

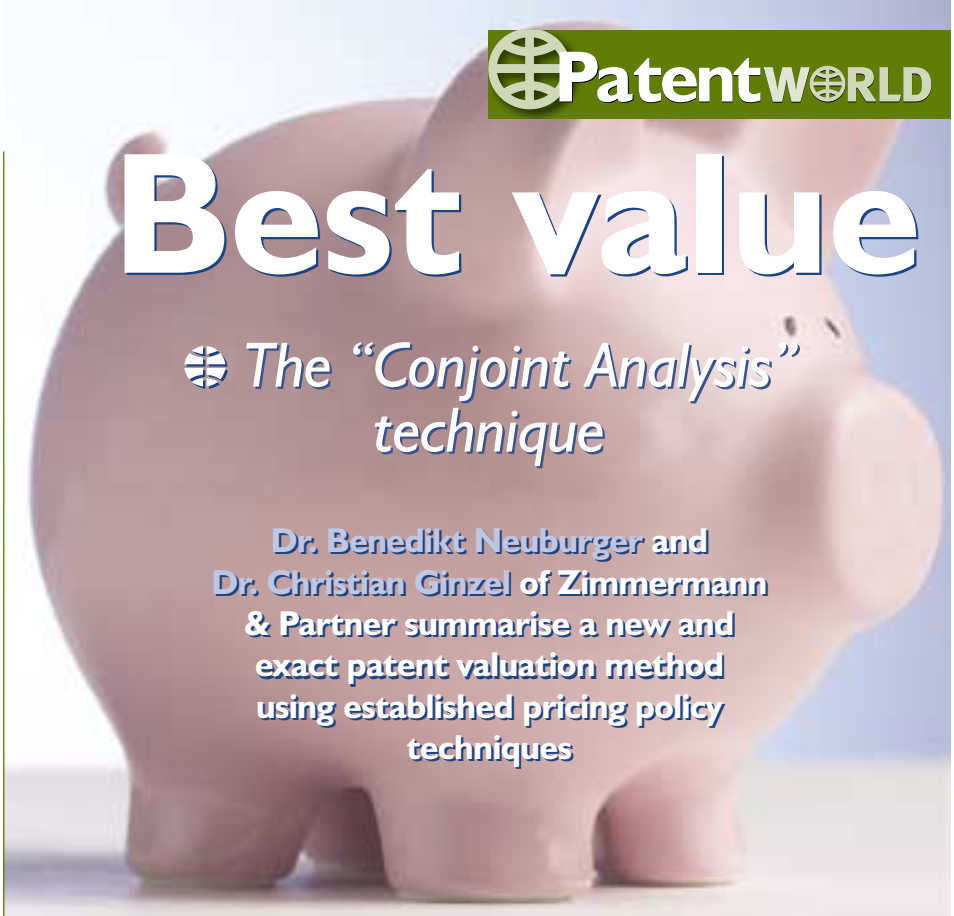
IN SUMMARY

- The known methods of patent valuation can be divided into four categories: cost-oriented methods, profit-oriented methods, market-oriented methods and the accounting of indicators. These have several drawbacks and leave the practitioner without methodical help in many respects
- Patent valuation is always a forecast, which can either be off the mark or hit the bull's eye. Valuation methods that are free of conceptual errors and use the latest and most exact information should be as correct as possible
- This article introduces the "Conjoint Analysis" valuation technique, which gives a precise patent value and can be used both for patents and pending applications, both for single patents and pluralities of patents.

AUTHORS

Dr. Benedikt Neuburger MBR (left) graduated in physics and is a master of business research. Whilst starting his training at the patent law firm Zimmermann & Partner in Munich to complete the process of becoming a German and European Patent Attorney, he worked on his doctoral thesis on patent valuation which was published in 2005 ("Die Bewertung von Patenten." Wiesbaden)

Dr. Christian Ginzl (right) is an associate with Zimmermann & Partner. After obtaining his doctorate in physics, he gathered industrial experience at the Siemens patent department for several years. Today, he is a qualified European and German Patent Attorney with more than 15 years experience in the field intellectual property law.



Best value

The "Conjoint Analysis" technique

Dr. Benedikt Neuburger and Dr. Christian Ginzl of Zimmermann & Partner summarise a new and exact patent valuation method using established pricing policy techniques

The awareness that IP has become a powerful competitive tool in technology markets has found its way into almost every corporate strategy. In 2005, the EPO registered the highest number of patent applications ever filed.¹ Clearly, the new competitive battlefield is IP.² The key weapons are patents. But how effective is each weapon, how valuable is each patent? How can you determine the value of a patent when, for instance, it is sold, licensed, a merger of enterprises occurs or in an initial public offering?

According to an economic understanding, patent value is defined as the future profits resulting exclusively from the ownership of the patent. The methods known so far in the art for estimating the value of a patent can be divided into four categories.³

- Cost-oriented methods calculate the expenses incurred in making and applying the invention such as R&D costs, patent attorney and patent office fees. Such methods, however, have little in common with an economic understanding of the patent value as they do not map future earnings resulting from the patent. Hence, they may be simple to apply, but their results are not of any value.
- Profit-oriented methods aim at calculating the present value by forecasting the future

profits resulting from the patent. From an economic understanding, this would appear to be the correct approach. However, the methods known are mainly concerned with determining an adequate discount rate with future risks being considered in said discount rate. Known profit-oriented methods do not give any methodical assistance as to how those future profits can be estimated. In many cases, they are estimated by extrapolating the profits of the last years, or by asking experts for their opinion. That is, the application of profit-oriented methods needs further methodical support, particularly in the case of a patent that is related to a product not yet brought to market.

- Market-oriented methods are based on the assumption that there is an active market and values are a result of free trading of fully informed market participants. The most popular example for a market-oriented method is the licence analogy method which calculates an amount that a licensee would pay for the right to use the invention protected by the patent. Normally, the licence rate is taken from recommendations given in the literature or from corporate documents. However, as uniqueness is one of the most characteristic natures of a patent, these methods suffer from the low comparability

between patents and licence agreements. Furthermore, when determining the resulting value of a patent, the sales of the patent-related product must be forecasted. This task, however, is not solved by the licence analogy method.

- Recently, many researchers have tried to give an estimation of the patent value by accounting for so-called indicators, eg the number of inventors, the multinationality of the inventors, the number of later patents citing the patent to be valued or whether the patent has been subject to an opposition or litigation etc. There have been studies showing a relationship between some indicators and the patent value.⁴ However, these methods consider neither the technical teaching and the scope of protection, nor do they examine the demand in the relevant market of the product/method protected by the patent. Therefore, they can only be applied as a rough estimate for large patent portfolios where the law of large numbers reduces the defectiveness of such coarse approaches.

Doing it better

Before discussing any further details, there are two major valuation issues to be aware of. Firstly, patent valuation is always a forecast. You may be off the mark or hit the bull's eye. However, if you use a valuation method that is free of conceptual errors, as well as the latest and most exact information that exists, you should be as correct as possible. Secondly, you don't get a Rolls-Royce if you don't invest enough. The same applies in the valuation fields. You obtain a valuation of poor quality if you don't spend enough time and money to have a closer look at both the patent and the relevant market.

We present a new patent valuation technique which is called "patent valuation by Conjoint Analysis". For further details and a complete valuation example please see *Neuburger (2005)*.⁵ In using this method, both the technical aspects of the patent and the market demand aspects of the product/method protected are taken into consideration. No licence rates must be estimated. The most up-to-date market information is used. No non-disclosed information on the patent is necessary. Related patents can be valued in one hit. Also, pending applications or utility models can be valued.

Conjoint Analysis (CA) has had a long and productive tradition in marketing, particularly in pricing policy. CA is a method for estimating the value people place on attributes and options which define products and services/methods. The goal of a CA is to assign specific utility values to the attributes that consumers consider when choosing between concurring products and making a purchase decision. For instance, a traditional electric bulb could be specified by the attributes power consumption, lifetime and price. Different options may be assigned to each attribute, e.g. 40 W, 60 W or 90 W to the power consumption attribute; 1,000 hours, 2,000 hours and 5,000 hours to the life-time

You may already have an idea how the CA could be used for valuing a patent. A patent is directed to an invention. An invention has at least one essential attribute which is, roughly speaking, an aspect of the invention that typically generates an added value for the consumers. The essential attribute may be an explicit feature listed in the independent claims, a function or an advantageous effect resulting from the invention. The essential attribute is the one that only the patentee is allowed to offer in its products therefore having an exclusive monopoly position. This is the one our CA market study has to be focussed on.

Once you have identified the essential attribute, you may have to "translate" it into a

“You don't get a Rolls-Royce if you don't invest enough. The same applies in the valuation fields”

attribute etc. When searching for information on the preference of consumers, random combinations – the so called "stimuli" – with one option of each attribute, are presented to the respondents of the CA interviews. That is, the consumers do not judge on isolated features of a product, but on complete products. In a typical CA interview the respondents rank the product stimuli presented according to their preference. For instance, the respondents are given 10 stimuli, each describing a bulb by means of specifying one option for each of the attributes power consumption, lifetime and price. Then, the respondents have to arrange these stimuli in an order that reflects their preference for the bulbs described on the stimuli, typically having the most preferred stimulus (i.e. the most preferred bulb) on the top of the stimuli stack. Upon evaluation of the results, one can calculate what additional price the consumers would be willing to pay in order to obtain the product with the specific attribute or option instead of the alternatives.

You may ask "Why don't you ask the consumers directly on how much extra they would agree on paying?" There is an easy answer: people could not tell you because the question would ask too much of them. Research clearly shows that you end up with invalid results if you ask such direct questions.⁶

language consumers can understand. Try cutting down the patent language to common speech by, for instance, replacing abstract claim wording with examples, analogies or the function/advantage of the invention.

For example, the patent to be valued is perhaps a patent on a plate having a slot at one circumferential position in order to place the handle of a champagne or wine glass. Such a plate may be very advantageous for cocktail receptions. The essential attribute of the invention may be identified as the slot in the plate. Alternatively, you could define the essential attribute of the invention as the possibility to removably fasten a glass to the plate, thus making it possible to hold a plate and a glass in one hand. Either way, when valuing the patent, one has to perform a CA that includes at least one attribute or option that relates to this central idea of the invention.

You don't get proper results if you ask the consumers complex questions about their purchasing behaviour directly. In real life consumers base their buying decision on a comparison of complete products. There may be a plate without a hole, white in colour, modern in design, made of ceramics, and at a rather high price. There may be another plate with a hole, also white in colour, but having conventional design, made of clay, and at a moderate price etc. In theory, there are many

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alternatives to combine all the options of the several attributes. However, in order to get evaluable results for the valuation it is sufficient to perform a CA including e.g. 10 such product stimuli. These are the products the consumers have to rate according to their preference.⁷ From these results we can obtain and calculate the preference for the essential attribute of the patent. Moreover, we can calculate exactly how much more the respondents would pay in order to have that hole in their plate instead of having a conventional hole-free plate.

“Always be aware that there is a trade-off between valuation quality and valuation effort”

From the results of this CA-survey, the optimum sales price for the slotted plates and the achievable profit for the essential attribute – the existence of the slots in the plates – is calculated. Note that only the patentee (and maybe a licensee) is allowed to sell the slotted plates. None of the competitors may profit from the sales of slotted plates. Consequently, the value of the patent is the calculated profit resulting from the monopoly earnings due to the patentee’s exclusive possibility to satisfy the demand for slotted plates.

If several patents of the same technical field are to be valued, it is possible to map the respective essential attributes of the several inventions into one joint CA, and therefore, it is sufficient to perform one single survey.

The market segment to be analysed is the market related to the invention. Therefore, the people to be surveyed belong to the set of people who could be interested in purchasing the patent-related product or method. The relevant market for the slotted plates is both private households and commercial entities such as hotels, restaurants, seminar organisers etc. Generally, none of these groups would have an interest in buying the patent. However, from an economic point of view it is interesting to note when using the CA method that we actually “use” these groups in determining the value of the patent.

Search for related art

Unsurprisingly, when valuating a patent diligently, you can’t go without examining the related state of the art. The purpose is

manifold. Firstly, it helps identify the essential attribute of the invention. Those attributes which are well known in the state of the art cannot be the essential attributes of the invention. Typically, the essential attribute of the invention is the one that is unknown in the state of the art in the protected combination. Secondly, a state of the art search helps identify other attributes which are relevant for potential consumers of the patent-related product/method. The CA has to provide the respondents with stimuli representing complete products. That is, apart from the

price and the patent-related attribute, there are further attributes and options important for the consumers which the CA has to cover. Thirdly, a state of the art search helps identify the scope of protection of the patent. Fourthly, a state of the art search may reveal other valid patents with their protection scope overlapping with the protection scope of the patents to be valued.

Detailed economical background

From the results of the CA you get from each respondent their utility for the essential attribute of the patent and their price sensitivity. After some mathematical normalisation and standardisation calculations you can convert them into each other. So you can calculate each respondent’s “reserve price” for the patent-protected essential attribute which is the maximum price at which the respective respondent would still buy the product having the essential attribute. If the essential attribute is offered at a price higher than the respondent’s reserve price, then the respondent would not buy it. Combining the reserve prices of all respondents you obtain the price-response function for the essential attribute that maps the demand for the essential attribute versus the price for it (based on the representative sample of respondents). It’s purely algebraic work to transfer the price-response function into the price-sales function and knowing the costs for the essential feature (including patent-related costs such as annuities, translation costs, patent attorney costs etc.), into the price-

profit function. The latter maps the profit versus the price of the essential attribute. Please be aware that we are talking about the theoretical *isolated price* at which the patent’s essential attribute is offered to the consumers and not about the price-profit function of the complete product. There is always a maximum in the price profit function. This is the maximally attainable profit that exclusively stems from the protected essential attribute. And this is the patent value.

The presented method for valuing patents also allows the consideration of uncertainty and risks such as a successful invalidity action or an effective invent-around of a competitor. Risks can be taken into account by considering alternative situations that each result in an alternative maximum profit with a certain probability of occurrence assigned to each situation.

Recommendation

Always be aware that there is a trade-off between valuation quality and valuation effort. Don’t use the CA valuation method for evidently mediocre patents – it’s not worth the expense. However, when valuing highly important patents, use the CA method – you will lose the IP battle if you value your best weapons incorrectly. 🌐

Notes

- 1 EPO Annual Report 2005, p. 3.
- 2 Rivette/Kline (2000): “Rembrandts in the Attic.” Boston, p. 3.
- 3 Smith/Parr (2000): “Valuation of Intellectual Property and Intangible Assets.” New York et al. For a summary see Neuburger (2005): “Die Bewertung von Patenten.” Wiesbaden.
- 4 E.g. Harhoff et al. (2003): “Citations, family size, opposition and the value of patent rights.” In: Research Policy, pp. 1343-1363.
- 5 Neuburger (2005): “Die Bewertung von Patenten.” Wiesbaden.
- 6 E.g. Hensel-Börner (2000): “Validität computergestützter hybrider Conjoint-Analyse.” Wiesbaden, pp. 46 et seqq.
- 7 This subset of all possible combinations is the so-called “orthogonal design” that every statistics software can generate. It comprises generally 9-25 stimuli. Too few stimuli does not allow statistically valid statements on the whole set whereas too many stimuli overburden the respondents. This in turn leads to invalid results of the patent valuation.



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