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Analysis of IP Valuation Product of LIPI IDP000040604 as Marketing Strategy for Promotion of Innovative and Inventive Activities

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Abstract. *IP Valuation means the process of how to compare object patented (protected) and its characteristics with the similar to gain a benefit. In this research, the product that value has been registered and certified for the patent in Indonesia with number IDP000040604. IP Valuation conducted to estimate the potential future economic benefit of this product. Qualitative and quantitative methods carry out to determine the value of IP. A qualitative method performed by in-depth analysis for Legal, Technology, Market and Finance indicators. A quantitative method conducted to determine the value of IP by using income approach with DCF method. From the qualitative analysis it shows that the product is in low risk and high opportunity quadrant, and from quantitative analysis, it shows that the NPV of the product is Rp.52.088.550,- with a royalty rate of 7% with estimated turnover about Rp.692.921.848,- for 10 years of useful economic life.*

Keywords*: IP Valuation, future economic benefit, qualitative and quantitative methods, high opportunity, royalty rate*

1. Introduction

According to WIPO definition, Intellectual property refers to the creation of mind as the invention; Literary works and artwork, names, logos, and pictures are used in business (WIPO, 2016). IPRs become important to enhance competitiveness and one of strategy to attract new investments and to maximize company revenue. The presence of intellectual property rights has changed the business strategy in developed countries (Arora, 2001). IPRs is a part of the intangible asset (Anderson, 1992). Before IPRs known by the company, most of the companies are trying to take benefit from tangible assets. But along with the time, the intangible asset known has benefits, so investors are vying for intangible assets investments. Most companies in developed countries use IPRs especially patent and copyright to obtain revenue, to defend the firm's competitive position and to increase competitiveness in the market (Allen, 2003).

Proprietary of IPRs becomes important to develop and determine a new business strategy especially technology-based business. Each type of IPRs has variations of the time period. Such as patent has maximum 20 years of useful period time before it becomes public domain. The time period will be different with another IPRs (copyright, industrial design, trademark, plant variety protection, and others). All kind of IPRs should be maintained, valuated and also monitored. With valuated IPRs, the readiness of technology can be determined so that can be used for new improvement.

2. Literature Study

Value, Valuation of IPRs and Technology Transfer
Determination value of IPRs usually associated with the economic benefit. The value of IPRs should be measurable so that the company can determine the amount economic benefit in the future. There are two types of value; those are objective value and

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subjective value. Objective value is a value which determined by the market. In other words objective value is based on actual market conditions; there are no differences meaning. While subjective value is an opinion. The subjective value will have a different value for each person. Usually, on Subjective value, there are various options provided to determine a decision (Wurzer, 2010).

Furthermore, Valuation is the process to define the value itself. In other words, valuation is a process to compare objects and it's characteristics with the others. So IP Valuation means the process of how to compare object patented (protected) and to compare its characteristics with a similar invention to gain an advantage. IP valuation process using comparable object and comparable characteristic. Comparable object means the object compared should be in the same scope with the others, and comparable characteristic means the object compared should be in the same dimension. IPRs can be valuated if the material and immaterial assets can be determined and differentiated. IPRs can be valuated individually but it is not easy and need knowledge and correct method. In Figure 1 shows how to define valuation of value (Wurzer, 2010):

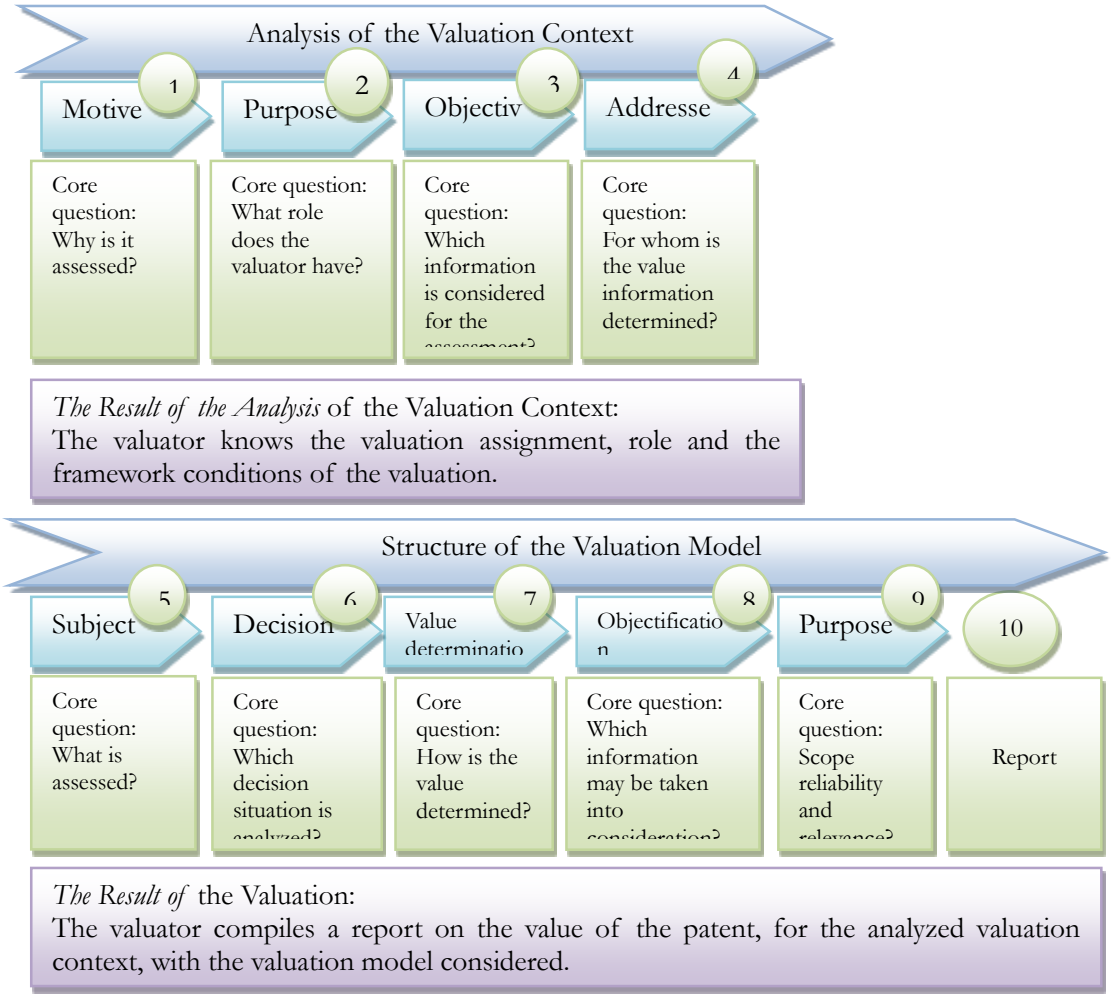

Figure 1. Steps to Define the Valuation of Value

To value IPRs, many factors that should be considered, that are the functions of IP in business and economic such as IP for taxes, financial accounting, merging and acquisition of a product/company, and also to maintain financial security. (V. Chiesa, 2005). With IPRs valuation also is one of the reasons why the transfer technology occurs. Transfer technology is a series of processes that include the flow of "know-how", experiences

and tools for reducing or adapting the changing atmosphere among various stakeholders (governments, financial institutions, private companies, non-profits and research/education institutions) (IPCC, 2000). Generally, the transfer technology occurs if it has a demand to contribute to solve a problem, to give a new added value, and also to enhance new competitiveness for business improvement. Technology transfer divided into two types; vertical and horizontal. Horizontal Technology Transfer means the transfer technology occurs from one operating environment to another. Vertical Transfer Technology means the transfer technology occurs from applied research center to development and commercialization stages (Grosse, 1996). In the present, vertical transfer technology has more benefit especially in developing business strategy and to gain a profit (royalty or license). Figure 2 shows the correlation between IPRs in technology transfer process:

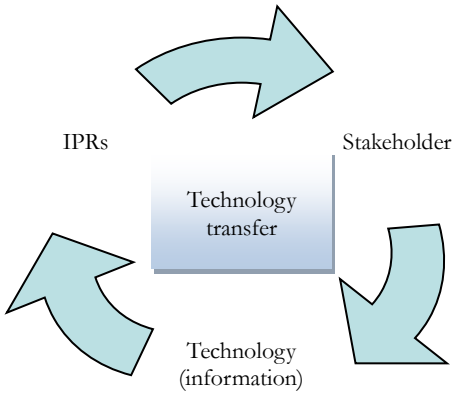

Figure 2. Technology Transfer Using IPR

Furthermore, there are some factors that influence on making technology transfer process more successful, one of them is the stabilization of economic level. With stable economic conditions, the process of technology transfer be conducted, and also it makes a possibility to increase job opportunities in a particular region. Transfer technology also supports to enhance the competitiveness especially business based on technology. For developing country, transfer technology is a requirement to enhance business competitiveness, to make new technology based firm, and to develop a new innovation.

The other factors that influence the transfer technology process are social conditions, cultures, and national policies. In addition, some requirements should be fulfilled, so that the transfer technology can occur, such as has a good infrastructure, technical knowledge, readiness resources and R & D, the number of financing instruments and also the driver of innovation in a country (Gurbiel, 2002).

Reasons to Valuing IP Assets

There are some reasons and functions why IP valuation is important (Turner, 2000):

a. as a material valuation of a company by shareholders,
b. consideration to determine a company acquired or merged,
c. consideration to determine when the company should 'buy-in' or 'buy-out',
d. denationalization of public sector,
e. valuing IP as fund raising,
f. by knowing the IP value can be used as Initial Public Offering (IPO),
g. as a cash flow and accounting statement,
h. with valuing IP as the decision to the acquisition of an IP asset itself,
i. as a consideration for licensing or not, and
j. as a consideration for further IP development.

From a-g reasons has correlation for business development as usual, and from h-j reasons has a correlation to developing a business based on IP itself and also developing new IP for new competitiveness. Furthermore, IP Valuation also has penetrated into the share of businesses, particularly businesses that use IP as a primary strategy.

The following are the reasons IP as a primary strategy in business (Susan Chaplinsky, 2002):

a. as a consideration to evaluating potential candidates for acquisitions or mergers,
b. as consideration for identifying and selecting assets that can provide added value,
c. to strengthen in licensing or royalty negotiations,
d. as financial considerations in IP maintenance, IP commercialization, and donations and CSR activities,

e. to evaluate and determine the technology readiness level product for research and development, and
f. as consideration to supports assessment for loan collateral.

By performing an IP valuation, will be known whether the IP has a profitable or not in the future.

3. Methodology

This research focuses on the valuation of IP IDP000040604. Patent IDP000040604 is an LIPI technology and has been utilized by the regional company in Indonesia. Utilization of this technology using license agreement between LIPI and regional company. Patent Product IDP000040604 is actually utilization of composition and mixture of Bacillus Mojavensis compound for critical soil.

This research also uses 2 methods to obtain the real value of IDP000040604. This research uses qualitative and quantitative methods. In the qualitative method, the influence factors are defined and valuated, and then analyzed and mapped. From the mapping analysis will give the conclusion about the status of the IP, so that the decision maker can define the best business strategy for that IP (Spasic, 2011). The following are the factors that influence on process valuing of IP IDP000040604:
a. legal status of the Patent,
b. finance status of the Patent,
c. technology status of the Patent, and
d. market conditions of the Patent.

The Quantitative method in this research conducted to calculate the economic benefit of the Patent IDP000040604. The following are some approaches for quantitative method (Spasic, 2011):
a. cost approach,
b. market approach,
c. the income approach,
d. "Rule of Thumb" approach,
e. Monte Carlo approach,
f. Industrial Standard approach, and
g. real options approach.

In other explanation related to IP valuation, there are 3 main methods can be used, those are cost-based, market-based, and income-based (Parr R.L, 1994). While for this research focuses on Income Based approach by using Discounted Flow (DCF) rate with variables below:
a. cash flow income earned from royalties (product sales) or patent license,
b. the estimated useful life of the patent, and
c. Determining some risk factors those effect on valuation process.

DCF is the most common method to calculate and predict income from some investments in a certain period. This method based on the amount of cash flow earned during the lifetime of the patent and discounted back to the present value. In the calculation of this cash flow, all assumption determined especially for business risk and the calculation should be considered the lifetime of the patent. After cash flow determined, NPV analysis can be conducted. With the NPV value will give the conclusion about the economic benefit of the patent. NPV with positive value means the patent has benefit economic in the future, but if the NPV has negative value it means the patent is not recommended to deliver to the market.

4. Finding and Discussion

Qualitative Analysis

In this research, qualitative analysis reviewed 4 main aspects, those are Legal Status, Technology Status, Market Condition, and Finance Status of patent IDP000040604. To analyze this patent each of aspects should be determined, scored, and also mapped with IPScore method (IPScore, 2010). From these factors will eventually provide the distinctive characteristics in the values of IP accessed (Tirmale, 2013). Figure 3 shown the result the qualitative analysis of patent IDP000040604:

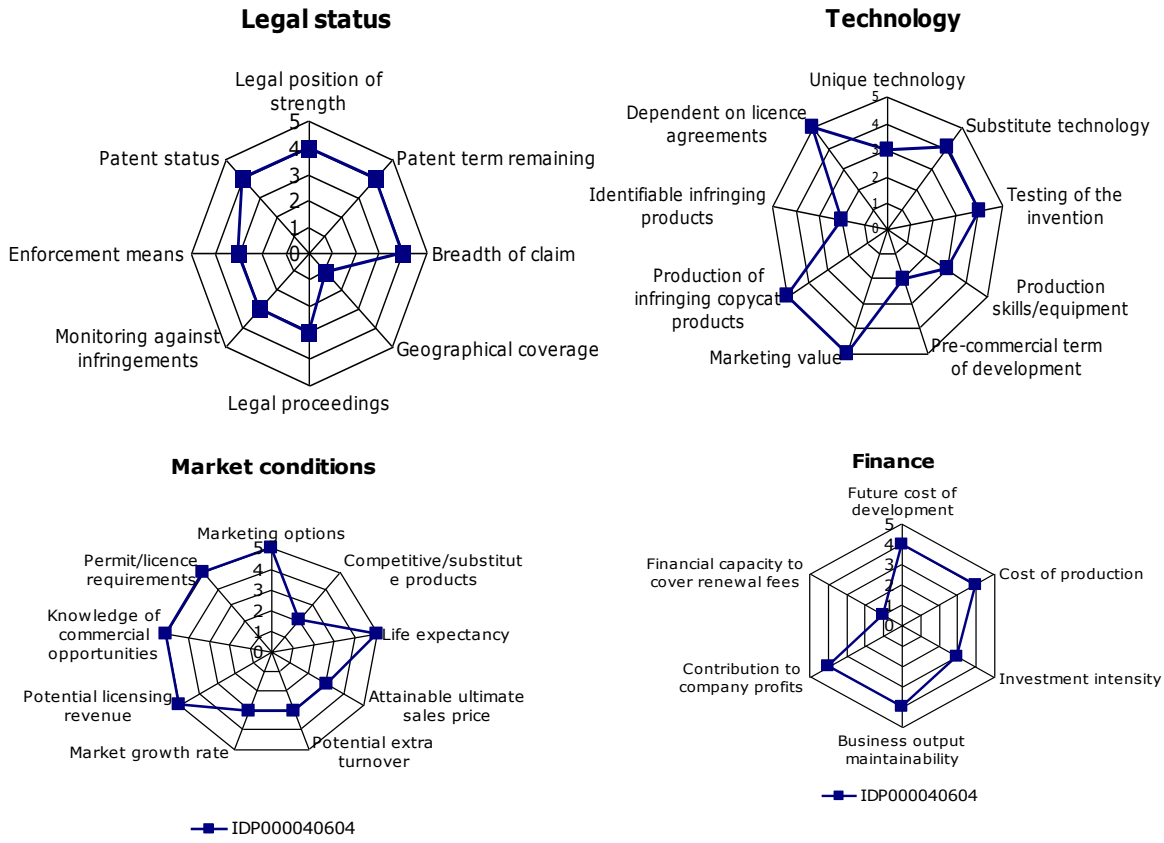

Figure 3. Radar Profile for Patent IDP000040604

From Figure 3, it shows that the geographical coverage has a low score. It is because the product is protected in a single country only (Indonesia). The wide of coverage area has implication to maintenance fee of that patent. The wider coverage areas will give more expensive in maintenance fee, and it should be considered with the benefit that will be gained from royalty/license. Limitation of the coverage area conducted to prevent the expensive maintenance cost of the patent. Besides that, limitation of coverage area also considers the readiness technology in other countries. Because it has the possibility that the other countries have an advanced technology than patent ID P000040604.

From the legal aspect in Figure. 3 also describes the validity period of the patent has a high score. It can occur because the lifetime of the patent is more than 10 years. This indicates that the patent still has a chance to deliver the product to the market. Usually, the business probability of a patent can be observed from the lifetime of that patent. For each year it will have a different probability. Over the time, the probability of projected growth will decrease because it enables the competitors to make a new technology with the same characteristic and same function. From validity period of the patent ID P000040604 also has linkage with the marketing value in Technology aspect. For the Technology aspect shows that the marketing value has a high score; it means the product has a big chance to be delivered to the market. The product also has a function to substitute the existing technology with enhancement of skill and equipment to exercise the production process. So if the investor desires to use this technology, the investor should prepare the new equipment and the human resource to be able and understand about the "know-how" of the IDP000040604 patent. Substitute technology will occur if the requirement for human resources and all equipment required are fulfilled.

Furthermore, from the Market Conditions aspect, patent IDP000040604 has a high commercial opportunity with a turnover by license. On the whole, from Figure. 3 shows patent IDP000040604 has a good market condition. Patent IDP000040604 will raise the revenue from licensing scheme and also has high commercial opportunities. However, from the market strategy also should pay attention to the competitive market, especially for substitute products. Because for patent IDP000040604 has a low score for competitive/substitute products. From the Financial aspect, patent IDP000040604 has a weakness for "financial capacity to cover renewal fees". It occurs because this patent produced from R&D government institutions, its means the maintenance fee charged to the government budget. Government budget has a limited budget to pay the monthly maintenance fee and this occurs in LIPI especially in Center for Innovation LIPI (one of its primary duties is to manage and register the IP from the researcher in LIPI). The patent which has no potential for commercialization will charge more of the government budget. To decrease the charge, it should be attempted a new strategy and enhance the amount of transfer technology to the stakeholder. From 4 aspects in Figure. 3, in-depth analysis conducted to mapping the strategic marketing of patent IDP000040604. The result of in-depth analysis for strategic marketing of patent IDP000040604 shown in Figure 4.

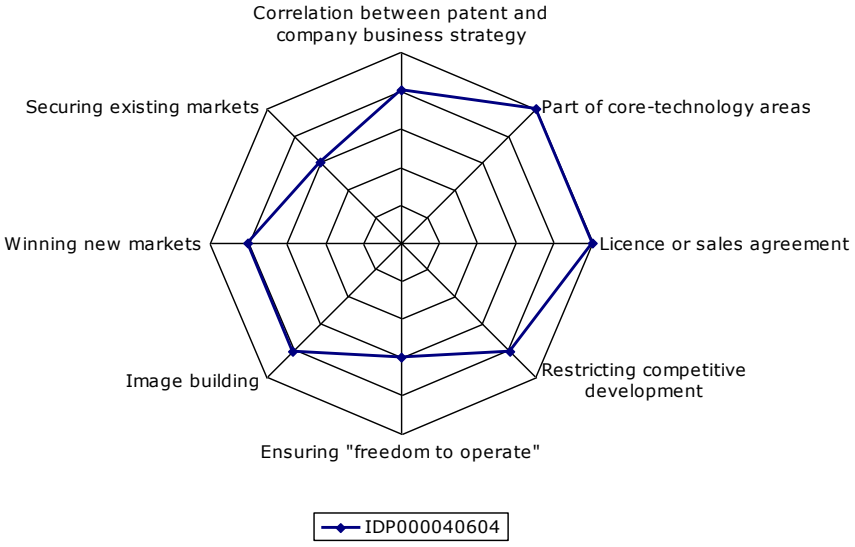

Figure 4. Strategic Profile Patent of IDP000040604

Figure 4 shows the strategic positioning of patent IDP000040604 in the market. From that figure describes that the most powerful strategy to marketing product IDP000040604 is by using Licence strategy. With license strategy, it will restrict the competitor to develop the same product and same characteristic. From Figure. 4 also describes that the patent IDP000040604 has a big chance to win the new markets by restricting competitive development. The restrictions competitive development can occur by strengthening the legal aspect and license agreement of patent IDP000040604. Nevertheless, from Figure 4 also describes the weakness of patent IDP000040604. From the Figure. 4, it describes the value of "securing for the existing markets" is still low. It can occur because the coverage area protection for patent IDP000040604 is limited (only protected in Indonesia). This weakness can be resolved if the coverage area expanded especially for mining country. The conclusion of qualitative analysis especially for the marketing strategy of patent IDP000040604 can be described in Figure 5.

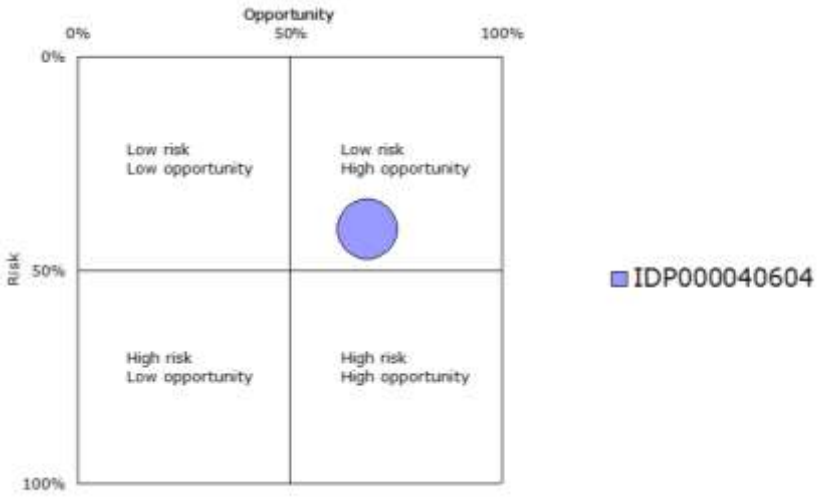

Figure 5. The Opportunity and Risk for Strategy Marketing of the Patent IDP000040604

Quantitative Analysis

Quantitative analysis conducted by considering all influencing factors and lifetime of the patent IDP000040604. There are many kinds of quantitative methods to valuate of IP, but in this research focuses on income method. The income approach used to get the real business value and to predict the economic benefit in the future based on a lifetime of patent IDP000040604. By predicting business value and economic benefit in the future, will be known whether the patent is marketable or not. In this quantitative analysis, some assumptions are used and all of those assumptions should be accurate to provide an actual value. Those assumptions should be validated to get the real value of patent IDP000040604. By knowing the value of patent IDP000040604, it will be easier to conduct the technology transfer process.

The business of technology transfer based on IP can be gained by using several principles below (IVSC, 2011):

a. income calculation through royalties,
b. income calculation through the additional revenue generated by the IP, and
c. calculation of income through excess income.

To obtain the value of IP by income approach, it also needed these following variables (Susan Chaplinsky, 2002):

a. cash flow from license or product sales,
b. Time period and duration the patent before it becomes a public domain,
c. Risk factors and success factors those affect the patent when it will be commercialized, and
d. calculation of discount rate and DCF.

Calculation of cash flow can be conducted if data of income (turnover) from royalty/license is known. Based on an agreement between licensor and licensee, the amount of turnover for the first year is Rp.75.000.000,-. And then the predicted turnover calculated for 10 years (based on the useful economic life of patent IDP000040604).

From the qualitative analysis result in Figure. 4, it is mentioned that patent IDP000040604 has "low risk" and "high opportunity". These results can be used to determine the value of discount rate. For "low risk" technology, the discount rate value is about 20-30% (Georgia-Pacific Corp. v. United States Plywood Corp, 1970). But for DCF calculation in this research using 25% (average value).

Furthermore, to calculate royalty rate, it also used the "rule of thumb" for a percentage of Profit Before Interest and Taxes (PBIT). In this calculation uses 40% because the patent IDP000040604 has a "high opportunity" in

qualitative analysis result. Also, the "rule of thumb" for "low risk" (qualitative analysis result) is about 20-33% (Georgia-Pacific Corp. v. United States Plywood Corp, 1970); and for this calculation using 25% (average value) based on risk factor and opportunity of patent IDP000040604. With "high opportunity" in the qualitative analysis the percentage of know-how of patent should be more than 70% (but in this calculation assumed 70%). The detail calculation of royalty rate for patent IDP000040604 shown in Table 1.

Table 1.

Calculation of Royalty Rate of Product IDP000040604

Base turnover in currency of choice (IDR)	75.000.000
Average Profit Before Interest and Tax (PBIT) for period (as % of Turnover)	40%
Notional royalty as a % of PBIT	25%
Apportionment of royalty to asset valued	70%
Royalty rate (40% x 25% x 70%)	**7%**
Income tax rate	10%
Discount rate	25%
Useful economic life (yrs.)	10

In another case, there are some factors to determine the royalty rate (Georgia-Pacific Corp. v. United States Plywood Corp, 1970):

a. Main factors:
   1. Strength of the IP (technology readiness level)
   2. Ability to dominate the market (monopoly)by IP, and
   3. The IP level based on sales or profits earned.

b. Other factors:
   1. the level of established technology in determining the value of royalty;
   2. tariff rates adjusted for other similar IP;
   3. the scope and nature of the license: is inclusive or exclusive, as well as the territory restriction in which the IP is protected;
   4. marketing strategy and monopoly policy owned by Licensor so that the monopoly can be a success in the market based on the protected IP;
   5. the relationship between licensee and licensor especially in the marketing of IP, the degree of royalty can be different if the licensee and licensor as a competitor, as a team that supports each other, or as an inventor in that IP;
   6. the effect of selling similar products to enhance promotion and selling others derivative products under license agreements;
   7. the time period and effectiveness period of the IP;
   8. the effect of the popularity of the IP, commercial success and also the profitability that gained from selling the technology;
   9. functions the new IP towards to the old devices, so that the degree of royalty can be appointed;
   10. the characteristic of the IP, the benefits that gained of IP, and also the character of commercialization of the IP in the market;
   11. based on the amount of infringer to who has used the IP or similar products and also the evidence of utilization of the IP;
   12. the prevalence level with the same business and also based on the proportion of the benefit or selling price that gained from that IP;
   13. estimation the realization of profit portion to cover the others elements like business risk, manufacturing process, to give the significant new added value for new products, or to reduce the infringer for this IP;

14. the effect of testimony or opinion from the experts about the IP influence the degree of the royalty; and
15. based on the agreement of licensee and licensor reasonably, so the proportional business can be set, how much the royalty will be given to the licensor according to the amount of selling the products, and profits sharing which is feasible between the two sides.

After the royalty rate has been determined, the next is to estimate DCF and NPV of patent IDP000040604 which is shown in Table 2.

Table 2.

Calculation DCF and NPV Product IDP000040604

Projected growth	**Agt-13**	**2014**	**2015**	**2016**	**2017**	**2018**
		30,00%	**30,00%**	**30,00%**	**30,00%**	**30,00%**
Turnover (IDR)	75.000.000	97.500.000	126.750.000	164.775.000	214.207.500	278.469.750
Royalty payable (IDR)	5.250.000	6.825.000	8.872.500	11.534.250	14.994.525	19.492.883
Tax (IDR)	525.000	682.500	887.250	1.153.425	1.499.453	1.949.288
Profits after tax (life) (IDR)	4.725.000	6.142.500	7.985.250	10.380.825	13.495.073	17.543.594

Projected growth	**Agt-13**	**2019**	**2020**	**2021**	**2022**	**2023**
		20,00%	**20,00%**	**20,00%**	**20,00%**	**20,00%**
Turnover (IDR)	75.000.000	334.163.700	400.996.440	481.195.728	577.434.874	692.921.848
Royalty payable (IDR)	5.250.000	23.391.459	28.069.751	33.683.701	40.420.441	48.504.529
Tax (IDR)	525.000	2.339.146	2.806.975	3.368.370	4.042.044	4.850.453
Profits after tax (life) (IDR)	4.725.000	21.052.313	25.262.776	30.315.331	36.378.397	43.654.076

NPV of royalty stream (IDR):	**52.088.550,-**

From Table 2, the projected growth of patent IDP000040604 predicted will decrease for 10 years of the useful economic life of the patent. In this analysis after 5 years, it is assumed the projected growth becomes 20% or decrease 10%. This assumption has a correlation with a possibility of the competitors to develop the new product with the same function and same characteristic. Moreover, the projected growth also has a correlation with market sharing of the product and the possibility of presenting the new and advanced technology. DCF calculation used to determine the value of IP based on calculation present cash flow. DCF also used to predict the profits that gained in

some period. In DCF calculation, it considers the possible expenses that may occur and calculate the business risk in the duration of the patent. From the turnover, the payable royalty can be calculated. Royalty payable calculated from royalty rate and the amount of turnover in 10 years. To obtain the net profit, the amount of royalty rate should be reduced by the expenses and taxes. The final result from DCF calculation will give the Net Present Value (NPV) as a consideration to make a decision about the commercialization of patent IDP000040604. To obtain the NPV value, it can be calculated from the Total amount present value (PV) of net cash minus total amount present value (PV) of investment. From the Table. 2, the turnover of patent IDP000040604 is shown in figure 6. From Figure. 6, it shows that the prediction of turnover is increasing although the projected growth is decreasing 10% from 2019 until 2023. By increasing the amount of turnover for 10 years, it will give the opportunity to obtain the stakeholder, and indicate the product has high potential in the market. From the DCF calculation it also shows that the result is in line with a qualitative method which has a high contribution to the company profits in Finance Aspects.

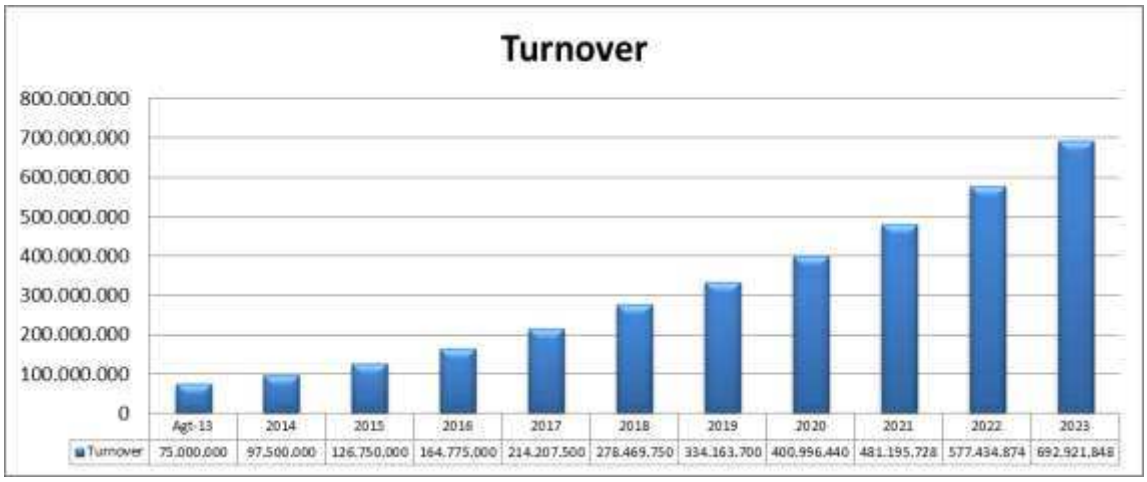

Figure. 6. Turnover Prediction of Product IDP000040604 for 10 years (2013 until 2023)

5. Conclusion

IP Valuation has some methods to determine the value of that IP itself. Patent IDP000040604 has through several stages until commercialization stages. To determine the IP valuation as a strategy for promotion innovative product, it has been conducted by using qualitative and quantitative analysis. From the qualitative analysis, it shows that the patent IDP000040604 has a "low risk" and "high opportunity" in the market. And from the analysis, it also gives the best marketing strategy for this product by licensing strategy. By a licensing strategy, it makes the patent IDP000040604 becomes more powerful to get high revenue from the market.

While from quantitative analysis, it shows that the product has high potential revenue for 10 years after licensing agreement. The Net Present Value for this product is about Rp.52.088.550,- and provides increasing revenue until 2023 with a royalty rate of 7%. The future economic benefit until 2023 is predicted about Rp.692.921.848,- although the market growth in 2019 until 2023 decreases 10%.

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