Internal Startup Valuation of PT Telekomunikasi Indonesia, Tbk by applying Risk-based New Venture Valuation Technique (Case Study: Company V)

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Abstract—The current industry 4.0 era is the digital transformation of industrial sectors. Every company competes to adapt digital technologies so they can continue to exist. PT Telekomunikasi Indonesia Tbk (Telkom), as the largest telecommunications company in Indonesia, began to focus on innovating. One obvious form performed by Telkom to boost innovation is establishing Amoeba (internal startup). Company V is one of the Amoeba and successfully fostered by Telkom. Company V run their business by providing a chatbot platform to help business owner leverage their communication and engagement with their customers using Bots and AI technology. As investors, Telkom needs to find out whether Company V is still eligible to remain incubated or not. Therefore it is necessary to do a valuation process for company V to provide information about what the value of company V is and how much funding should be given. The method used to solve the problem in this paper is a risk-based new venture valuation technique. The result shows that Company V is in milestone 2, with approximately the valuation is 83,16 billion IDR. If market validation is complete and normal risk is applied, the valuation of Company V will reach 568,23 billion IDR starting from year 3, month 5.

Index Terms— internal startup, chatbot, risk-based new venture valuation technique, Telkom.

I. INTRODUCTION

The digital transformation can accelerate innovations as a new business model can be realized faster. Everything can be digitized and digitalized, which the company can make the company's process more efficient. One obvious form performed by PT Telkom Indonesia to boost innovation is establishing Amoeba, which is an innovation team that consists of people who have a high desire to innovate. Every Amoeba is managed by Amoeba Management (AMA). Therefore, every progress and development must be reported to the Amoeba Management. The role of Amoeba Management is a combination of venture capital and incubator. They provide funding for the Amoeba also provide guidance. In the guidance of the Amoeba Management that refers to lean startup, there are 5 stages that must be passed by each Amoeba before reaching the graduation stage which is: the idea generation and validation; customer validation; product validation; business model validation; and market validation.

Company V is one of the startups formed by Amoeba and successfully fostered by Amoeba Management. Company V

run their business by providing a chatbot platform to help business owner leverage their communication and engagement with their customers using Bots and AI technology. Instead of hiring people to become customer services, companies and online sellers can use this service from Company V. In running its business, Company V experiences various challenges, especially from the awareness of the importance of AI technology to support the business.

Company V is currently in the stage of increasing its business scale from business model validation to market validation. After going through the market validation stage, it is hoped that company V will become business as usual from Telkom. However, there is a possibility that company V will be sold to another party. As investors, Telkom and other parties who are potentially interested in company V want to find out how much valuation from company V in the future. Therefore it is necessary to do a valuation process for company V to provide information to investors what the value of company V is and how much funding should be given.

II. LITERATURE REVIEW

A. Business Situation Analysis

There have been some techniques that can be used to conduct external analysis, such as SWOT analysis, PESTLE or PEST analysis, and Porter's Five Force analysis. However, PEST analysis was considered to be more basic and therefore needed to be performed before continuing the SWOT analysis. Internal analysis is carried out using the VRIN framework by previously identifying the resources and capabilities of Company V.

According to external analysis that the government strongly supports investment in technology, especially Artificial Intelligence and Robotics and the AI industry is forecasted within 2019-2024 to grow with CAGR 36%. Although the AI industry is still new in Indonesia, the opportunity is still high supported by currently 14% of companies in Indonesia which have adopted artificial intelligence (AI) as an important part of their daily operations and business strategies and 42% are experimenting with using AI in their business.

According to internal analysis that had already explained in the previous section indicate that Company V has well enough resources and capabilities to compete in the AI

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industry. The capabilities of Company V will become their strength also the support from the parent company PT Telekomunikasi Indonesia will boost their reputation and could help them innovate the new product to compete in the industry.

SWOT analysis is carried out after conducting external and internal analysis for Company V's competitive position and formulating a strategy. SWOT analysis is shown in the table below.

TABLE I: SWOT ANALYSIS OF COMPANY V

Strengths		Weakness	
1	Ability to use facilities and infrastructure of Telkom	1	Company V cannot make decisions freely because it must pay attention to regulations from Telkom
2	Ability to integrate their product in big messaging platform such as Line and Telegram	2	There is currently no compensation, reward and punishment mechanism in Company V to form a strong team
3	Systematic organizational management		
4	One of pioneers in AI industry in Indonesia		
Opportunities		Threats	
1	AI industry globally is growing rapidly, and it is forecasted from 2019-2024 will grow with CAGR 36%	1	Several numbers of competitors already formed before Company V enter this industry and cooperated with giant tech company
2	The government strongly supports investment in technology, especially Artificial Intelligence and Robotics	2	AI industry in Indonesia will get some protest due to increase unemployment rate.
3	There are still limited player in AI industry	3	The level of interest of using AI in Indonesia is still low

B. Valuation

The risk-based new venture valuation technique basically is a deeper extension of the discounted cash flow method. Unlike DCF which assumes the risk or discount rate of the expected cash flows is constant, real options factors in the changing uncertainty of the expected cash flows. The entrepreneur and investor can overcome information asymmetry, the problems with DCF and method of comparables as well as integrate real options thinking into the new venture valuation process by applying risk-based valuation technique. In order to apply risk-based valuation technique, financial modeling and commercialization risk have to be identified first.

Commercialization risk is a phrase that typically encompasses all risks associated with bringing a business concept to market. All new venture commercialization risks will have a large subjective component and therefore rely, in most part, on the knowledge and perception of the individual. The classification of commercialization risk is consists of development, customer acceptance, and marketing and sales.

The Operating Cash Flow (OCF) is used to determine the enterprise's value as opposed to Free Cash Flow because the Operating Cash Flow is a prime indicator of how well the new venture's business model is succeeding. Free Cash Flow can be impacted by other activities not directly related to the business model. The risk-based valuation technique consists of: Determining the time when the commercialization risk of new venture is minimized (t_n); formulating the future value for the new venture at t_n using discounted cash flow method; validating the future value by compare with other companies; applying real option principles to assign a current value to the new venture; and adjusting the financial model to attain a balanced investment. The step 1-3 is focusing on the normal

risk stage of the company while the fourth is crucial to value the company in the development stage.

According to the modified Black-Scholes model, there are four factors used in this valuation technique. Discounted cash flow used to value the company as the first step, exercise price expressed as staged investments, the expiry time is shown by using milestone, discount rates used vary depending on each value-changing event (milestone) that has been set. One important point to use this technique is that the company should reach t_n within three years because the projected financial model was set for 60 months.

III. METHODOLOGY

There are several steps to solve the problem in this paper that constructed into a methodology. In this research, start by describing business issue exploration, analysis of the business situation, external and internal analysis, SWOT analysis, business valuation, formulation strategy, and implementation plan.

IV. FINDINGS AND ARGUMENT

A. Sales Volume Projection

Company V, which is a Telkom fostered startup, has been given a sales target for the next 3 years as a condition for Company V's business to continue. The first year the growth of the customer enterprise package must reach 50% each month, while the customer starter package and the medium package 18% each month. Then in the second year, customer growth must reach 17% every month, and the third year customer growth must reach 15% every month. For the fourth and fifth years, because there is no target set by Telkom, the forecast is done using AI market growth with a CAGR of 36% or 3% per month. Currently, by the time that the projection of sales volume begins, Company's V has 2 customers for the starter package, 1 customer for the medium package, and 2 customers for enterprise package.

B. Cost of Sales

Company V's cost of sales just consists of server and partnership costs. There are 2 servers that provide service for Company V called Sigma and AWS server. The cost of the server is increasing according to the average historical inflation rate of 3.35%. The servers can process 8000 data in milliseconds. The advantage of the Company V business model is the revenue will increase above the inflation rate, but the cost of the server will just increase following the inflation rate. Also, there is a payment gateway for the starter package and medium package which costs 6.000 IDR for every transaction. The partnership cost is 50% for MetraNet and 20% for EBIS. The calculation of the profit margin has resulted in 29%.

C. Operating Expenses

The operating expense is projected using a monthly basis. The operating expense is categorized into four categories which are facility and maintenance expenses, marketing expenses, product development expenses, and general and administrative expenses. The assumptions are the facility and maintenance expenses will increase according to the historical average inflation rate of 3.35%. The marketing

expenses increase due to the target set by Telkom to Company V.

D. Milestone

The milestone of Company V is based on the innovation journey of Amoeba. Currently, Company V is in the business model validation stage which customer validation and product validation already passed. Therefore, the milestone defined based on three types of risk, development risk, customer acceptance risk, and marketing and sales risk. The discount rate applied for normal risk (milestone 4) is 20% which would happen in year 3 month 5. Normal risk signifies milestone 3, that is, the sales acquisition channel has been validated and completed. Before milestone 3 was resolved, the discount rate for this milestone was increased by 10% become 30%. In milestone 2 (beta-tested completed), the discount rate was increased by 15% become 45%. For milestone 1 (market survey), the discount rate was also increased by 20% become 65%. The milestone could be summarized as a Gantt chart shown in Table II.

TABLE II: MILESTONE OF COMPANY V

Description	Y1 M0	Y1 M1	Y1 M2	Y1 M3	Y1 M4	Y1 M5	Y1 M6	Y1 M7	Y1 M8	Y1 M9	Y1 M10	Y1 M11	Y1 M12	Y3 M5	Y5 M12
Type of Risk	Milestone (s)														
Development Risk (BMV)	Market Survey														
Customer Acceptance Risk (BMV)	Beta Testing														
Marketing & Sales Risk (MV)	Product launch promotion														
	Sales channel acquisition														
Stages	Milestone														
Market Survey	Milestone 1														
Beta test completed	Milestone 2														
Sales channel acquisition validated	Milestone 3														
Normal Risk Starting to be Applied	Milestone 4														
Terminal Value Applied															

E. Discount Rate

Basically, the discount rate for the discounted cash flow method is constant, but risk-based new venture technique uses a different discount rate for every milestone. The differences in the discount rate are due to different due to an assessment of the risk experienced by Company V in each of its milestones. The discount rate traced to the normal risk applied to milestone 1 (development risk).

The discount rate applied for normal risk (milestone 4) is 20% which would happen in year 3 month 5. Normal risk signifies milestone 3, that is, the sales acquisition channel has been validated and completed. Before milestone 3 was resolved, the discount rate for this milestone was increased by 10% become 30%. In milestone 2, the discount rate was increased by 15% become 45%. For milestone 1, the discount rate was also increased by 20% become 65%.

F. Terminal Growth Rate

In the last stage to complete the valuation method on Company V, it is necessary to determine the terminal growth rate to get the valuation value after the projection ends. however, in determining the terminal growth rate, the author uses Indonesian gross domestic product because the artificial intelligence industry is currently growing rapidly with a CAGR of 36% each year and this industry will increasingly develop given that almost all human activities have begun to be digitalized which requires artificial intelligence. Therefore it is assumed to determine the terminal growth rate of Company V operating in Indonesia, used the Indonesian GDP of 5.18%.

G. Result of Valuation

After determining the discount rate for each milestone and also the terminal growth rate, the valuation of Company V can be calculated using calculation tools. Since milestone 1 planned to be finished in year 1 month 1, then the calculation for discount rate applied directly after year 1 month 1, which year 1 month 2. This is also applied to other milestones. the result of the valuation of Company V presented in Table III.

TABLE III: VALUATION SUMMARY (IN IDR)

	Origination	1	2	3	4
Discount Rate	0,0%	65,0%	45,0%	30,0%	20,0%
Net Present Value of Cash Flows from Pro Forma F/S	Rp	Rp17.048.837.411	Rp39.051.334.609	Rp 86.318.312.814	Rp142.471.063.633
Growth into Perpetuity of 5,2%	Rp	Rp14.622.591.114	Rp44.113.095.853	Rp144.741.016.237	Rp425.763.679.846
Valuation	Rp31.591.803.725	Rp31.671.428.525	Rp83.164.430.462	Rp231.059.329.051	Rp568.234.743.479
Date	Yr 1 Mth 0	Yr 1 Mth 1	Yr 1 Mth 4	Yr 1 Mth 12	Yr 3 Mth 5
Capital Requirements	Rp79.624.800	Rp732.196.320	Rp3.719.094.980	Rp4.260.393.010	Rp0
Capital Requirement as a % of Valuation	0,3%	2,3%	4,5%	1,8%	0,0%

To better understand the results, the graph of Company V valuation provided and shown in Figure I

FIGURE I: VALUATION PER MILESTONE (IN IDR)

H. Sensitivity Analysis

The next step after getting the results of the valuation of Company V is to do a sensitivity analysis to find out which variables are quite sensitive to the valuation results. Every variable is swung +20% and -20% from the current assumption. Some of the variables that are varied are:

1. Inflation rate
2. Quantity sold realization for the starter package
3. Quantity sold realization for medium package
4. Quantity sold realization for enterprise package
5. Price per unit realization for the starter package
6. Price per unit realization for medium package
7. Price per unit realization for enterprise package
8. Terminal growth rate
9. Milestone 4 discount rate

The result of sensitivity analysis showed that milestone 4 discount rate was the most sensitive variable that could yield firm value -22.35% from the current firm value (swing +20%) and 39.02% from the firm value (swing -20%). Tornado chart shows in Figure II which the most sensitive variable.

FIGURE II: TORNADO CHART

I. Monte Carlo Simulation

Monte Carlo simulation used to find the probability of different outcomes due to the intervention of random variables. In this paper, Monte Carlo simulation is used to find the probability of the valuation result of Company V. From the sensitivity analysis, the most four variables were chosen to be simulated using monte carlo simulation with 1 million iterations. Those variables are milestone 4 discount rate, the price per unit realization for enterprise package, quantity sold realization for enterprise package, and terminal growth rate. According to the result of simulations, 18.7732% probability that the valuation of Company V is under 500 billion IDR, 72.784% probability that the valuation of Company V ranged between 500 billion IDR and 700 billion IDR, 8.4428% probability that the valuation of Company V ranged between 700 billion IDR and 974 billion IDR. The graphs of monte carlo simulations were shown in Figure III, Figure IV, and Figure V.

FIGURE III: MONTE CARLO SIMULATION UNDER 500 BILLION IDR

FIGURE IV: MONTE CARLO SIMULATION BETWEEN 500-700 BILLION IDR

FIGURE V: MONTE CARLO SIMULATION BETWEEN 700-974 BILLION IDR

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

Based on valuation results using risk-based new venture valuation technique, Company V is in milestone 2, after completely finish milestone 1, which development risk (market survey). Approximately the valuation of Company V is 83,16 billion IDR. This value will continue to increase if Company V can complete the market validation (sales acquisition channel). If market validation is complete and normal risk is applied, the valuation of Company V will reach 568,23 billion IDR starting from year 3, month 5.

Based on the external and internal analysis, Company V operates in the Artificial Intelligence industry, which currently has not many players in Indonesia. This could be an advantage for Company V and also for Telkom to increase its sales acquisition channel. According to sales revenue that has been discussed in the previous chapter, there is potential for Company V to grow and become a new source of income for Telkom. Therefore, if Telkom takes over Company V would be beneficial for both of them.

B. Recommendation

In the reference paper of the Risk-Based New Venture Valuation Technique, the valuation process should compare with other companies using relative valuation. However, in this research, relative valuation did not apply. Hence, the relative valuation should be applied for further study to evaluate the valuation result with other companies.

The sensitivity analysis performed in this paper was using 8 parameters to be varied. The author suggests using more parameters to find which parameter that very sensitive to the valuation result.

The AI industry in this research is forecasted will experience rapid growth with CAGR 36%. The trend of the AI industry should be updated in the next research to increase the accuracy of the valuation.

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