some implications about the need to improve conditions for the utilization of intellectual assets, especially through better valuation practices.

2 Intangible assets in the emerging 'knowledge market'

We begin from the position that the valuation and capitalization of intellectual assets should be seen in terms of the growing need to improve the way economically-important knowledge is generated and utilized in the economy. The argument is that the ultimate goal should be to promote and sustain innovation processes. Therefore, we start by briefly exploring the role intangible assets—especially those protected by IPRs—plays in the innovation process. The role of this type of intangibles particularly can be seen in terms of an emerging 'market for knowledge'. (Baumol, 2002) The idea of a 'market for knowledge' goes beyond the generally accepted premise that new technological knowledge has become more important to the economy. It emphasises, moreover, that the way economic activities are organized is also changing and in doing so, new challenges are emerging.

2.1 Three illustrative scenarios

Three basic scenarios can be used to substantiate the increasing relevance of valuation techniques, while also illustrating the sort of challenges that are in question. The first involves the changing way innovation activities are organized. Here it has been pointed out that the innovation process increasingly implies joint ventures, R&D collaborations, and other multi-actor arrangements in which different interests become involved in different capacities for different durations. (Arora, Fosfuri, Garbardella, 2001) The increasing currency of such constellations and the changing division of labor they imply, require new tools in order to work well. One prerequisite for such arrangements is an agreed way by which to value intangible assets during the collaboration and after. Here trusted techniques for valuation are becoming more important.

New challenges also emerge from the changing environment for financing innovation, not least in life-science research. This second scenario is characterized by innovators who are faced by particularly high investment costs, by long-horizons for development, testing, etc, as well as by un- or underdeveloped markets. Measuring intangibles becomes an important basis on which to attract investment as well as other funding for this type of innovator, who generally lack of traditional forms for collateral and who face evolving funding needs during course of the innovation process. Innovators of this type also find themselves faced by a wider variety of financing instruments from a variety of sources. (business angels, venture capital, public grants etc.) In general, there is a need for standard methods for valuing intangibles where more than one funder is involved, where funding needs are subject to change at different stages, and where traditional guidelines for funding do not apply.

A third scenario emerges at the firm-level, in cases where the challenge of proactively organizing company activities substantially involves intangible assets. In firms who are built around 'knowledge' and the hopeful

creation of intangible assets, there is a recognized need (especially in times of uncertainty) to develop a well-reasoned expectation of the value of what maybe the bedrock of the company. This is true of single tech firms familiar from the dot-com era; but it is also true to varying degrees of other companies, including diversified companies who need robust and reliable ways to gauge the relevant importance of their different in-house activities. In a range of settings, standardized valuation tools are thus also increasingly in demand at the firm-level.

2.2 The contribution of valuation techniques

Such challenges imply an overall need to adapt the conditions for the sustainable and equitable functioning of the 'market for knowledge'. In a well-working market, we expect that new knowledge can find the right complementary resources (not least funding); that knowledge creators and users can be brought together under conditions that are favourable for developing the idea; and that the same goes for promoting collaboration between different developers, in order to coordinate larger projects based on different pieces of knowledge. In this setting, there may be scope to improve interactions within knowledge markets or to improve the interaction between 'knowledge production' (generation and utilization of new knowledge) and other fixtures of the innovation system, specifically financial markets.

In this context, intangibles that have been codified in formal ways, such as in a patent, design right, trademarks or, otherwise, through contracts, are seen as especially important. These intellectual assets¹ represent accumulated knowledge that is also quasi-transferable. They are less intangible, because of codification, and more of an asset because the firm has a basis to appropriate profits. The expectation that improved valuation methods for such assets can improve the market for knowledge is significantly based on the fact that information has a fundamental effect on the organisation of markets, and on the perception of risks. (Arrow, 1999) In terms of improving the role of valuation reporting standards, it is necessary to focus both on their potential effects on the micro, as well as on the macro level.

At the level of the firm, valuation approaches based on intellectual capital models or business scorecard models are often inflated by a large number of indicators encompassing all areas of business activity. This may cause informational overload and reduce the efficiency of the new reporting standards. An OECD symposium (1999) suggests that there is a need to concentrate on firm's innovation processes and how these generate value. It is important to appreciate here that understanding what determines the value of intellectual intangibles entails understanding the firm's place in the innovation system. Baum G. et al. (2000) found that the most important value drivers in a company are (in rank order) innovation, the ability to attract talented employees, alliances, quality of processes, products or services, environmental performance, brand investment, technology, customer satisfaction. Hence, Baum et al. (2000) supports the argument that some firm-aspects are more important than others. To be successful, a firm must know the potential value of its knowledge base, have a strategy for monetising its intellectual assets, and be effective in generating a return on these valuable assets.

In this light, improved accountancy practices for intellectual assets can have a variety of positive effects beyond immediate, actuarial tasks. For example, they can contribute:

- To making enterprises more aware of value-potential which might otherwise be overlooked: (or under or overvalued)
- To sensitizing other actors in the innovation system to a more realistic understanding of the risks and rewards of this value
- To improving the working of different financial markets (more perfect information) which are important to the innovating small and medium-sized enterprise.

¹ The term used by the UNECE High Level Task Force on Valuation.

- To facilitating access to other markets (e.g. the US), including promoting different types of cooperation with foreign companies (mergers and acquisitions, also R&D collaboration)
- And to improving our analysis of the workings of the economy in significant ways: that is, they may lead to better economic and innovation policy.

At the level of the wider economy, the role of valuation reporting standards has implication for financial stability. The work of the Bank for International Settlements on financial risk measures and pro-cyclicality (see Lowe, 2002) notes in particular the possible effects of different methods and standards of intangible valuation on the aggregate economic conditions. The role valuation techniques of intangibles may play in this pursuit includes at least three general functions:

- The first function is to enhance conditions for the generation of new knowledge. This entails the organisation of markets for new knowledge, relative structures and appropriability mechanisms. The dissemination of knowledge and its spill-over effects is also dependent on the existence of efficient markets for knowledge appropriability.
- The second function is the (dynamically) efficient allocation of resources, such as, financial capital, human capital and knowledge capital in the economic activities. Given the importance of these factors to economic growth a more effective utilisation of those becomes a major policy issue.
- The third function relates to the uncertainty generated in the economy when there are systematic and large gaps between the market value of companies and the book value of their tangible assets. New reporting techniques on firms' intangibles may reduce this gap and contribute to more stable economies. It is not our intention here to discuss the complex interactions between institutions, such as reporting technique standards, the financial system and macroeconomic trends. However, it is important to recognize that reporting techniques help determine how the market factors in risk during the course of a business cycle. Is it possible to reduce macroeconomic instability and avoid procyclical tendencies due to well designed and new reporting techniques. In short, what may be the macroeconomic effects of the new reporting initiatives on market perception and distribution of risks?

A final issue that is perhaps underestimated in the literature is the potential costs related to a mandatory standardisation of information disclosure of intellectual assets. In general, there is reason to suspect that poorly designed accountancy standards may be detrimental to the functioning of intangible markets. This raises the question of what the potential dangers of this exercise are. This is an issue that we leave to future discussion. However, some important issues here would involve reporting incentives, macroeconomic effects, costs –particularly for the SME's, arbitrariness of what is reported and what is not, etc. In any case, a bad standard for reporting may be much worse than no standard at all.

3 Brief survey of intangible valuation approaches

In other markets such as those for products, it can be relatively uncomplicated to arrive at a 'fair market price'. One often has the advantage of being able to look to the sale prices of equivalent goods in order to get to get an idea of the 'going price' and value the good on this basis. Market surveys are also applicable in such situations. Determining the fair market value of an intellectual asset is however much more complicated. One point is that there is no market to survey for a new and unproven idea. Another is that the novelty implied in these assets means that such equivalent benchmarks are not available especially in more radical cases. Indeed, formal valuation of intellectual assets faces many challenges.

In view of the rising need for reliable valuation methods here, a surprising diversity of approaches has developed in recent years. (eg. Cañibano et al, 1999) One investment-literature oriented survey (Sveiby, 2001) identifies 21 approaches for measuring intangible assets. This section surveys several types of valuation methods intangibles, especially those involving intellectual property rights. The survey also takes into account that approaches also vary as to how they are designed to be used and by whom. We note that

the applications for the different approaches range from input for theoretical models, to accountancy standards for equity markets, to more specific tools for corporate management.

3.1 General characteristics

There are basically two classes of approach: (i.) the cost-based approaches which proceed from different methods to estimate the cost to develop the asset or an asset that accomplishes the same thing; and (ii.) value-based approaches, which utilize discounted cash-flow analysis or other approaches such as real-option methods (familiar from financial theory) in order to predict market value. In addition there is a set of other more tools that attempt more indirectly to proxy not only prices. The individual approaches are characterized by different focuses and different objectives. As a result they have different strengths in different contexts. In general, measuring 'intangibles' is done for a variety of different reasons: an accountancy/business management perspective wants to measure such assets in order to assist in decisions related to mergers and acquisitions or other investment decisions, to manage patent portfolios, to monitor the firm's performance/potential and report to shareholders etc. A financial analyst/investor perspective wants broadly to understand the same phenomena about companies, although their reasons for doing so are fundamentally different. In addition, theoreticians want to understand more aggregate phenomena, such as how such assets are allocated in the economy.

In addition to understanding why intangibles are being measured, a major distinction is what is considered to be an intangible asset. As the motives for measurement suggest, there is a large range for what falls under the category. These vary in degree of 'intangibility' and the degree to which the company has control over it as an 'asset'. At the one end, we have 'intangible assets' that proxy human capital or other as a residual category of company value. At the other, we have intellectual assets as covered by patent, design right, trademarks or, otherwise, through contracts.

3.2 Distinguishing patents and what is patented

A first step to addressing the value of intellectual assets is to distinguish between the underlying invention - which might be called the underlying intellectual asset - and the intellectual property right which confers exclusive rights over that invention. This distinction implies that the direct financial value of a patent is the value of potential profits obtainable from fully exploiting the invention defined by the patent's claims that are in excess of those obtainable without patent protection.

On this basis, Pitkelthy (2002) distinguishes the commercialization of inventions from the patents protecting such inventions on the basis that they hinge on one another but are not co-dependent. In the one direction, the ability to commercialize an invention depends on many non-IPR factors, such as, speed to market, control of complementary assets, etc. In the other, intellectual-property-rights may remain valuable even if the inventor no longer has any interest in direct commercialization. That is, a patent provides a right to protect anything falling within the scope of the claim irrespective of whether the idea is commercialized and by whom.

In terms of valuation, the strength of the intellectual property is nonetheless a critical factor in valuation approaches. The existence of patent and its status provide important indications of the value of the asset as perceived by the applicant. Patenting can indicate first that the applicant expected the invention's value to exceed the cost of filing for the right. The subsequent grant and the payment of maintenance fees provides further suggestion of the value even where there is no other indication of the invention's value reflected either directly on product or license revenues or indirectly through value on the equity-markets. The choices made at different points provide salient indicators of the asset's value environment. These information points have been picked upon especially real-option approaches, which we focus on in section 3.3. Another type of information that is developed by the process of patenting is patent citations. These have increasingly been used to proxy for important patents. We will feature approaches that use citations in section 3.4.

3.3 General approaches to valuation

Against this background and the background above, we explore some different approaches to intangible valuation currently being used. These are divided into two main lines that represent quite different traditions. The two traditions that have established themselves to approach the valuation question are again:

- **Cost-based approaches:** Cost-based approaches tend to proceed either from the costs related to the generation of the intangible asset in question and/or cost-estimates for a potential buyer to develop a solution which is the same or which accomplishes a similar result. Accordingly, this type is the more conservative approach and is favoured by some (especially in times of economic downturn) as providing relatively dependable valuation results at the lower end of what the asset may be worth. The question is how they are used: they are better at reflecting value to the asset holder but less useful for use by financial markets. One limitation is that the market is interested in information about the value (not the cost) of internally generated intangibles. Accumulated R&D costs in a particular project or programme, for instance, may represent partly or fully sunk costs if they are rendered obsolete due to a competitor's success.
- **Value-based approaches:** Value-based approaches tend to provide higher valuations than cost-based. The basic approach attempts to establish what the market (especially the equity market) perceives the value-contribution of intangibles to be when they assess company-value. This set of methods is based on the strong assumption that capital markets are efficient, in other words that there are no imperfections in the market of intangible assets due to insufficient information and information asymmetries. This is obviously a serious limitation if the aim is to find the intrinsic value of the intangible. On the other hand, this approach provides tools to systematically investigate the shadow value (or marginal contribution) of each intangible relative to tangible assets (see Bosworth et al., 2000).
 - **Real option-based methods:** In this line of approach, a relatively new and promising area for valuation of intangible assets involves option-pricing techniques. Here, real option valuation methods are used to factor in risk and other properties that may be captured in the option element of the intangible. One of the weaknesses of this approach is that the determination of the parameters necessary for estimating the real option value may become somewhat arbitrary (see below).

3.4 Conceptualizing tools

Another line of approaches involves conceptual models which can function as management tools.

Approaches such as the intellectual capital model or the balance scorecard can be characterized belonging to 'the new reporting paradigm' (see Upton (2001)). The balance scorecard (Kaplan & Norton, 1992) is one high profile approach that addresses the limited applicability of financial reporting standards to firms with disproportionately high intangible assets. It tries to account for the aspirations of investors, customers, employees and suppliers in creating value ultimately at the financial level. A further example is the Canadian Performance Reporting Initiative (CPRI). The fundamental premise behind CPRI is that the market and the firm need to acquire more insight into pre-transactional and forward-looking value creation processes of the firm. One premise is that traditional financial reporting is inherently limited in its ability to measure value creation. This suggests the need for a parallel reporting system to traditional cost-based financial reporting which enables measurement of value creation as it occurs.

A further example is illustrative of a more specific tool which incorporates different types of approaches. This tool was developed at SINTEF (in Norway) to help a large company evaluate acquisitions in the IT sector. It was based on the results of an NTNU project that had explored 'new technology-based enterprises' (NTBF) and had identified the tendency of specific types of these firms to 'tank'. In this setting, the tool systematizes a set of factors including technology, human capital, market as well as formal IPR rights and other legal

conditions. On this basis it generates scenarios for cash flow, given a set of different eventualities. An option-pricing is built into the model.

3.5 Focus on real-option based approaches

Real-option based approaches offer some of the most productive ways to address the valuation question, so they deserve more attention. Option based valuation approaches provide a particularly apt framework in which to consider the management of companies' patent portfolios and other IPR assets. These approaches are based on option pricing in financial markets. Option pricing theory (OPT) understands an option to be a financial instrument that gives a right but not an obligation, at or before some specified time, to purchase or sell an underlying asset whose price is subject to some form of random variation.

This basic definition of a financial option can be applied to situations other than financial options. Such non-financial options are known as real options. An example of a real option may be an R&D project. The cost of an R&D project may be identified as the price of a call option on the future commercialization of the project and the future investment needed to capitalize on the R&D program with the exercise price of the option. This approach is particularly apt where choices are involved—such as the choice to patent, to renew a patent etc—and where different outcomes can be envisioned. Taking account of such choices and such potential outcomes can lay the basis for much more realistic valuation of assets than approaches that do not factor these in.

Patenting involves several types of choices or options. It is theoretically possible to divide up the various stages of a patent or patent applications life into a series of options. Firstly, there are the options comprising expansion, deferral and abandonment of the patent rights. Secondly, there is the option of licensing the patent. Patent royalty cash flows may be then considered as a perpetual American option. Thirdly, one also has the option to sell the patent and the option not to license the patent. This gives us two additional options. Each one of these options should be possible to value using some of the concepts from real option theory. Real option theory predicts that early in a patent or applications' life the option component comprises the major part of the patent value. This value is often considerable. The theory supports in fact the view that early in their lives one should usually renew patents even in the absence of any current returns. However, much work remains in developing practical application of option pricing theory. On the other hand, pricing techniques of IPRs based on real option theories are already being used by market analysts in certain areas and deserves more attention. In fact, real option theories provide a new conceptual framework for a whole range of innovation policy issues.

3.6 Focus on citation-based approaches

Another approach which has increasingly been applied in theoretical analysis, relies on information found in individual patents. These approaches use the citations that patents make to antecedent patents. The expressed purpose of these citations is initially to distinguish the citing patent from the technological state of the art as represented by the cited patent. In this approach to valuation, patent-citations are used to say something about the 'impact' of patented technology and to identify so-called knowledge spillovers from one technology to another.²

The citation-based approach goes back to the early 1980s, when citations were used to identify "technologically important patents" (Carpenter, Narin, Wolf, 1981), to identify marketing trends (Narin, F: 1983), and, more to the point, to address issue of "the economic value of innovation". (Trajtenberg, 1983 and 1990) The association of citations with some 'impact' measure is based in different assumptions about what citation streams indicate. Sampat & Ziedonis, (2003) indicate that, in general, citations can be interpreted to reflect entry into profitable areas of research and/or technological opportunities or market interest in a technological area. In this setting citing patents can be seen as reflecting knowledge spillovers from earlier

² Iversen 2000. Kaloudis, 2003.

inventions, thereby suggesting some of the value spills over to subsequent inventions (ie. the citing patent: see box) In the other direction, cited patents might also reflect a 'publicity effect' whereby economically successful patents are more widely known and therefore more cited.

Box: the citation-based approach uses the extent of citation-streams as an indication of the value of the patented technologies involved.

- Citations made by a given patent (so-called 'backward-citations') can imply both the quality of the citing patent and the degree of extra-value that it derives in the form of a knowledge spillover from the cited-patents. The number of citations made is thought to represent how much of the extra (social) value from previous inventions is being captured by the citing patent. By citing earlier patented technology, the citing patent is to a certain degree capturing excess-value (a dividend on the social return) of the unappropriated value of the cited patents.
- Citations made to a given patent (so-called 'forward-citations') can indicate how important the cited patent is, and therefore indicate something about its value. The citations streams can indicate an important new technology and/or market.
- Limitations: patent citations take years to develop, so they are best used retrospectively and not in real time. Nonetheless, they can contribute to more comprehensive analysis for example in association with interviews et al.

In different ways, literature on this front has indicated that:

1. citation counts are indicative of knowledge spillovers and, by implication, of the generation of higher levels of 'social value' (e.g. Jaffe, Trajtenberg, and Fogarty, 2000)
2. citation-weighted patent stocks are indicative of the level of firm-value (Hall et al, 2000)
3. that citations are a good indicator of whether a patent is licensed (Mogee & Putnam, 2000) but not of licensing-revenues (Sampat & Ziedonis, 2003)

In addition, citations have been used as one component among others, reflecting the need implied by the complexity of the valuation question, for a range of different data. Harhoff et al (1999) have combined citation analysis with interviews and surveys in the case of particularly important inventions. This combined approach is promising, and it confirms a relationship between citations and value.

- Lanjouw & Shankerman (1999) have analyzed the patent-citations in light of other information to construct composite measures of "patent-quality". Adjusting for quality in this way improves analysis both in relationship to R&D expenditure and to economic significance.
- Oriani & Sobrero (2002) have used citation measures to augment a real-options approach. In this case, citations were used to rate levels of technological- uncertainty. (cf. Minutes from UNECE meeting)

4 The importance of getting the value right: evidence from Norwegian patenting

The successful transformation from intangible assets to value in competitive markets is contingent on a multitude of factors, many of them external to the firm. How do intangible assets fare as firms attempt to navigate these contingencies? In light of the above theoretical discussion, this final section explores Norwegian patenting behaviour for indications as to how the knowledge market functions in Norway. It is based on a study sponsored by WIPO to understand how SMEs use the IPR system in Norway. (Iversen, 2001) This glance through a patent-lens³ suggests that some firms in particular have difficulties navigating

³ Based on the WIPO study, the patent-lens used here picks up 6,303 Norwegian entities who, together, were involved in 14,319 'active' domestic patents during the 1990s. By "Active", we mean any patent that was applied for and/or granted during the 1990s AND any patent applied for before then but granted during the nineties.

the contingencies along the way from new knowledge (patent application) to intangible asset. (valid patent grant) In this exercise, we observe how different size-classes of firms not only enjoy higher levels of success in terms of grants: more to the point, we note that the smaller the firm, the higher the probability that it will itself withdraw the application. Withdrawal rates reveal something about the way individual firms evaluate the worth of their intangible assets and their ability to realize it.

4.1 Patenting and value

The premise for this exercise is that patent application represents accumulated knowledge and it represents an expectation of some economic return or other value. The fact that an economic agent applies for a patent indicates that the firm has accumulated novel knowledge which it considers to be an asset with commercial possibility. We recognize of course that this mode of formalizing one's intangible asset is neither equally attractive nor equally pertinent to all new economic knowledge in all firms in all industries. Notwithstanding, those who do apply dedicate resources (both in time and money) in the quest to derive some value from new knowledge that they presumably have developed.⁴

In this light, the fact that an applicant withdraws his own application can indicate a number of things. On the one hand, it can indicate that the application was poorly framed and the applicant had reason to believe that it would not be granted in an acceptable form. A more likely reason for why an applicant does not follow up the application (following a fee schedule) is that it has run out of the funding necessary to bring the idea to market (cf. the capitalization process, above) and/or that it has lost faith in the idea's ultimate success seen in relation to costs. We can therefore interpret withdrawal to mean, in one way or another, that the initial value expectations by the applicant became disappointed.

4.2 A decade of domestic patenting in Norway

The WIPO study indicates several aspects about the Norwegian knowledge market. The first is largely anecdotal. In raw terms, innovative Norwegian firms tend to be less active in protecting their IP than firms in other European countries. (cf. CIS) Whether this is due to their failure to recognize the value of their intangible assets or to some other reason⁵, is not known. One can assume a problem (especially among some firms) in recognizing intangible assets and formalizing them. As indicated, one potential advantage of improved valuation exercises is that they might get firms to take stock of their intangible assets.

A second observation is, however, that Norwegian actors, not least SMEs, have used the patent and trademark systems more actively in the course of the 1990s. This suggests that the knowledge base is growing, the propensity to formalize intangibles is growing, the propensity to use the IPR system is growing, or a combination. In this situation, it is important to make sure that all actors have realistic expectations about this exercise and that they have equal chances to derive value from it.

A final general observation is that the propensity to get as far as a patent application is strongly dependent on the size of the firm, for whatever reason. Smaller firms are on average much less likely to apply for patents than larger ones, even in the same industries. For example, a large firm (over 100 employees) in the electrical equipment industry filed on average 1.6 applications in Norway, while a medium-sized firms (50-99) on average filed 0.25 applications in the same period: the smallest are almost off the chart. (0.03) This suggests that either large enterprises tend to be more innovative, that they tend to be better at recognizing the potential of intellectual property rights to make the most of their new knowledge, that they are in a better position to capitalize on formalized intangible assets or a combination.

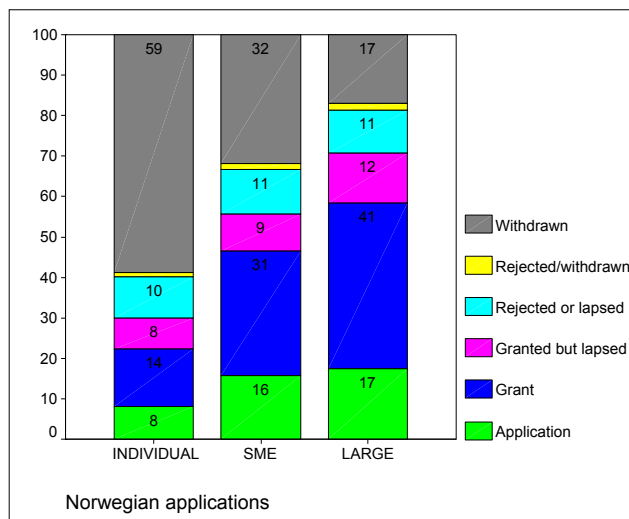
⁴ We recognize that the 'value' of patenting will differ among these actors and across time. Primarily, the value is seen in terms of aid the competitive position of the firm by affording it the room to cultivate its distinct qualities without threat of direct competition from imitations. In addition, there are other ways in which patenting can hold 'value' for the assignee which do not immediately involve dollar sign: e.g. signals to the market, strong-fences in R&D collaborations, etc.

⁵ ie related to the competitiveness of their markets, the relevance of patenting to their markets, etc.

4.3 Size-dependent patent-withdrawal

A more specific point from the WIPO report is that SME patents are more often withdrawn than those of large entities. This raises suspicions that smaller entities find it more difficult than larger ones to follow through on their attempts to capitalize on formalizing intangible assets. In this vein, the figure shows that 'success' among Norwegian patenting is indeed dependent on firm size. There may be many factors behind the differences in success rates, where "success" is measured as non-withdrawal. Part of the explanation is probably to be found at the firm level: larger firms have a better working understanding of the IPR-System, they have internal resources (and thus staying power and fighting power in litigation), and that they have a more conscious and better informed policy about intangible assets built into the enterprise's business strategy.

Figure 1. Norwegian applications⁶ by size-class and status. (N=12,277)



Source: Iversen (2002)

The reason that a much larger proportion of SME applications is withdrawn (1/3) than large enterprise applications (1/6) has to do both with such internal factors. However, it presumably also involves factors that are external to the firm, especially access to funding at critical stages in the development process. In general, the variable withdrawal rates suggest that several types of factors that might be at play, including:

- (i.) that smaller actors, especially independent inventors, tend to overestimate the value of their intangible assets going into a formalization process.
- (ii.) that smaller applicants are forced to cut losses during the long development process because of difficulties accessing complementary assets—especially funding. This suggests that many, perhaps good ideas, are not developed. (capitalization problem and the functioning of investment markets)
- (iii.) and, that smaller applicants have a poorer working understanding of the patent system and could use a greater degree of assistance when approaching it.

4.4 Some implications

In terms of valuation and capitalization of intangible assets, this exercise indicates that there is potential to raise the efficiency of intellectual assets utilization not least in a country with a large population of small enterprises. Here, the domestic patenting record illustrates that the value of intangible assets is by no means predetermined or constant. The fact that smaller firms patent less often, on average, than larger enterprises indicates that something about the generation and/or utilization of new knowledge and/or the utilization of the patent system is subject to scale.

⁶ 2,042 Unknowns and Unregistered applications are removed.

If we interpret this observation to mean that scale can influence the degree of formalizing intangible assets, we can posit two implications for improved valuation methods. The first is that standard methods need to take into account this type of difference. The second is that, as small firms become acquainted with valuation methods, there is the possibility that they might become more aware of the potential value of their intangible assets. A positive side-effect might be that they will more actively integrate a policy of formalizing intangible assets into their business strategy.

The size-related tendency to withdraw patent applications emphasizes the importance of improving firm-internal processes. The large proportion of SME withdrawals indicates that we face a need not only to increase awareness, but, moreover, to increase expertise about formalizing intangible assets. Here it is important that the smaller enterprises also have a realistic expectation of the potential value of intangible assets in the face of great uncertainty. The routinization of valuation exercises can promote this at the firm-level.

Establishing accepted standards for IP valuation may have a more instrumental affect in terms of factors external to the firm. We need also to increase awareness and expertise in not only in other companies, but in the institutional framework surrounding these companies. This wider recognition and more nuanced view of intangible assets, especially among banks and funding agencies, might improve the way financial markets work in relation to innovating firms.

5 Conclusion

Value-creation in the economy is connected to knowledge creation, dissemination, and utilization in its constituent enterprises and institutes. Methods to improve the way intangibles are recognized and valued via accountancy methods can improve the way the market for knowledge functions and, moreover, the way that emerging market interacts with established financial markets. The purpose of this short note has been to explore the relationship between valuation of intangibles and innovation processes, which was done both in theoretical and empirical terms. The ultimate goal is further off. The goal facing us is to improve the way intellectual assets are generated and utilized in an environment in which intangible assets have become more important.

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Vedlegg 1

03.12.2002

NOTAT

Fra: STEP-gruppen /Eric Iversen og Aris Kaloudis

Til: Forskningsrådet og Patentstyret

Referat fra UNECEs ekspertgruppe for verdsetting og kapitalisering av intellektuelle eiendeler - første møte

1. Møteoversikt

18.-19. november 2002, Palais des Nations: Geneve, Sveits.

Hovedansvarlig: Larissa Kapitsa, UNECE - United Nations Economic Commission for Europe, Direktør for Coordinating Unit for Operational Activities.

Innhold: Fire seksjoner, 17 innlegg, (se vedlegg)

Deltakelse: 55 registrerte deltakere totalt. Mange delegater fra UK, sentral Europa og Russland. Fire deltakere fra Norge, tre fra Danmark, én fra Sverige.

Deltakere fra Norge: Eric Iversen (STEP), Aris Kaloudis (STEP), Hanno Roberts (BI), Jan Taug (<http://taug.no/>).

2. Hovedinntrykk

Formålet med oppstartsmøtet til UNECE ekspertgruppen (heretter FNs forum) var å identifisere, systematisere og avgrense problemstillinger knyttet til verdsetting og kapitalisering av intellektuelle eiendeler. Dette er et aktuelt tema som i økende grad er viktig å drøfte i et bredt internasjonalt forum. Oppstartsmøtet i FNs forum kan sees på som et første ledd i et slikt arbeid. Som sådan, viste dette første møtet både hvor fruktbar men også hvor vanskelig en bred drøfting av denne problematikken kan være.

Ekspertgruppen var relativt bredt anlagt på to måter. For det første, var den bred i forhold til den type ekspertise de ulike deltakerne representerte. Gruppen besto av representanter både fra den private og den offentlige sektor men også fra ulike forskningsinstitusjoner. Det var blant annet flere anerkjente forskere fra ulike faglige tradisjoner. Vi anser dette mangfoldet som en viktig forutsetning og en stor fordel med FN forumet.

Ekspertgruppen var også bredt anlagt når det gjaldt det geografiske utgangspunktet til de ulike deltakerne. Det mest påfallende skillet var mellom de østeuropeiske deltakerne og de fra Vest-Europa og Nord-Amerika. Også denne dimensjon utgjør en unik styrke ved FN forumet. I oppstartsmøtet førte ulikhetene som er implisitt i denne sammensetting til en del forvirring, særlig når det var kombinert med de ulike deltakernes faglige fokus.

Vårt hovedinntrykk er dermed noe blandet, både når det gjelder relevansen til FN forumets målsetninger og til kvaliteten. De fire ulike seksjonene var til dels ikke klart nok avgrenset (med unntak av seksjon 3), mens relevansen til FN forumets målsetninger og kvaliteten til de enkelte innlegg varierte forholdsvis mye. Flere innlegg bidro med faglig interessante synspunkter som virket klargjørende og tankevekkende for forsamlingen. Dette gjaldt spesielt tema rundt analytiske metoder for verdsetting av intellektuel eiendeler. Det var ellers jevnt over gode observasjoner og konstruktive kommentarer fra salen. I tillegg var det en forbedring fra dag 1 til dag 2, ettersom oppstartsmøtet begynte å finne sin form.

Innleggene handlet for det meste om bedriftsinterne prosesser knyttet til intellektuelle eiendeler. Det kan her skilles mellom to ulike typer fokus. Det var på den ene siden flere deltakere som var

mest opptatt av de fremtidige verdiene som ligger i bedriftenes styringsprosesser av intellektuell kapital. På den andre siden la andre vekt på de intellektuelle verdiene som allerede finnes i bedriftene. Avstanden mellom disse hovedtilnærmingene var stor til tross for at de kan sees på som komplementære.

Det var relativt lite fokusering på det mer overordnede nivået, der verdsetting og kapitalisering av intellektuelle eiendeler også sees som et offentlig virkemiddel for innovasjon og økonomisk vekst. FN forumet prøvde å få slike visjoner frem (spesielt i seksjon 4, men også under seksjon 2), men fokus på politikkkutforming ble for svakt i oppstartsmøtet. Dette skyldes ikke minst at problemstillingen er uvant og kompleks i seg selv. FN forumet burde være et velegnet forum for å utvikle dette temaet parallelt med diskusjoner om verdsettingsmetoder.

3. Sentrale bidrag

De 17 ulike innleggene kan deles inn i fire kategorier som delvis går på tvers av møtets fire seksjoner. Den første kategorien inkluderer verdsetting av bedriftenes intellektuelle kapital på bakgrunn av informasjon om interne verdiprosesser. Hovedinntrykket fra innleggene i denne kategorien er at det, i tråd med moderne bedriftsteori, fremgår en betydelig eksperimentering med nye metoder for bedre å forstå hva som skaper merverdi i selskapene. Vårt inntrykk er at denne typen tilnærminger foreløpig har begrenset betydning for markedenes verdsetting av bedrifters immaterielle rettigheter.

Innlegg fra bl.a. Taug og Roberts (begge fra Norge) hører hjemme i denne kategorien. Her var det en tendens til å tone ned betydningen av de immaterielle rettighetene (IR) som allerede eies av bedriftene og fremheve bedriftenes organisering av prosesser som skaper verdier i fremtiden. Det hevdes at allerede oppnådd IR forteller oss lite om bedriftenes evne til å generere fremtidige verdier og at i stedet både enkelte bedrifter og markeder bør fokusere på de faktorene og prosessene som kan gi merverdi i fremtiden. Denne tilnærmingen legger nødvendigvis større vekt på styring og utvikling av bedriftenes menneskelige kapital.

Den andre kategorien inneholder innlegg om metoder for å kartlegge og måle verdien på IR (i hovedsak patenter) i et selskap. Det var til stede flere anerkjente autoriteter på dette feltet (bl.a. Pitkelthy og Bosworth). Innleggene av denne typen var konsistente og til dels meget gode, men ble unntaksvis litt for tekniske for panelet.

En underkategori av metodediskusjonen fokuserte på kommunikasjonsverktøy. Glasgow (USA) og Nielsen (DK) presenterte verktøy som på ulike vis kan hjelpe den enkelte bedriften til å synliggjøre og presentere hvilken posisjon (og dermed verdi) dens IR kan ha i forhold til verdiskaping innenfor bedriften (IP-Score 2.0) og i forhold til andre teknologier eller konkurrenter i markedet (Patent Matrix). Det sistnevnte er et interessant verktøy i bl.a. analyse av patentkrav og av siteringsmønstre.

Hovedkonklusjonene fra de innleggene som fokuserte på analytiske metoder for å måle verdien av IR er følgende:

- Tidligere kostnader er ikke et velegnet mål for verdsetting av immaterielle eiendeler (inkludert FoU).
- Metoden som ser ut til å gi lovende resultater og som tiltrekker seg mye god forskning, er opsjonsmetoden. Hovedideen her kommer fra finanst teori. En opsjon gir mulighet til å velge om man skal investere i et underliggende verdipapir på et fremtidig tidspunkt. På samme måte kan man betrakte en patentrettighet som en 'real' opsjon, dvs. muligheten til å velge å bruke patentrettigheten eller ikke på et senere tidspunkt, når kunnskapen om teknologien og om

markedet er bedre, og investeringsrisikoen lavere. Denne valgmuligheten er et gode i seg selv, og har en pris som fastsettes i markedet.

- Det er verdien av bedriftenes portefølje av patenter som bør estimeres, ikke verdien av enkelte patenter i en bedrift. I tillegg må man justere denne verdien med risikomålinger i bransjen og i det tekniske området som hvert enkelt patent hører til.

Flere deltagere så på IR som et godt utgangspunkt for å kunne estimere nåverdien av fremtidig avkastning i en bedrift. Opsjonsteorimetoden, sammen med mer sofistikert måleverktøy, kan kaste mer lys over hvordan verdien av IP kan henge sammen med verdien av andre immaterielle rettigheter i et selskap og eventuelt andre eksterne faktorer.

Den tredje kategorien består av innlegg som hadde et mer overordnet politikk perspektiv. Endemann (CA) holdt et generelt innlegg om Canadas nasjonale innovasjonssystem, men hun berørte ikke verdsettingsproblematikken. To innlegg fra EU kommisjonen var mer visjonære og inkorporerte et 'holistisk' perspektiv. Dette perspektivet er basert på erkjennelsen av at all kunnskap er kontekstuell. Derfor må en verdsetting av intellektuell kapital ta i betraktning hvordan kunnskap generer merverdi i et innovasjonssystem. På det grunnlaget er det strategisk viktig å integrere sektorielle og regionale subsystemer. Dette er ikke like lett i praksis, men perspektivet er absolutt interessant.

Vi savnet innlegg som diskuterte hvordan verdsetting av IR og andre intellektuelle eiendeler kan sees som et offentlig/politisk virkemiddel for å forbedre ressursallokering og incentiver for innovasjon i et nasjonalt system. Iversen og Kaloudis (se vedlegg) påpekte denne mangelen i konferansen.

Den fjerde og siste kategorien inneholder innlegg fra Russland og andre sentraleuropeiske land. Disse var omfattende presentasjoner, men var lite fokuserte og tok for seg problemstillinger som var mest aktuelle for denne geografiske regionen.

Det er liten tvil om at UNECE arbeid kan være interessant både for overgangskonomiene og for utviklingsland. Vår anbefaling er i tråd med representanter fra EU-kommisjon, at en bør ha et mer systemorientert perspektiv på politikktutforming i det videre arbeidet.

Verdsettingsproblemstillingen er viktig ikke bare for de enkelte bedriftenes fremtidig vekst og lønnsomhet, men også for innovasjonspolitikken i et land.

5. Konklusjoner og videreføring av UNECEs arbeid

Det blir spennende å se hvordan FN forumets arbeid blir fulgt opp. Det ble sagt at en forlengelse av ekspertgruppens arbeid vil bli overtatt og koordinert i en annen del av UNECE (Economic Analysis Division?).

Det vil etter vår mening være hensiktsmessig å dele ekspertgruppens fremtidige arbeid i to tematiske moduler. Den ene modulen bør fokusere mer på verdsettingsprinsipper og -prioriteringer på systemisknivå. Den andre modulen bør fokusere mer på hvordan man kan forbedre verdsettingsmetoder og dataverktøy. I dette arbeidet er det viktig å ha klart for seg hvordan bedrifter kommuniserer sine underliggende verdier til markedet, og at dette er av betydning både for finansmarkedets og innovasjonssystemets effektivitet.