

A Framework for the Economic Analysis of Patents in a Business Context

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This framework of analysis and economic evaluation of patents has been developed in a project initiated and supported by the Italian Ministry of Economic Development – Italian Patent and Trademark Office (Ufficio Italiano Brevetti e Marchi, UIBM), having the aim and objective of defining “a joint methodology shared among public administrations, public and private research sectors, private enterprises and banks in order to elaborate and deploy an evaluation model with which to identify and locate the economic value of patents, namely the added value accruing to an enterprise from the exploitation of new patented technologies”.

The project outcomes and this framework have been one of the key aspects of the Memorandum of Understanding between the Italian Ministry of Economic Development, ABI (representing banks), Confindustria (representing industry), CRUI (representing university), signed on the 21st October 2008.

The last century has witnessed an increasing attention to the intangible assets and the intellectual property rights, while economy was progressively shifting from the traditional productive sectors to those ones, which resulted more impacted by improved- and new- technologies, and whose competitiveness resides in the knowledge, competences and innovation potential.

In this context a new paradigm about innovation and economic growth emerged, the so-called Knowledge-based Economy, but it was not the only one.

New and established enterprises found themselves in the position of acquiring valuable knowledge, technologies, intellectual properties from external sources in order to develop new products/ processes, enrich their technology and patent portfolios, which in turn strengthen their competitive advantage. The emergence of “markets for technology” is captured in the so-called Open Innovation paradigm.

While these transactions required a deeper understanding of the valuation methodologies for those intangible assets, in the last decades the interest for determining the value of such assets and in particular the economic value of Intellectual Property (IP) Assets became even more pervasive.

It emerged the need to communicate the value of a new kind of assets expecting to have relevant economic and financial impact, the opportunity of a new type of disclosure of new information having economic – financial impact.

Evidence of such economic financial impacts could be derived from an Ocean Tomo's analysis¹, which revealed that in the last thirty years an increasing portion of the value of companies belongs to the so-called intangible assets: It reported that already in 2005 almost 80% of the market value of S&P 500 companies was related to the intangibles. It is not difficult to derive the value of the Intellectual Property assets, if we remember that, as portion of the intangible assets, they make up about 50-70% of the latter.

In these scenarios, which involves LEs and SMEs as well, the management and evaluation of intangibles and intellectual property rights (IPRs) is driving unprecedented attention.

If we look at the context where such industrial property has the potential for various exploitation and valorization paths, we can identify at least three layers, three elements for such innovation and economic growth.

- The first one, in the middle in the drawing of slide 2, is the Industrial Property (which also means R&D, technology, innovation): An adequate business plan for its exploitation could highlight the business potential and pave the way for some profits.
- The second element, on the top of the drawing, emerges from the exploitation plan and is the potential for creating future economic value, which includes strategy and operations plan and resources.
- The third level represents the ground level or the fertile soil, in which the two other elements are seeded, and it is the access to financing – Debt / Risk capital (investments / funding).

What considerations can be put forward to justify creating and nurturing "enabling conditions" and who are the parties involved? We can start thinking that: Patent Systems shape today's economic and business arena; are considered a fundamental component of development; Patents represent, as other IPs, a competitive resource and could confer a competitive advantage; Industrial Properties and patents act as catalysts in the business context; Industrial Property can impact the revenues generating potential and capability of enterprises and can affect business sustainability, business risk, as well as the bottom line.

Then, for the actors, we can think of: - The Patent system / Institutions; - The Enterprises / Industry; - The Finance Sector / Banks.

¹ Carson, R. "Introduction. Get your assets in gear: aligning IP strategy and business strategy". Available at http://www.wipo.int/sme/en/documents/pdf/ip_business_strategy.pdf. Accessed November 2008

In this triangle, "patent – business – financing" (slide 4), on the side "patent – business", activities intervene like Creating/ Obtaining/ Transferring patents / IP. On the side "business – financing" we may expect more about traditional and non-traditional programs and practices for Enterprise Financing / Rating.

It is on the "patent – financing" side, which is the conjunction between "Industrial Property" and "Finance: Banks, Investors", where we saw/ see the possibility for the aforementioned IP-based economic growth and the opportunity to intervene designing and deploying a framework for analysis and valuation of patents/ IP, in the perspective of helping, facilitating the financing of projects / ventures backed-up by IP.

In this effort of linking IP and Finance, the project identified the need for a methodology in order to recognize the economic value in the business context and to communicate it.

The question "*How a patent, or a patent portfolio, or a cluster of various IPRs could impact profitability (profit margin, bottom line...)?*" is both for the entrepreneur, who invests in IP for a project, his own enterprise / venture, and for the bank or for the venture capitalist or for the investor interested in a project / venture backed up by different assets, among which IP has a large share and/or relevant contribution.

As reported in the opening note of this narrative of the presentation, the UIBM's project had clear objectives: "*... elaborate and deploy an evaluation model with which to identify and locate the economic value of patents, namely the added value accruing to an enterprise from the exploitation of new patented technologies*".

In other words the task was to create a methodology and a tool for mapping and measuring patents in a business context, considering not only the patent and the invention, but also the business plan for exploitation and value extraction initiatives. A further target was the development of a tool for the analysis, evaluation and appraisal, according to that joint methodology for evaluating relevance and robustness of patents/ intellectual property contribution to the cash-flow generating potential.

In this way patents were/ are no longer considered only defensive instruments, but real business tools having relevance for decisions about investing/financing.

In its approach of identifying and developing the methodology and the framework, the project faced some challenges.

Among others, it needed to: Balance complexity and standardization; Comply with qualitative and quantitative analysis; Measure relevance and merit; Be compatible with current evaluation practices (e.g. of projects) in banks; Be aligned with other regulations/ definitions (e.g. IAS, FASB, Basel II...); Be a communication tool; comprehensible and transparent; etc.

In order to understand and represent the contribution of patents/ IP to the business project, - in a business context, in presence of initiatives of exploitation and of expectations of value creation/ extraction from such initiatives, - there is a need for modeling this process of value creation.

On the one hand we understand that the Entrepreneur "acts" upon real exploitation initiatives backed-up by IP, for improving the cash flows (premium price, cost reduction, increased market share, partnerships and contracts...). On the other hand, for the evaluation, usually we (would like to) refer to a model, which could support and guide our qualitative/ quantitative analysis, aiming at understanding the contribution of the patent(s) to the "real" value creation/ extraction process.

So, for an evaluation in a business context, we would like to model the process and therefore we would need to recognize the Value Drivers, i.e. identify, select and "read" the Value Driver Indicators in the Value Creating Process, where the enterprise is the unit of analysis. Moreover we would also need to recognize the Enablers i.e. identify, select and "read" Opportunities & Threats in the Value Creating Process in the Market, whereas, in this case, the context becomes our unit of analysis.

The adoption of different perspectives, to "read" and model the valorization and exploitation path(s), is a way of structuring the identification and selection of the indicators for the model/ framework. In particular, we thought that the patent/ IP can be viewed through the factors that, in the following areas, could have an impact on revenues, costs, profit, cash flows, positioning, competitiveness, etc. The areas are: - Efficacy of protection; - Position of the invention(s) in the state of the art and in the technology road-map; - Capacity/ Resources for the patent(s)/ invention(s) in the enterprise: efficacy and efficiency of the exploitation; - Channels for market access/ marketing of the patent(s) / invention(s); - Market (trend, readiness...).

These five areas become the five perspectives for the analysis of the patent and, in turn, become the five modules of the framework in which the criteria and indicators are accommodated and organized (slide 11).

In order to support the analysis, indeed, we have considered that the framework should allow different perspectives or modules for organizing and structuring criteria and indicators, and it should allow for the correlations among parameters for mapping the asset(s), as well.

For the valuation method to adopt, the availability of Rating/ Ranking Methods has been considered as the most adequate ones, as they are generally referred to be flexible/ multi-criteria/ multi-parameters, as in fact our framework should be. Moreover, advantageously, these methods have been already largely adopted and tested and, in particular, among others, they are already known and used by experts in the financial world, (analysts, banks, investors...), by marketing experts, by technical-economic valuation practitioners, etc.

For building the framework components (which are: Scoring criteria, referring to the criteria and indicators; Scoring System; Scoring Scales; Weighting factors; Decision Table, referring to partial and overall results, and specific areas to look at), theoretical and practical insights has been derived both from the literature and best practices (e.g. with reference to the book of Razgaitis²).

² R. Razgaitis. 2003. "Valuation and Pricing of technology-based Intellectual Property". Wiley

According to the general application of a Rating/ Ranking Method, the proposed model – framework of analysis relies for the valuation on the reasoned assignment of the scores and the application of weights to signal relevance. With the proposed modular structure experts can advantageously take into account individual results and aggregated ones, or use module by module results or overall outcome of the valuation platform. Additionally users can rely on such tool for analysis in support of strategic considerations and planning, while evaluators can extract, from this framework, useful inputs in the subsequent application of traditional (and non-traditional) “monetary” valuation methods.

Within the modules, the indicators, which are 86 in total, distributed in five modules as said, have a Primary Grouping, which identifies them either indicating Robustness (Robustness of [patent, technology...]), or indicating Impact / Effect. Additionally the indicators are also characterized via a so-called Secondary Grouping, which distinguishes between indicators related to Probability of Success (or Risk) and the ones closer to Relevance.

For an overview on how the two groupings have been realized and visualized in an exemplary module, please refer to slide 15. For an example of presentation of the results and mapping of the outcomes in the Capacity/ Impact diagram (Primary Grouping) and in the Probability of Success/ Relevance diagram (Secondary Grouping), please refer to slides from 16 to 19, which include an exemplary case, fully resolved using the framework.

In particular, the slide number 17 presents an alternative interpretation of the secondary grouping, where Relevance could be a “*proxi*” for Profitability, and Probability of Success is intended as a “complementary measure” of Risk, ($\text{Risk} = 1 - \text{Probability}$). The same diagram on slide 17 is recalled in slide 20 to illustrate the IP-based Project selection when exemplary, ideal lines representing a “utility function” or an “efficient frontier” are drawn.

In conclusion the proposal and development of this modular framework/ platform for the economic analysis and valuation of patents proved a good choice for organizing Business Context related indicators and criteria, remembering that Business Context related criteria are usually hard-to-quantify.

It helps in structuring and simplifying the analysis, allowing for the systematic grouping and integration of indicators/ parameters/ modules; moreover it supports extracting indications about risk, in particular with respect to potential areas/ perspectives (like on a chart), which could be functional, eventually, to facilitate credit worthiness analysis.

In its simplest form the framework provides useful guidelines / checklists.

For an advanced use, its modular and specific format proved flexible, manageable and customizable: It could be integrated and used, for example, in support of “judgmental” evaluation methods, e.g. for evaluating IP-based new innovative enterprises, start-ups, spin-offs...

The usefulness and appreciation of this framework, as a tool for the economic analysis and valuation of patents, derive from the fact that it provides a model and guidelines for a simplified evaluation of a complex type of asset at work in a business context, as it stretches between finance and strategy, and provides also graphical representation of the results in support of the decision making.

The platform represents also a sort of control / check tool, not only for *ad hoc* analyses and valuations, but also for recursive check-up.

The valuation according to five perspectives allows for an improved understanding of the so-called intrinsic value, and, since the analysis can be used for tailoring and framing a subsequent application of traditional valuation formulas, it could also pave the way for a more reliable calculation of a monetary value.

In this sense, slide 24 schematically illustrates the conceptual applications of the outcomes of the platform/ framework (which can be seen as a grid of scores and weights presenting, graphically and numerically, how a project scores in terms of Robustness, Risk / Probability of Success, Relevance, Impact) to correct/ tailor the calculation and the parameters, which intervene in the application of well known valuation methods like Cost-, Market-, Income-, Real Option- Approach.

The inclusion and selection of additional parameters for assessing risk in presence of patents/ IP in a project could be beneficial in the decision process for financing innovative projects or opening credit lines for innovative SMEs (e.g. highlighting possibilities for the mitigation of the business risk, better credit rating thanks to competitive advantages, etc.). Or we can also think using the tool in support of devising financial instruments to facilitate access to capitals to SMEs and to new and innovative firms/ ventures.

The framework could also eventually facilitate integrations of IP related policies into programs in support of enterprises' creation and development.

We can say, in the end, that this UIBM Project did not aim and look specifically at a formula for determining the monetary value of patents, but at a tool to collect, select and support the assessment of the merit and contributions of patents in a comprehensive view of credit worthiness in favor of innovative business projects supported by patents/ IP.

This was achieved by looking at patent/ IP correlations with other business or project components for: Improving the analysis of credit worthiness, in presence of IP; Improving risk management: risk mitigation logic; Locating and "reading" patents in a business, strategic and financial-economic context; Facilitating access to debt and venture capital; Considering (perhaps, for the future) the feasibility of using patents as collaterals, guarantees, pledges.