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Valuation IP of Nano Technology to Make a Nano Tea Based on Mangosteen Peel as a New Product Development

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**JOURNAL OF SCIENCE, TECHNOLOGY AND INNOVATION
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FOREWORD by EDITOR-in-CHIEF

We are very pleased to inform the readers that *Journal of Science, Technology, & Innovation Policy and Management (STIPM Journal)* Vol. 5, No. 1, July, 2020 is now ready for public reading and views.

STIPM Journal is an online research journal managed by the Research Center for Science, Technology, Innovation Policy and Management, Indonesian Institute of Sciences (P2KMI-LIPI). This journal in fact provides scientific information needed mostly by the research scholars. As a peer reviewed journal, STIPM provides free access to research thoughts, innovation, and original discoveries.

In this edition, the STIPM Journal contains six articles dealing with science, technology and innovation policy and management written by scholars from Japan and Indonesia.

The first article, entitled *Dynamics of Organisational Capability of Japanese Construction Firm towards Open and Service Innovation through PPP/PFI arrangement* was written by **Taeko Suehiro, Kumiko Miyazaki**. This study examines the influence of Public-Private Partnership (PPP)—or, more specifically, Private Finance Initiative (PFI)—arrangements in relation to open and service innovation in construction firms in Japan.

Second article was composed by **Pratiwi**, entitled *The Role of Local Community Associations as Intermediaries: A Multiple Case Study in a Rural Area*. This study investigates the role, capabilities, and the outcome of the engagement of local community associations as intermediaries in different sectors such as agriculture, food processing, and tourism product. This study describes the way innovation promotes rural development.

Erman Aminullah et al., present the third article, *Policy Role in Innovation Network: Case of Indonesian Food Processing Firms*. The objective of the study is to reveal internal and external factors that affect the use of network relations for innovation, with a focus on mapping the policy role in innovation networks. The study was undertaken through case analysis in four different firms in Indonesia.

The fourth article entitled *Potentials of Research Activities in Medicines at the Indonesian Institute of Sciences (LIPI)* was by **Hadi Kardoyo et al.** This article reveals the findings of research priority setting (RPS) in the field of medicine and health at the Indonesian Institute of Sciences (LIPI) in 2017. The RPS stage had been conducted with the Delphi Method and produced five major issues.

Next article entitled *What We Learn from Innovation Failure: A Review of Clean Water Postpaid Service in Remote Island Indonesia Using Sea Water Reverse Osmosis (SWRO) Technology* was presented by **Rendi Febrianda and Nur Laili**. Final article was compiled by **Syukri Yusuf Nasution and Yovita Isnasari** with the title *Valuation IP of Nano Technology to Make a Nano Tea Based on Mangosteen Peel as a New Product Development*. This article analyses the potential of nano technology in developing new

product, such as how much the potential of the turn over if the technology is used to produce a nano tea based on mangosteen peel, how much the royalty rate, and how is the positioning of the technology in in relation with legal aspects, technological readiness, market condition and finance.

In addition to all articles presented in this volume, we also would like to thank the authors, editors, and reviewers who have worked very hard in this edition. We hope that all articles featured in this edition are useful for the readers.

Jakarta, 16 July 2020

Editor-In-Chief

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Valuation IP of Nano Technology to Make a Nano-Tea Based on Mangosteen Peel as a New Product Development

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ABSTRACT

Valuation IP of IDS000001555 analysed the economic impact and measured the financial benefits of the asset if implemented in a business. This patent is about technology used to produce mangosteen peel nano-tea. This technology is to produce nano-particle with ball-mill method. This research used qualitative and quantitative methods with descriptive analysis. By using the qualitative method, this research focused on scoring the IP in a several aspects, while the quantitative method conducted by income approach used the Discounted Cash Flow method. The qualitative method showed the technology of IDS000001555 had a high opportunity and low risk value. This patent also has the best marketing strategy with a licensing agreement.

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I. INTRODUCTION

Intellectual property (IP) shares many of the characteristics associated with real and personal property. For example, intellectual property is an asset, and as such it can be bought, sold, licensed, exchanged, or gratuitously given away like any other form of property. According to the WIPO definition, intellectual property refers to the creation of mind as the invention; Literary works and artwork, names, logos, and pictures used in business (WIPO, 2016).

Intellectual Property has 2 scopes (WIPO, 2016):

- 1) Industrial Property includes patents for inventions, trademarks, industrial designs and geographical indications.
- 2) Copyright covers literary works (such as novels, poems and plays), films, music, artistic works (e.g., drawings, paintings, photographs and sculptures) and architectural design. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and broadcasters in their radio and television programs.

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Some Intellectual Property Rights (IPRs) have varying time limits, they depend on the types of IP. In this case, industrial property will be more discussed especially on patent. Patent becomes more important especially in industry because with monopoly, authority to develop the product by the patent will restrict the competitors to manufacture and sell the same product in the market. It is also a strategy of industry to protect their products in the market. To be patentable, an invention should be a novelty, an inventive step, and applicable for industry.

The number of patents is increasing every year. However, not all patents can be applied in industry. To find out whether the patent has an opportunity in business or not, the institution which produced the patent should have calculated the opportunity of the patent by valuing the patent in from many aspects. The value of the patent can be calculated by the time period of the patent and also some factors which influence the patent in the marketplace.

In the case of nanotechnology, there are many factors that are considered to influence the IP valuation process as a basis for licensing. At least there are number of discussions that have been debated such as legal conditions, competencies, technology and market strategy that must be considered in the process of valuation of nanotechnology (Wartburg & Teichert, 2020; Zingg & Fischer, 2019). Based on this case, this research wants to analyse the potential nano-technology in order to develop new product. How much the potential of the turn over if the technology is used to produce a nano-tea based on mangosteen peel? How much the royalty rate? And what the positioning of the technology considered with legal aspects, technological readiness, market condition and finance?

II. LITERATURE REVIEW

1. Valuation of IP

The valuation of IP is one of the methods used to assess the value of a technology. This valuation showed how the technology can provide the economic impact, especially in terms to predict the revenue gained in a certain period of

time. The valuation is a process of identifying and measuring the financial benefit of an asset (Spasic, 2011). Valuation of IP is only possible if it can be exactly identified and differentiated from other assets.

Valuation is the process to define the value itself. Value in this case is anything that has the potential for economic benefits in the future. Based on this definition, there are many factors affecting the value of the IP or technology (Wurzer, 2010):

- 1) *Income*: the amount of revenue obtained from the use of the IP;
- 2) *Cost*: the amount of costs incurred by a company to develop some products or technology to become a commercial product or technology;
- 3) *Time*: related to the length of the period in which profit or revenue can be obtained; and
- 4) *Risk*: is a challenge or obstacle that will be faced when a decision has been taken, which affects the benefits to be received. This risk is not only related to companies who make product/technology, but also has correlation to decision maker or stakeholder. For example, the risk to the investors (the reason why they should invest their funds in that product/technology).

Furthermore, there are some reasons and functions why valuations of IP are important (Turner, 2000):

- 1) as a material valuation of a company by shareholders;
- 2) consideration to determine a company acquired or merged;
- 3) consideration to determine when the company should 'buy-in' or 'buy-out';
- 4) denationalization of public sector,
- 5) valuing IP as fund raising;
- 6) knowing the IP value can be used as Initial Public Offering (IPO);
- 7) as a cash flow and accounting statement;
- 8) with valuing IP as the decision to the acquisition of an IP asset itself;
- 9) as a consideration for licensing or not; and
- 10) as a consideration for further IP development.

To obtain an IP patent is very important. However, most important is how the patent can be useful to increase the benefit in a business process. The valuation of an IP is importantly needed because it will provide information on how much the value of IP can be used to generate maximum benefits to a business. From the value of IP, the owner of IP can make the best strategy to commercialize the IP for the benefit of its stakeholders.

2. Influence of a Patent in Business

A patent is an important asset because it influences the improvement in the revenue of a business. The value of a patent can be used as a marketing strategy to improve the value of the business or value added of the production process. Patents are heterogeneous in their value and function for their owners and supply different levels of additional profit to companies through the original IP protection and related strategic functions (Somaya, 2003). In other literature, a patent portfolio enhances the bargaining power of a company (Noel, 2006). There are several reasons why intellectual property, especially patents, becomes important for a business:

- 1) Registered patent and designs prevent competitors from launching similar, competing products and potentially pushing the business aside within the market;
- 2) Holding the rights to a product design enables a company to make a unique offering to their market, and price their products accordingly as a price maker;
- 3) The company's position and profile as an innovative business can be boosted; and
- 4) For design-only businesses, the license for their patent, used by third parties to manufacture and sell their product(s), provides a significant and valuable income stream.

Patent applications have been extended to promising and expanding new fields of technology (Kortum, 1999). Patent also becomes a key to build and generate a new idea for new technology. The patent will give the opportunity to develop a business in that field.

The following are also the reasons why IP, especially a patent, is a primary strategy in business (Susan Chaplinsky, 2002):

- 1) as a consideration to evaluating potential candidates for acquisitions or mergers;
- 2) as consideration for identifying and selecting assets that can provide added value;
- 3) to strengthen in licensing or royalty negotiations;
- 4) as financial considerations in patent maintenance, patent commercialization, and donations and CSR activities;
- 5) to evaluate and determine the technology readiness level product for research and development; and
- 6) as consideration to support assessment for loan collateral.

Patents are not only used to block competitors in the market. They are also important instruments for collaborations with companies in both the vertical and horizontal market dimensions (Hall, 2001). However, a patent may enable a firm to exclude rivals. When a patent prevents competitors from entering a market, it can literally confer monopoly power upon the owner.

Patent valuation is also conducted in management purpose (Reitzig, 2004). The organization has a decision to provide the best strategy to gain the optimal profit. The profitability of the patent also depends on rate of the patent growth in same scope of the technology (Zhang & Zhang, 2020). By valuating the patent, it will affect the policy decision maker, the investment and also stakeholder persuasion to bring the technology in the market (Bergin, 2018).

In Indonesia, R&D institutions and universities usually produce patents. The presence of the patent can be a reason for technology transfer from an R&D organization to industry or stakeholder. Transfer technology can occur: if the patent contributes to solve a problem, to give a new added value, and also to enhance new competitiveness for business improvement. Also, some requirement should be fulfilled so that the transfer technology can occur. This includes the condition of technology infrastructure, techni-

cal knowledge readiness resources, R & D, the number of financing instruments available, and the drivers of innovation in a country (Gurbiel, 2002).

By increasing the number of patents in Indonesia, the need for valuing the patent has become more important as a key strategy for R&D institutions in Indonesia, for increasing the amount of technology transfer to industry. Besides, it does not only direct the research direction to be more specific for demand, but also to develop a new patent based on a previous patent that has already used in industry.

III. METHODOLOGY

In this research, the valuation of the patent focuses on patent IDS000001555 and henceforth will be referred as patent X in this study. This patent is used to produce the product of mangosteen peel nano-tea. This product is new in the market. It used mangosteen peel as the basic ingredient. With this idea, research was conducted to identify the value of patent X to observe the potential of the patent to produce the revenue and turnover if it is applied in producing of mangosteen peel nano-tea in industry.

In this research, two methods were used to obtain the value of patent X. This research used qualitative and quantitative methods by using descriptive analysis (Creswell, 2003). The data were obtained from questionnaire and in-depth interview with the inventor of Patent X. Each question in the questionnaire has a scoring, and by using IPScore the detail analysis was conducted to describe the position of the patent in each category. Mixed methods were used because it represented the result more accurately, and this method was often used in field of business (Hurmerinta-Peltomaki, & Nummela, 2006). Besides, the use of the mixed method gave the integration and linkage of a qualitative and quantitative result (O’Cathain, Murphy, & Nicholl, 2010).

For this research, several influential factors of the qualitative method were defined, including the legal factor, technology factor, market factor and finance factor by using the IPScore method (IPScore, 2010). All those factors are valued and mapped in a radar profile of Patent

X. The analysis of those factors gave the conclusion about the status of Patent X. Also from this analysis, the position of the technology brought to the business. This valuation result was used as recommendation to decision maker to define the best strategy to improve income based on utilization of Patent X in a business.

In the quantitative methods, there are some approaches used to value of patent (Spasic, 2011):

- 1) cost;
- 2) markets;
- 3) income;
- 4) ‘Rule of Thumb’;
- 5) Monte Carlo method;
- 6) industrial standards; and
- 7) a real options approach.

However, this research was focused on the Discounted Cash Flow Approach. This approach used the following variables (Parr, 1994):

- 1) cash flow income earned from royalties (product sales) or patent license;
- 2) the estimated useful life of the patent;
- 3) determine several risk factors which have an effect on the valuation process; and
- 4) a discount rate.

In the discounted cash flow (DFC) approach, the researcher determined the value of the patent X by computing the present value of the cash flow attributable to that Patent X, over the useful life of the asset. This approach represents discounting the future cash flows arising from assets by its cost of capital less initial outlays, thus yielding its net present value (NPV) (Bose, 2004). DCF analysis was conducted for the length of the lifetime of the patent. For example, a Patent X with 10 years effective period should have predicted probability to generate profits. Whereas, the DCF analysis will determine the NPV for a certain time period to predict the value of the patent.

IV. RESULTS AND DISCUSSION

1. Qualitative Method

In this research, we used the qualitative method, and analysed the technology of Patent X through four influent factors: legal status, technology,

market conditions, and finance. Those factors defined the IPScore. The result of status of Patent X was shown in radar profiles (Figure 1).

In a legal status profile, Patent X has a weakness (low value) in geographical coverage. This weakness of Patent X is protected in a single country (Indonesia). A reason why the width of coverage area has a limitation is because it has an implication in maintenance fee of that patent. The wider the coverage areas, the more expensive the maintenance fee will be. It should be considered with the benefit that will be gained from royalty/license. Besides, this patent will be marketed only in Indonesia, so the focus of the protection patent is only in Indonesia.

The legal status profile also indicates that Patent X has a high score in “patent termination remaining”, which meant the Patent X had a useful lifetime patent over 10 years so that the Patent X had a chance to be applied before new technologies emerge as competitors.

In the market aspect profile, Patent X had a strong potential extra turnover and is potential for

licensing. It also indicated that the Patent X had an opportunity to delivery to the market (business) through a licensing strategy. This condition also had a correlation with technology status.

The technology status profile showed that Patent X was a “unique technology” so that the patent has a chance to be a substitute for the existing technology. Patent X had a unique technology because it was ‘nano-technology’.

The financial aspect profile of Patent X had an average contribution to ‘company profit’ and ‘financial capacity to cover renewal fees’. This depends on the status of Patent X. This technology was produced and registered by R&D government, so this technology must make a contribution for non-tax state revenue to the government if it is applied in a business (commercialization). The amount of the revenue and turnover of the Patent X was described in quantitative method.

Furthermore, many factors can be described to identify the opportunity of the technology more clearly. Based on IPScore, the opportunity of the technology can be described from the

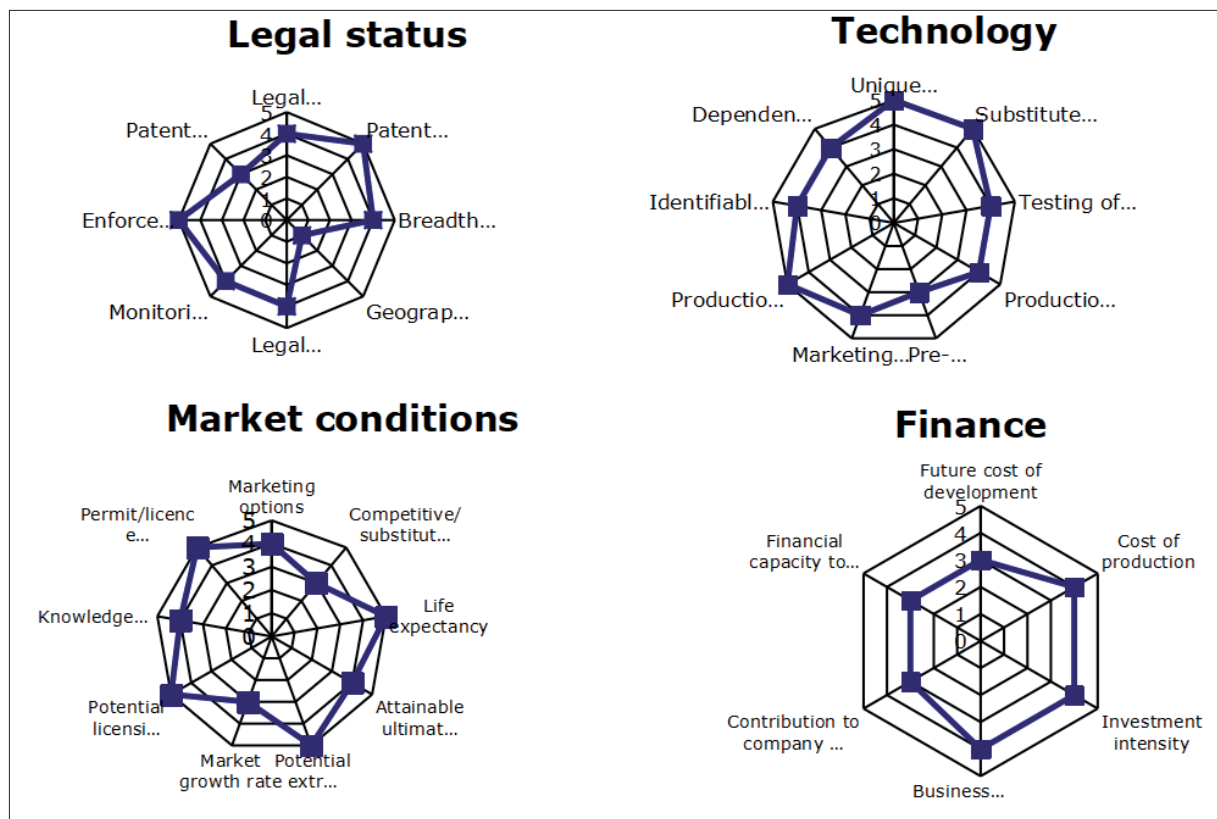


Figure. 1. Radar Profile of Patent X

geographical coverage, the opportunity of the other technology to substitute this technology, competitiveness, turnover rate and also the life expectancy of this technology to provide long term business. The opportunity of this technology is shown in Figure 2.

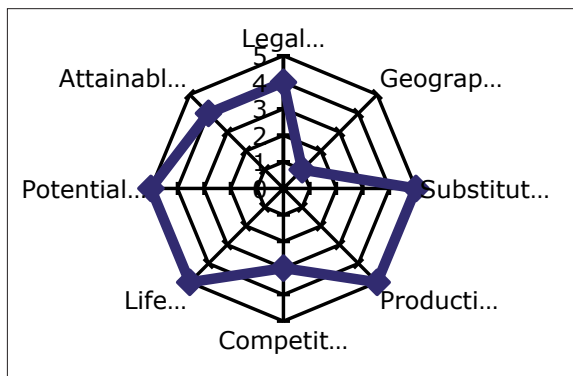


Figure 2. Opportunity of Patent X in Various Aspects

In-depth analysis was conducted to map the strategic marketing of Patent X. The result of in-depth analysis for strategic marketing of Patent X is ‘shown in Figure. 3.

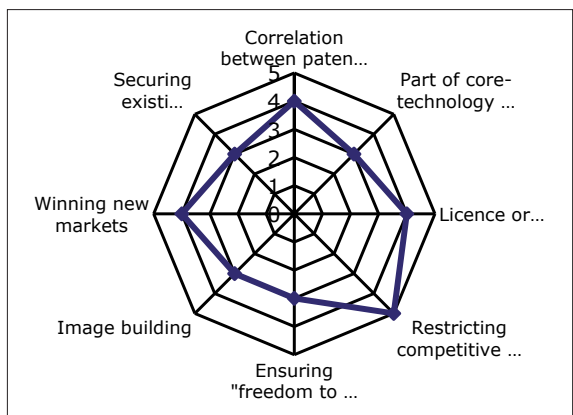


Figure 3. Correlation Value of a Patent X with the Business Strategy

Patent X has a correlation between company business. It is “in line” with the opportunity for a license or royalty agreement and has a chance to deliver the market a license or royalty agreement. However, the limitation of coverage area of Patent X is the single country protection which will give the competitor an opportunity to develop the same technology in another country.

Furthermore, form the IPScore analysis, this technology has a high opportunity to develop a

new business especially in the protected area (legal aspect) with a low risk condition if delivered to the market as a basic technology to produce a nano-tea based on mangosteen peel. This positioning is represented in Figure 4.

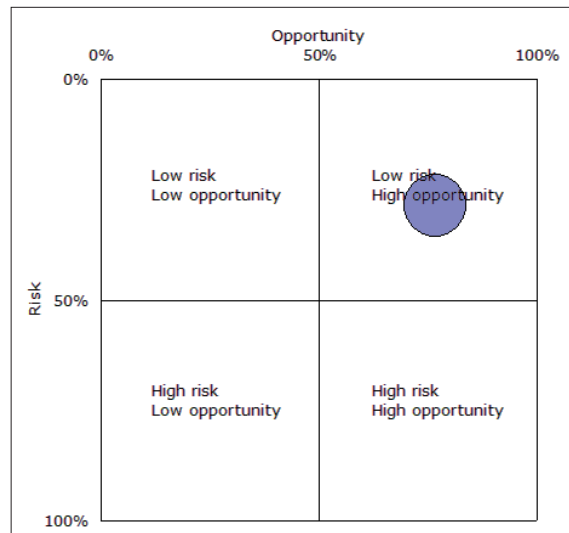


Figure 4. Position of the Patent X, Risk and Opportunity in a Business

This profile showed that Patent X can enhance the revenue stream of business unit especially for mangosteen peel nano-tea. ‘Low risk’ means that Patent X has no or little competitor in Indonesia. High Opportunity means that no competitor, will an opportunity to develop a mangosteen peel nano-tea business in Indonesia. It also indicates that this technology is an advanced technology that is difficult to imitate in the same field. This position provided a linkage to determine the amount of the royalty that can be used as a reference for negotiation with the stakeholder.

2. Quantitative Method

Patent X was valued by the income approach by using the discounted cash flow (DCF) approach. In this case, Patent X used as a ‘core technology’ to produce mangosteen peel nano-tea. Profits was calculated by accounting several aspects, including analysis cost of mangosteen skin nano-tea production; analysis of investment costs; and analysis of DCF. From the DCF analysis, the average of profit was obtained in a certain time (useful economic lifetime of the Patent X). The

calculation of DCF was conducted on the production process of the product, to determine the fixed and variable cost in this process. The results of the DCF determined the investment feasibility of product using Patent X (Table 1).

Results of the DCF calculation determined the average revenue of commercialization of product at about Rp617.000.000, generated by using the Patent X as a core technology. The amount of revenue was used as a reference in calculating the royalty rate of Patent X. Furthermore, the value of average revenue was used to predict the value of turnover when the technology was used on a commercial production scale. The calculation of royalty rate of Patent X is shown in Table 2.

From Table 2, the amount of royalty rate was obtained from the percentage of average

profit before interest and tax (PBIT), rational royalty and from apportionment of royalties to asset valued. The value of “average profit before interest and tax (PBIT) for the period (as a % of Turnover)” was determined by using the ‘rule of thumb’ method. The value of this rule was 35% because the Patent X has a ‘high opportunity’ based on value in the qualitative analysis. In addition, the ‘rule of thumb’ for ‘low risk’ (qualitative analysis result) for ‘rational royalty as a % of PBIT’ is about 20–33% (Georgia-Pacific Corp. v. United States Plywood Corp, 1970); and this calculation used 25% (average value) based on risk factor and opportunity of Patent X. With ‘high opportunity’ in the qualitative analysis, the percentage of know-how of patent should be more than 70% (but in this calculation assume it is 70%). From that amount, the calculation of the royalty rate of the Patent X was about 6.13%.

Table 1.
DCF Analysis of Patent X (based on 10 years useful patent lifetime)

YEAR(S)	0	1	2	3	4	...(in million rupiah)
reception Sales	-	1,974.72	2,090.88	2,207.04	2,323.20	2,323.20
capital Investments						
Working capital	(968.94)	(738.75)				
total capital						
Fees	(968,94)	(738.75)	-	-	-	-
- Production cost	-	-	-	-	-	-
- Business costs	-	1,168.22	1,236.93	1,305.65	1,374.37	1,374.37
- Finance Costs	-	216.03	228.73	241.44	254.15	254.15
Total cost	-	45.08	48.15	51.23	54.30	54.43
Net Cashflow	-	1,429.32	1,513.82	1,598,32	1,682.82	1,682.95
Accumulated Net Cashflow	(968.94)	(193.35)	577.06	608,72	640.38	640.25
YEAR(S)	6	7	8	9	10 (in million rupiah)	
reception Sales	2,323.20	2,207.04	2,090.88	1,974.72	1,858.56	
capital Investments						
Working capital	-	-	-	-	-	
total capital	-	-	-	-	-	
Fees						
- Production cost	1,374.37	1,305.65	1,236.93	1,168.22	1,099.50	
- Business costs	249.07	243.98	238.90	233.82	228.73	
- Finance Costs	54.43	53.02	50.08	47.15	44.22	
Total cost	1,677.87	1,602.65	1,525.92	1,449.19	1,372.45	
Net Cashflow	645.33	604.38	564.96	525.53	486.11	
Accumulated Net Cashflow	1,949.44	2,553.82	3,118.78	3,644.32	4,130.43	

Source: Calculated from Primary and Secondary Data

Table 2.
Calculation of Royalty Rate of Patent X

Criteria	Value
Projected growth	40.00% (I-III), 30% (IV-VI); 20% (VII-X)
Average Profit Before Interest and Tax (PBIT) for the period (as% of Turnover)	35%
Rational royalty as a% of PBIT	25%
Apportionment of royalties to asset valued	70%
Royalty rate (35% x 25% x 70%)	6.13%
Income tax rate	10.0%
Discount rate	20.00%
Useful economic life (years)	10

Source: Calculated from primary and secondary data

By using royalty rate 6.13% and turnover of Rp617,000.000, the amount of turnover prediction was determined, and NPV value was generated by Patent X. From Table 2, the calculation of turnover and NPV was conducted based on an assumption of projected growth of the technology. The projected growth of Patent X was assumed to get decreased by 10% every 3 years with 10 years of patent lifetime. The detail calculation of turnover and NPV of the Patent X is shown in Table 3.

The projected growth of the Patent X was predicted to get decreased 3 times every 3 years for 10 years of the useful of the patent (Table 3). In this analysis after 6 years, it was assumed that the projected growth becomes 20% or decreases 20% from the first year. This assumption was conducted because there were possibilities of the competitors to develop the new technology to substitute the Patent X. The competitor has a opportunity to develop the new technology with all the functions and characteristics which are probably the same or better than Patent X.

This projected growth has correlation with the market size of Patent X: ‘securing existing market’ (Figure 3). The capability to secure the existing market has correlation to the lifetime of the Patent X because if the lifetime of the Patent X is over ten years, it means that the Patent X is in the public domain. If that occurs, it will difficult to secure the market by using the same technology. Therefore, this invention should be

seen as a new patent based on previous patent to secure the market and to monopoly the market by using this new technology.

The projected income of Patent X is increasingly every year, and the amount of the NPV is about Rp605,227,434 (Table 3). The DCF analysis showed that the predicted profits from using Patent X are gained in lifetime period of the patent. Furthermore, the turnover of Patent X is shown in Figure 5.

The projected turnover of Patent X increased in a 10 years (useful lifetime of the Patent X) (Figure 5). Although based on projected growth, this technology has decreased by 10% every three years, but the profits gained each year actually increased.

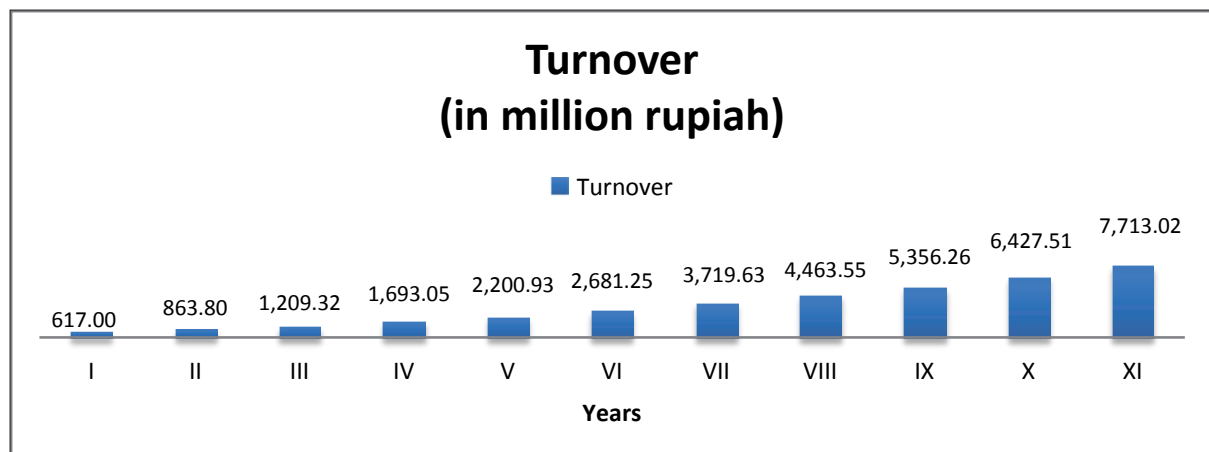
It also indicates that the Patent X has a high opportunity to be involved in a business. This result also can be a reference for stakeholders who want to invest in this technology. By combining the results from qualitative and quantitative methods, Patent X has a high potential contribution and has a high opportunity to gain revenue (Figure 5).

From this valuation, the patented technology should has a good requirement to be implemented in business operation. Strategy from the design of the business until the implementation and evaluation should be covered in a clear pathway to achieve the target. How to manage the prospective needs are also required to make them more feasible in a promising business (Song, Kim, & Lee, 2018).

Table 3.
Calculation Turnover and NPV of Patent X

Year(s)	I	II	III	IV	V(in million Rupiah)
Turnover	617.00	863.80	1,209.32	1,693.05	2,200.96
Royalty payable	37.79	52.91	74.07	103.70	134.81
Tax	3.78	5.29	7.40	10.37	13.48
Profit after tax	34.01	47.62	66.66	93.33	121.33
Profits after tax (life)	34.01	47.62	66.66	93.33	121.33
Year(s)	VI	VII	VIII	IX	X (in million Rupiah)
Turnover	2,861.25	3,719.63	4,463.55	5,356.26	6,427.51
Royalty payable	175.25	227.83	273.39	328.07	393.69
Tax	17.53	22.78	27.34	32.81	39.37
Profit after tax	157.73	205.04	246.05	295.26	354.32
Profits after tax (life)	157.73	205.04	246.05	295.26	354.32
NPV of royalty stream:	605.23				

Source: Calculated from primary and secondary data



Source: Calculated from primary and secondary data

Figure 5. Turnover of Patent X

V. CONCLUSION

Valuation of Patent X was conducted by both qualitative and quantitative methods. The qualitative method was used to map the Patent X from four aspects: legal, technology, market conditions, and finance, by using the IPScore approach. It showed that the Patent X had a proper correlation and 'high opportunity' and 'low risk' if involved in a business. Patent X also had an opportunity to gain a mutual benefit by a licensing agreement strategy.

While from quantitative method, income analysis conducted by a DCF approach was

used to project the revenue in a periodical of the lifetime Patent X (10 years). Results of this analysis showed that Patent X had a royalty rate 6.13% with a net present value (NPV) of about Rp605 millions. The amount of turnover of the Patent X over a 10 years period increased although the projected growth decreased 10% every three years. The future economic benefit predicted at about Rp7.7 billion during the 10 years of the lifetime period of the patent. It is indicating that the Patent X has an opportunity to obtain revenue in business of nano-tea based on mangosteen peel.

From the valuation result, it also can be used as one of the materials for policy recommendation for the organization to provide the best strategy to make a priority in order to develop a business based on nanotechnology to develop a new product (in this case is a nano-tea based on mangosteen peel). The strategy can be business to business (B2B) way or business to consumer (B2C) alternative to gain the optimal profit. This valuation results can be strengthening the argument that the product and technology can be delivered to the market. Also this result can be used as one of the reference material to convince the stakeholder and also investor to invest in this business.

To strengthen this research, many focus of another research can be conducted. How the market strategy and supply chain management can be formulated to make this product can be accepted in the market. In other field, how to make a good design for new product and analysis of competitor for the same product should be conducted to make this product success in the market.

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