EVALUATION OF INVESTMENT IN IoT STARTUP AT PT TMI

Wiwit Hermawan1), Kin Tjendrasa2)
School of Business and Management, Institut Teknologi Bandung, Bandung, Indonesia
1) wiwit_hermawan@sbm-itb.ac.id, 2) kin_tjendrasa@sbm-itb.ac.id

Abstract
Smartphone revolution, the rise of OTT (Over the Top) technology, and growth of mobile application drive explosion in data demand and erosion of legacy service, which voice and SMS (Short Messaging Service) revenue. It forces mobile telecommunication operators to explore new revenue sources through new business development by taking the opportunity across technology, media, and telecommunication (TMT). Telkomsel Mitra Inovasi (TMI), Telkomsel Corporate Venture Capital (CVC), conducts non-organic business development through investment in an early-stage startup from TMT sectors. January 2020, TMI followed in Series B1 funding of the Internet of Things (IoT) startup. The investment evaluation utilizes two factors which capital gain and incremental revenue to existing Telkomsel business. There is uncertainty in financial return on high-risk investments in a new startup company, and existing Telkomsel IoT provides smart connectivity services. However, connectivity will become increasingly commoditized, declining from 9% of total IoT revenue in 2018 to 5% in 2025. Consequently, Telkomsel IoT should expand its role to seize the incremental revenue opportunities. This research project uses discounted cash flow (DCF), secondary data to predict expected financial return after capturing possible risk investment for sound management decisions.

Key words: Telecommunication, Investment, Startup, IoT, Discounted Cash Flow (DCF)

1. Introduction
1.1 Background
In the past few years, mobile telecommunication companies' business has shifted from legacy services which voice and SMS (Short Messaging Service) to data service. The change shifts towards a digital business with the support of the smartphone revolution, Over-The-Top (OTT) technology maturity, and bubble of a digital technology startup. The smartphone revolution has led to an explosion in data demand. OTT services offer various range of contents such as media & entertainment, education & training, health & fitness, telecommunication. Meanwhile, digital technology startup brings real service through the mobile application to fulfill people's daily life needs, such as food delivery, transportation, personal loan, shopping, mobile money, and payment. The traffic of data service has grown exponentially. Hence, mobile telecommunication operators must make more contributions to the digital world to gain more benefits. Otherwise, they will only become the dump pipe.
The digital technology startup can contribute not only to economic development but also to solve the classical issue of unemployment and welfare. Quoting startupranking.com in early 2020, Indonesia ranks fifth in the world with 2,714 technology startups after the US, India, UK, and Canada. Shortly, Indonesia will become one of the countries with the greatest digital creative economic power in Asia. In May 2019, Telkomsel announced a new subsidiary company named Telkomsel Mitra Inovasi (TMI). TMI completes the three pillars of Telkomsel digital innovation, which previously had been The NextDev and Telkomsel Innovation Center (TINC).

1.2 Telkomsel Mitra Inovasi (TMI) Profile

TMI is a Telkomsel's Corporate Venture Capital (CVC) with an initial capital of USD 40 million. TMI targets its investment in a startup at an early stage (pre-Series B, Series B, pre-Series C) from TMT sectors. A targeted startup should have a promising prospect as well as the potential to be synergized with Telkomsel's ecosystem assets and competencies. This synergy is to accelerate startup growth. In conducting investment activities, TMI has a partnership with third parties, PT Metra Digital Investama (MDI) for indirect investment and Singtel Innov8 Pte, Ltd (Innov8) for direct investment.

1.3 Business Issue

With the assistance of MDI Venture, at January 2020 TMI has followed in Series B1 funding at IoT startup who specialize in logistic, inventory, returnable asset and field asset management. Evaluation parameters of the achievement of investment objective are capital gain and incremental value to existing Telkomsel business. When evaluating the investment, there are issues which uncertainty in financial return on high-risk investment in a new startup company, and existing Telkomsel IoT provides smart connectivity service to its subscribers. However, connectivity will become increasingly commoditized, declining from 9% of total IoT revenue in 2018 to 5% in 2025. Consequently, Telkomsel IoT should expand its role to seize the incremental revenue opportunities.

2. Literature Review

2.1 Discounted Cash Flow Valuation (DCF)

The first and most fundamental approach to valuing a firm is discounted cash flow (DCF) valuation. In discounted cash flow valuation, we estimate the value of any asset by discounting the expected cash flows on that asset at a rate that reflects their riskiness. In a sense, we measure the intrinsic value of an asset. The value of any asset is a function of the cash flows generated by that asset, the life of the asset, the expected growth in the cash flows, and the riskiness associated with these cash flows. In other words, it is the present value of the expected cash flows on that asset. (Damodaran, 2010:812).

2.1.1 Net Present Value (NPV)

Net Present Value (NPV) is the sum of the present values of the expected cash flow on the project, net of the initial investment (Damodaran, 2010:312). The general formulation of the NPV rule is as follows:
\[
\text{NPV} = \sum_{t=1}^{t=N} \frac{CF_t}{(1 + r)^t} - \text{Initial Investment}
\]

\(CF_t\) = Cash flow in period t  
\(r\) = Discount rate  
\(N\) = Life of the project

NPV helps decision rule about the project because the hurdle rate is already factored in the present value.

- If the NPV > 0 \(\rightarrow\) Accept the project
- If the NPV < 0 \(\rightarrow\) Reject the project

NPV that is greater than 0 implies that the project makes a return greater than the hurdle rate.

2.1.2 Interest Rate of Return (IRR)

Internal rate of return (IRR) is the rate of return earned by the project based on cash flows, allowing for the time value of money. The IRR is the discount rate that makes the NPV of the project equal to zero (Damodaran, 2010:325).

IRR helps decision making process to accept or reject a project with following rule

- If the IRR > cost of capital \(\rightarrow\) Accept the project
- If the IRR < cost of capital \(\rightarrow\) Reject the project

2.1.3 Payback Period

Payback period is the length of time it will take for nominal cash flows from the project to recover the initial investment (Damodaran, 2010:308). This value is set subjectively on the basis of a number of factors (Gitman and Zutter, 2012:393). Thus, if the payback period is less than the determined period made by the investor, the project should be accepted. Otherwise if the payback period is more than the determined period, so the project is rejected.

2.1.4 Terminal Value (TV)

Terminal value (TV) is the value of a business or project beyond the forecast period when future cash flows can be estimated. Terminal value assumes a business will grow at a set growth rate forever after the forecast period.

Following is the formula of terminal value.

\[
\text{Terminal Value}_n = \frac{\text{Free Cashflow}_n * (1 + \text{Perpetual growth rate})}{(\text{Cost of capital} - \text{Perpetual growth rate})}
\]

(Ganti, A, 2020)

Perpetual growth rate = percentage of cash flow growth starting period \(n+1\)

2.2 Weighted Average Cost of Capital (WACC)

In DCF, the cash flows we discounted were before interest and principal payments, and the discount rate we used was the weighted average cost of capital (WACC). WACC is considered the reflection of the project’s risk level. The longer time the cash flows projection causes a higher risk of if being realized because of the time value of money and other uncertainty factors. WACC
is also considered as the required return for a project or investment. The company must achieve such requirements to satisfy the lender or owner for delaying their consumption to invest in the project.

Following is the formula of WACC.

\[ WACC = \frac{E}{(D+E)}(r_e) + \frac{D}{(D+E)}(r_d)(1-t) \]

(Ross, Westerfield, and Jaffe, 2009:599)

- \( E \) = Market value of equity
- \( D \) = Market value of debt
- \( r_e \) = Cost of equity
- \( r_d \) = Cost of debt
- \( t \) = Corporate tax rate

2.2.1 Cost of Equity

The cost of equity is one of the critical parameters that an investor should consider regarding their investment. It is also one of the components to determine the WACC. The cost of equity explains the minimum return that investor need in exchange for owning an asset and bearing the risk of its ownership.

One standard method to calculate the cost of equity is the Capital Asset Pricing Model (CAPM). Following is the formula of CAPM.

\[ \text{Cost of equity} = R_f + \beta_i(E(R_m) - R_f) \]

(Damodaran, 2010:121)

- \( R_f \) = Risk free Rate
- \( E(R_m) \) = Expected Return on market portfolio
- \( \beta_i \) = Beta of asset i
- \( E(R_m) - R_f \) = Risk premium on market portfolio

This model takes into consideration the rate of investment that investors consider to be risk-free such as government bonds or the central bank rate of a country.

3. Methodology of Research

The methodology of this final project is using a quantitative method by calculating fair projection incremental revenue through free cash flow, net present value, and terminal value.

3.1 External Analysis

3.1.1 PESTEL Analysis
Table 1. PESTEL Analysis

| Political | Economic | Sociocultural | Technology | Ecological | Legal |
|-----------|----------|---------------|------------|------------|-------|
| Indonesian government recognizes the benefit of IoT to support implementation of Making Indonesia 4.0 program. | According to GSMA Intelligence in The Mobile Economy 2019, IoT revenue will reach USD 1.1 trillion globally in 2025. | Quality of human resources is relatively lower than other South East Asia countries. Hopefully, it will improve along with Making Indonesia 4.0 implementation. | Connectivity to support various IoT use case implementation in Indonesia is ready by the completion of the Palapa Ring project from the government, broadband city by mobile telecommunication operators, and dedicated frequency spectrum for IoT. | IoT is environmentally friendly that can reduce global carbon emission by about 15% by 2030. (Ekholm, B., and Rockström, J., 2019) | Main concern is security and data privacy. Personal Data Protection Law is not available (Kusumawati, D., Winarko, B., Wahab Riva’atul A., and Pradono, W., 2017) |

3.1.2 Porter Five Force Analysis

IoT has strong substitute technology in which telemetry, analog-based technology is widely used in various industries such as manufacturing, transportation, airlines, oil, and gas (AVSystem, 2019). In Indonesia, IoT adoption is considered low, and the providers still explore market needs. IoT providers, associations, and the government should strengthen the ecosystem, support infrastructure to ensure interoperability and reliability, and looking for solutions about security and data privacy concerns.

3.2 Internal Analysis
3.2.1 VRIO Analysis

VRIO framework is used to assess the competitive implication of Telkomsel resource related to IoT business.
Table 2. VRIO Analysis related to IoT business

| Aspect                                           | Valuable (V) | Rare (R) | Costly to Imitate (I) | Organized to capture value (O) | Conclusion              |
|-------------------------------------------------|--------------|----------|-----------------------|-------------------------------|-------------------------|
| Telkomsel Human Resource, Creativity, and Innovation | Y            | N        | N                     | N                             | Competitive Parity       |
| Telkomsel IoT Product, Quality and Product Principle/Partner | Y            | N        | N                     | N                             | Competitive Parity       |
| Telkomsel Customer Relationship Management (CRM) | Y            | Y        | N                     | N                             | Temporary Competitive Advantage |
| Telkomsel Mobile Network Coverage and Brand Image | Y            | Y        | Y                     | Y                             | Competitive Advantage    |

3.2.2 SWOT Analysis

Table 3. SWOT Analysis

| Strengths                                      | Weaknesses                                      | Opportunities                                      | Threats                                     |
|------------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------------------------|
| - Network coverage and brand image            | - Lack of good strategy and doable action plan for commercialization breakthrough | - Program Making Indonesia 4.0                     | - Telemetry technology                       |
| - Support from funded startup                 | - Security and data privacy                     | - E-commerce, supply chain, logistics and transportation | - Quick changing technology                 |
| - Data analytic capabilities                  |                                                 | - Smart home and smart building                    | - Regulatory change                         |
| - Updated technology                          |                                                 | - Financial industry                               | - Fierce competition                        |
|                                                 |                                                 | - Healthcare and pharmaceutical                     | - Shifting in global technology base         |

3.3 Data Collection

Data collection method of this final project consists of:

- Literature study, referring to theory from textbooks, journals, and the internet, which is related to this final project.
- Secondary data collection in which the data sources are from TMI and Telkomsel data with some modifications. The author also conducts an observation of the company activities and interview with key personnel in the company.

4. Result and Discussion

4.1 Assumption

Current Telkomsel IoT business has offered IoT connectivity service to its subscribers. The funded startup supports Telkomsel IoT creating new incremental business in two areas, which IoT professional service and IoT application, platform, and services. Taking advantage of “Making Indonesia 4.0” and e-commerce booming, new business target related industry sectors such as
government, financial, logistics, supply chain, transportation, general trading, oil and mining, healthcare, pharmaceutical, and the financial industry. The new incremental business will be ready in the market in the fourth quarter of 2020 and expected new subscribers onboard in December 2020.

Telkomsel is a private company, so some information is not publicly available. Therefore, some assumptions are made to conduct financial projection. Those assumptions are
- Cost of capital is 18%
- Perpetuity continuity growth is 0.1% as technology is quickly changing technology in the digital era
- Revenue share to IoT platform provider is 50%
- Installation and testing cost is 35%
- Automation adoption in Indonesia is 16%
- Projection period is 6 years starting 2020 until 2025

4.2 Financial Projection
4.2.1 Financial Projection New Business

Table 4. Financial Projection New Business

| Description         | 2020   | 2021   | 2022   | 2023   | 2024   | 2025   |
|---------------------|--------|--------|--------|--------|--------|--------|
| Revenue             | 1.75   | 23.08  | 28.45  | 35.07  | 43.23  | 53.30  |
| Cost                | -0.80  | -10.59 | -13.05 | -16.07 | -19.81 | -24.40 |
| Expenses            | -0.09  | -1.15  | -1.42  | -1.75  | -2.16  | -2.66  |
| Tax                 | -0.22  | -2.83  | -3.49  | -4.31  | -5.32  | -6.56  |
| Net Income          | 0.65   | 8.50   | 10.48  | 12.93  | 15.95  | 19.67  |
| Capex               | -28.40 | -27.75 | 8.50   | 10.48  | 12.93  | 15.95  |
| Free Cash Flow      |        |        |        |        |        |        |

4.2.2 Financial Projection Consolidated (Existing Business + New Incremental Business)

Table 5. Financial Projection Consolidated

| Description         | Actual | 2020   | 2021   | 2022   | 2023   | 2024   | 2025   |
|---------------------|--------|--------|--------|--------|--------|--------|--------|
| Revenue             | 403.82 | 448.94 | 517.94 | 576.26 | 641.50 | 714.55 | 796.44 |
| Costs               | -67.99 | -95.36 | -118.37| -136.56| -144.58| -167.35| -194.03|
| Expenses            | -15.11 | -22.44 | -25.90 | -28.81 | -32.07 | -35.73 | -39.82 |
| Tax                 | -80.18 | -82.75 | -93.42 | -102.72| -116.21| -127.87| -140.65|
| Net Income          | 240.54 | 248.24 | 280.25 | 308.17 | 348.63 | 383.60 | 421.94 |
| Capex               |        |        |        |        |        |        |        |
| Free Cash Flow      | 240.54 | 219.84 | 280.25 | 308.17 | 348.63 | 383.60 | 421.94 |
4.2.3 Net Present Value (NPV), Terminal Value, Internal Rate of Return (IRR), and Payback Period

Table 6. Net Present Value (NPV), Terminal Value, Internal Rate of Return (IRR), and Payback Period

| Discount Rate | 18% |
|---------------|-----|
| Perpetual Growth Rate | 0.1% |

(In Billion IDR)

| Year | In cash flow | Terminal Value | NPV |
|------|-------------|----------------|-----|
| Investment | -28.40 | 0.65 | 18.40 |
| 2020 | 0.65 | 8.50 | 6.78 |
| 2021 | 10.48 | 12.93 | 9.05 |
| 2022 | 15.95 | 19.67 | 65.70 |
| 2023 | 110.01 | 69.38 |
| Net Present Value (NPV) | 69.38 |
| Internal Rate of Return (IRR) | 43.77% |
| Payback Period | 4 years |

4.2.4 Sensitivity Analysis

| Parameters | 20% | 40% | 60% | 80% |
|------------|-----|-----|-----|-----|
| Automation adoption | Down | Up | Up | Down | Up | Up |
| Revenue Share to IoT Platform provider | -33% | 33% | -67% | 67% | -100% | 100% | -133% | 133% |
| Installation and testing cost | 24% | -24% | 49% | -49% | 73% | -73% | 98% | -98% |
| Installation and testing cost | 7% | -7% | 13% | -13% | 20% | -20% | 27% | -27% |

Automation adoption is the most significant factor influencing the projection result, so do business synergy with other State-Owned Enterprises (SOE), State Agencies, and Ministries.

5. Conclusion

The investment in IoT startup enhances the service line of Telkomsel IoT business beyond the connectivity provider. The new funded IoT startup supports creating new incremental business through delivering new services in the Professional Services and Application, Platform, and Services areas. These new services complement Telkomsel IoT services to become an IoT solution provider. With an investment of IDR 28.40 billion, a discount rate of 18%, and a perpetual growth rate of 0.1%, this new increment business has NPV of IDR 69.38 billion with Terminal Value at the end of the projection period of IDR 110.01 billion and IRR of 43.77%. The investment will experience a break-even point when it reaches three years and eight months.
TMI should hold the investment in IoT startup. With the gained profit, TMI can start a new venture to fulfill market needs. Telkomsel IoT should continue building internal capability, expertise, and strategy through collaboration with internal and external parties. Internal, such as IT Business Intelligent and Analytics, to conduct analytical processes to obtain valuable insight, Data Governance, and Legal to answer security, data privacy, and regulatory compliance. External, AIS Thailand other Singtel group company for commercialization strategy and breakthrough, IoT association, and the government to align industry and regulatory. Potential target market is business synergy with other State-Owned Enterprises (SOE), State Agencies and Ministries, the smart home, smart building, supply chain, e-commerce related industry, government, energy, agriculture, healthcare, pharmaceutical, and TMT sectors.

REFERENCES

AVSystem, 2019, *IoT vs M2M — What is the Difference?*, [https://www.avsystem.com/blog/iot-and-m2m-what-is-the-difference/](https://www.avsystem.com/blog/iot-and-m2m-what-is-the-difference/) [Accessed on 23 March 2020]

AVSystem, 2019, *What is IoT architecture?*, [https://www.avsystem.com/blog/what-is-iot-architecture/](https://www.avsystem.com/blog/what-is-iot-architecture/) [Accessed on 12 February 2020]

Damodaran, Aswath, 2010, *Applied Corporate Finance – Third Edition*, New Jersey, USA: John Wiley & Sons, Inc.

Das, K., Wibowo, P., Chui, M., Agarwal, V., and Lath, V., 2019, *Automation and the future of work in Indonesia Jobs lost, jobs gained, jobs changed*, [https://www.mckinsey.com/~/media/mckinsey/featured%20insights/asia%20pacific/automation%20and%20the%20future%20of%20work%20in%20indonesia/automation-and-the-future-of-work-in-indonesia-vf.ashx](https://www.mckinsey.com/~/media/mckinsey/featured%20insights/asia%20pacific/automation%20and%20the%20future%20of%20work%20in%20indonesia/automation-and-the-future-of-work-in-indonesia-vf.ashx) [Accessed on 21 April 2020]

Ekholm, B., and Rockström, J., 2019, *Digital technology can cut global emissions by 15%. Here’s how*, [https://www.weforum.org/agenda/2019/01/why-digitalization-is-the-key-to-exponential-climate-action/](https://www.weforum.org/agenda/2019/01/why-digitalization-is-the-key-to-exponential-climate-action/) [Accessed on 24 March 2020]

GSMA Intelligence, 2019, *The Mobile Economy 2019*, [https://data.qsmaintelligence.com/api-web/v2/research-file-download?id=51249388&file=2915-260220-Mobile-Economy.pdf](https://data.qsmaintelligence.com/api-web/v2/research-file-download?id=51249388&file=2915-260220-Mobile-Economy.pdf) [Accessed on 23 March 2020]

Hambrick, Donald C., and Fredrickson, James W., 2005, *Are you sure you have a strategy?*, [https://pdfs.semanticscholar.org/564c/83c48e6a3c8dc3ca2cc39d4470f150f6a352.pdf](https://pdfs.semanticscholar.org/564c/83c48e6a3c8dc3ca2cc39d4470f150f6a352.pdf) [Accessed on 28 March 2020]

Hwang, Yitaek, 2020, *Cellular IoT Explained – NB-IoT vs. LTE-M vs. 5G and More*, [https://www.iotforall.com/cellular-iot-explained-nb-iot-vs-lte-m/](https://www.iotforall.com/cellular-iot-explained-nb-iot-vs-lte-m/) [Accessed on 23 March 2020]

Jatmiko, Leo D., 2019, *Mengapa IoT Belum Digunakan Maksimal di Manufaktur Indonesia?*, [https://teknologi.bisnis.com/read/20190712/84/1123371/mengapa-iot-belum-digunakan-maksimal-di-manufaktur-indonesia](https://teknologi.bisnis.com/read/20190712/84/1123371/mengapa-iot-belum-digunakan-maksimal-di-manufaktur-indonesia) [Accessed on 1 March 2020]

Kementerian Komunikasi dan Informatika Republik Indonesia, 2019, *Potensi Pasar Internet of Things di Indonesia Capai Rp 444 T*,
