THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Analysis of Using Risk and Capital Budgeting for Investment Decision Making in SINI Company

Tsaniya Millah Syahidah

Undergraduate Student, Bachelor of Entrepreneurship,
Institute Technology Bandung, Indonesia

AcipSutardi

Lecturer, School of Business and Management,
Institute Technology Bandung, Indonesia

Abstract:

This research focuses on the SINI Company. SINI Company is a device tracker technology-driven start-up company. SINI Device Tracker is a form of smart device tracker. This product is equipped with a chip that will be connected by Bluetooth to the user's smartphone by SINI Apps. The features of this product are tracking features, sound mode, and missed call mode. In order to produce the product and application, SINI has invested high amount of initial investment for the research and development. SINI needs to reconsider the investment if the risk is too high and need high cost of mitigation and if the return of the investment is not as high as it expected. The purpose of this research is to describe and explain the risk analysis and capital budgeting for SINI Company. This research will use the theory problem root cause, internal and external business condition, risk analysis, capital budgeting, and investment decision making. By using the historical data of SINI financial data, added with comparison secondary data from company in the similar specification with SINI, as Tile and Chipolo, market situation secondary data, and data from previous study. At this stage in the study, the risk analysis and capital budgeting will be defined as a guideline for investment decision making in SINI Company.

Keywords: *Electronic consumer, technology startup, risk analysis, capital budgeting analysis, investment decision making*

1. Introduction

This research focuses on the SINI Company. SINI Company is a device tracker technology-driven startup company. SINI Device Tracker is proposed to customers that are travelers and entrepreneurs who are often losing their products. SINI came up with a market solution that is a device tracker linked by application to the smartphone. The app is connected to the device now already out for Android users, and SINI is currently developing the application for iOS users. Currently, SINI has invested a high amount of investment in research and development for products.

According to the paper report, more than 36 percent of business companies use a quantitative risk assessment, only 4 percent do not measure risk, and the remaining 60 percent only analyze risk subjectively (Schall, Sundem, & Geijsbeek, Survey and Analysis of Capital Budgeting Methods, 1978). The paper also examines the findings of such surveys to determine whether the risk present in a company's environment contributes to the use of different methods of capital budgeting (Schall & Sundem, Capital Budgeting Methods and Risk: A Further Analysis, 1986). Analysis of capital budgeting is a method of refining the knowledge to generate the most relevant considerations for a financial planner in charge of selecting investment opportunities (Durand, 1986). Capital budgeting is a fundamental and used as a method for organizing, managing, and allocating scarce resources to competing demands everywhere. Capital budgeting is an integral part of financial planning and decision-making as capital budgeting resources contribute to a better decision and can support the selection of particular investments among competitive alternatives (Kengatharan, 2016)

1.1. Problem Statement

Investment projects are subject to different types of risks that can affect the beneficiary's expected performance. The influences that come from the external environment, as well as the endogenous factors unique to the investment objective's organizational and functional structure, may have a different manifestation in time than initially anticipated, and thus the more significant the variations found, the higher the project's risk of failing to make sure that the intended outcomes are achieved (Burja & Burja, 2009)

SINI Company is currently at the development stage. Given the fact, SINI is projecting a high amount of Investment Projection and those investments invested without risk analysis. There's a possibility that SINI has a high-risk value, and it can be a loss for the company. Therefore, SINI Company needs to analyze capital budgeting to measure and guide SINI Company's Investment Decisions to define the financial profitability of any investment project. SINI needs to have guidelines for considering further investment based on an analysis.

1.2. Research Question

- What are the comprehensive and measurable strategy of business risk, market risk, and operational risk analysis in SINI Company?
- What is the analysis of capital budgeting in SINI for investment decision making?
- How to implement the risk analysis and capital budgeting analysis for investment decisions in SINI Company?

2. Literature Review

2.1. Risk Analysis

Risk is the uncertainty of future outcome(s). Change in this context has two dimensions, which are the range of possible outcomes and the probability of an outcome occurring (Olsson, 2002)

2.1.1. Risk Identification

The first stage of risk analysis consists of predicting potential risks (Bujoreanu, 2012) In this Research, the risks are focused on three types of risks which may be affecting the investment, which are (Gitman & Zutter, 2012):

- Business risk, risk of failure to reach business goals due to insufficient plans, insufficient resources, or changes in the economic or competitive climate. (statista.com, 2020)
- Market risk, risk of loss due to market price changes. This risk encompasses interest rate risk, foreign currency risk, commodity price risk, share price risk
- Operational risk, risk of failure due to acts taken on or by individuals, systems, facilities or technologies or the like having a functional effect like fraudulent activities

2.1.2. Risk Measurement

A risk management system requires a measure of success, a measure of risk, a way to model risk and return in alternative interest rate scenarios, and a planning strategy tool. Risk minimization refers to attempts to set a risk equal to zero, while betting-the-ranch strategies ignore the possibility of raising returns in the most likely scenarios of interest rates (Speakes, 1984)

The risk-level approach would include the use of the likelihood and effect definitions, as well as the level descriptions. The following are example concepts and how risk management teams should use these (Peltier, 2004)

Likelihood	5	Medium	Medium	High	High	High
	4	Low	Medium	Medium	High	High
	3	Low	Medium	Medium	Medium	High
	2	Low	Low	Medium	Medium	High
	1	Low	Low	Low	Medium	Medium
		1	2	3	4	5
		Impact				

Table 1: Risk Matrix

Source: (Husein & Imbar, 2015)

* Likelihood: The Possibility of a Risk That May Occur

* Impact: Calculation of the Extent of the Loss or Harm to the Value of the Asset

2.1.3. Risk Treatment/Mitigation

Risk reduction is a proactive technique that senior management uses to raising the organizational risk. The risk reduction mechanism can be done using a variety of different approaches. Those are the risk control approaches (Gitman, Lawrence J., 2012):

- Risk assumption. Upon evaluating the threats and determining the degree of danger, team findings led management to conclude that the best business strategy is to accept the potential risk and continue to operate.
- Risk alleviation. Senior management approves the introduction of the required controls, which will reduce the risk to an appropriate level.
- Risk avoidance. Management of risk analysis opts to reduce risks by removing the mechanism that may cause risks.
- Risk limitation. By enforcing controls that mitigate the adverse impact of a danger that would exercise a weakness, this approach limits risk.
- Risk planning. This is a mechanism where risk management is determined by designing an infrastructure that gives priority, introduces, and manages controls.
- Risk transference. Here the liability is passed by management using other ways to cover for a loss such as purchasing an insurance policy.
- Whatever risk reduction strategy is used, an organization's business priorities must be remembered when selecting either of those techniques. This may not be realistic.

2.2. Capital Budgeting

Capital budgeting is one of a method to evaluate and select between investments to achieve the firm's goal of maximizing owners' wealth (Gitman & Zutter, 2012). Statistics used for the study of capital budgeting was based on the

cash flow produced by the projects. The methodology uses 'only the marginal or cumulative after-tax cash flow, which can be applied to the plan being analyzed' when evaluating these cash flows. (Okoruwa, Cox, & Thompson, 1994). The principle of capital budgeting presumes that programs are judged based on economic value. Within the literature, advanced investment valuation approaches such as NPV and IRR were proposed based on certain economic principles, including time value of capital, risk avoidance, and an expected value maximization target (Kengatharan, 2016). The researcher uses the payback period, net present value (NPV), and internal rate of return (IRR) for the capital budgeting analysis.

2.2.1. Payback Period

The payback period is referring to the period of time it takes for the client to recover its original investment in a project, dependent on capital inflows (Gitman & Zutter, 2012).

Decision Criteria:

If the payback period is used to make accept–reject decisions, the requirement for the decision criteria apply:

- If the payback period time is lower than the maximum acceptable payback period, approve the investment.
- If the payback period time is greater than the maximum acceptable payback period, reject the investment.

The period of the maximum acceptable payback period is determined by management.

2.2.2. Net Present Value

Net present value (NPV) is a sophisticated technique of capital budgeting; calculated by deducting the original expenditure of a project from the present value of its cash inflows discounted at a rate equivalent to the capital cost of the company (Gitman & Zutter, 2012)

NPV = Present value of cash inflows - Initial investment

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} - CF_0$$

Formula 1: NPV (Gitman & Zutter, 2012)

Decision Criteria:

When using NPV to make accept – reject decisions, the requirements for the decision are as follows:

- If the NPV is greater than \$0, approve the investment.
- If the NPV is lower \$0, reject the investment.

If the NPV reaches \$0, the company will receive a return that reaches its capital cost. Such activity will increase the company's market value, and thus its owners' wealth by a sum equal to the NPV (Gitman & Zutter, 2012)

2.2.3. Internal Rate of Return

This capital budgeting method is commonly used capital budgeting techniques. The internal rate of return (IRR) method is designed using a discount rate that equates the NPV of an investment opportunity with \$0 (because the present value of cash inflows equals the initial investment). This is the rate of return the firm earns if it invests in the project and collects the cash inflows provided (Gitman & Zutter, 2012).

$$\sum_{t=1}^n \frac{CF_t}{(1+IRR)^t} = CF_0$$

Formula 2: IRR (Gitman & Zutter, 2012)

Decision Criteria:

When IRR is used to make accept – reject decisions, the requirements for the decision are as follows:

- If the IRR is greater than the capital cost, approve the investment.
- If the IRR is lower than the capital costs, reject the investment.

2.3. Investment Decision Making

Behavioral finance topic will require initial investment analysis (Peteros & Maleyeff, 2013) :

- Identify the social, cognitive and psychological factors influencing the financial decision-making process
- Learn how such prejudices adversely affect investment performance
- Reconcile the disconnection between investment theory and investment behavior
- Improve investment outcomes by preventing these behavioral errors in investment decision-making.

Analysis of decisions provides a framework and direction for the structured contemplation of challenging decisions. A decision-maker can take action with trust obtained from a good view of the issue using decision analysis (Lezki, Aydin, & ER, 2015). Provide examples of experiences in other related cases, and generalize them using a flow chart or diagram to explain a decision system (Marshall, Bibby, & WoonBong, 2013) This Research will consider the decision making from the risk analysis result and capital budgeting result from the net present value (NPV), internal rate of return (IRR), payback period.

3. Conceptual Framework

SINI's initial investment requires a high amount of money, which is spent without further analysis of risk and capital budgeting. Using the theories of risk analysis, capital budgeting, and investment decision making to construct the decision to accept the investment or not.

Figure 1: Conceptual Framework

4. Methodology

This research uses a problem-solving format. This case study determines to describe and explain the risk analysis and capital budgeting for SINI Company. At this stage in the study, the risk analysis and capital budgeting will be generally defined as a guideline for investment decision making in SINI Company. By using the historical data of SINI financial data, added with comparative secondary data from the company in a similar specification with SINI, like Tile and Chipolo, market situation secondary data, and data from the previous study.

5. Analysis and Result

5.1. Analysis of Root Cause

Figure 2: Analysis Root of Cause in SINI

In SINI Company, the main problem is on production, SINI delayed the timeline of development, it's affecting every aspect in business. SINI delayed the product launch because of a problem in development that SINI faced, then SINI also got a longer-term on payback period. It is also affecting how SINI does marketing. The SINI Company team has to manage to still be active on social media when we are trying to delay launching on social media. The researcher focuses on the finance aspect. SINI is far from steady on finance. SINI's sales barely started in March 2020. The researcher wants to recheck all of the problems. This problem of significant investment and development delays and further development can be analyzed with the theory of risk analysis, and after that researcher can manage the capital allocation and capital budgeting. So, when SINI wants to continue the development, and if SINI has further development, SINI can manage the risk and plan the finance better.

5.2. Risk Analysis

The analysis is based on SINI current condition. The risk analysis is focused on business risk, market risk, and operational risks. Based on the problems analyzed in the root cause analysis in Figure 2, The researchers focus on risk affected by the amount of investment and development delays.

5.2.1. Risk Identification

In SINI Company, we faced several risk types. From the historical data and added with external data from several sources, it is explained that these are risks that SINI may face for the current investment:

5.2.1.1. Business Risk

5.2.1.1.1. High cost in research and development

This risk is considered to be having probabilities because of SINI's current investments, as Table 2 shown. Tile has received over five rounds of funding totaling \$104M. Their latest funding was raised from a Series C round on Jul 24, 2019. Chipolo received over three rounds of funding, totaling \$580.8K. Their most recent funding was received from a Pre-Seed round on Mar 4, 2019 (crunchbase.com, 2020). As related companies, Tile and Chipolo approves that to run business in the electronic consumer industry, SINI may expect much more investment ahead.

No	Investment	Cost
1	Research and Development Application on Android	Rp28,500,000
2	Research and Development Application on iOS	Rp38,500,000
3	Website Making	Rp5,000,000

Table 2: SINI Investment Cost

5.2.1.1.2. Sales Decreasement

Based on the historical SINI's sales, this decreasement can affect investment performance as the return rate is getting lower.

Figure 3: SINI Sales in 2020

5.2.1.2. Market Risk

5.2.1.2.1 COVID-19 effect on market condition

Nearly 40 percent of respondents say that they feel worse about COVID-19 's effect on their company than they did last month. Market electronics Expected to be the most affected manufacturing segment (statista.com, 2020). External status in Indonesia has undermined the rupiah value. The crisis triggered by the COVID-19 pandemic, Indonesia now expects this year's budget deficit to hit a multi-decade peak of 4.7%, followed by another two years of a fiscal deficit of or above 3.0% of GDP (bi.go.id, 2020).

5.2.1.3. Operational Risk

5.2.1.3. 1.The discrepancy between research and development of actual timeline and timeline target

This risk is considered to be having probabilities because of SINI's historical timeline as Table 3 shown is explaining that SINI is having a problem with executing the timeline.

SINI Research and Development Timeline										
No	Objectives	Strategic Initiative	2019				2020			
			8	9	10	11	12	1	2	3
1	SINI Android Apps	Create user friendly apps								
2	High Fidelity Prototype of SINI Device Tracker	Creating final prototype to interpreting our product								
3	Vendor for Production	Find vendor that have a good experience								
4	Production of Device tracker	Define how much quantity to be produce								
5		3-5 Website Content Finished								
6	Finishing Website (Before March 2020)	Meeting with website developer done (3 times a month, it can be online or offline meeting)								
7		Fixed packaging design								
8		Packaging ready to use								
9	Finishing Product Development	Completed our product system by the end of February at least								
10		Development SINI App for IOS finished by the end of march								
11		Get an update every week, there is a progress of development								

Table 3: SINI Research and Development Timeline

5.2.1.3.2. Crash on the system such as bugs, malfunction, disconnection, security, etc.

Mobile software design errors often prove highly risky and costly in the long run. A good application is one that is capable of handling external environment security attacks. High risks are associated with the running of unsafe mobile software and should be handled with top priority (Kakkar, Shah, & Kakkar, 2013)

5.2.1.3.3. Website Usage Not Efficient

Online transactions are potentially difficult to recognize. The outcome of this analysis is that the poor satisfaction faced by customers comes partly from transaction cost risk and partly from the possibility of physical and psychological distress (Chen, Yan, & Fan, 2015). The quality of websites may affect the intention to use websites (Semuel, Wijaya, & Devie, 2019).

5.2.2. Risk Measurement

Measuring the risks using the theory of Risk Matrix, the researcher sets the rating and level of impact and likelihood before classifying the risks into the matrix.

Likelihood		Frequency per Year
Rating	Criteria	
1	Rare	< 5 cases
2	Unlikely	5 - 10 cases
3	Possible	11 - 20 cases
4	Likely	21 - 40 cases
5	Almost Certain	> 40 cases

Table 4: Likelihood Parameter Table

Impact		Description
Rating	Criteria	
1	Insignificant	The impact might be neglected with secure
2	Minor	Minor impacts and can be overcome with simple procedures
3	Moderate	The impact is significant, but it can be managed using certain procedures
4	Major	Significant impact, potential financial cost and impeded organizational performance
5	Catastrophic	Extreme impact, potentially high financial cost and cessation of performance organization, as well as the impact on reputation organization

Table 5: Impact Parameter Table

After determining the value of likelihood and impact, then an assessment of each risk that has been taken defined in the previous process can be done. Risk assessment is constructed by its likelihood and impact values in detail can be seen in Table 4.

Number	Risk Identification		Likelihood	Impact
	Aspect	Detail		
1	Business Risk	High cost in research and development	4	4
2		Sales decrease	3	4
3	Market Risk	COVID-19 effect on market condition	2	4
4	Operational Risk	The discrepancy between Research and development actual timeline and timeline target	3	2
5		Crash on system such as bugs, malfunction, disconnection, security etc.	1	3
6		Website usage not efficient	1	2

Table 6: Likelihood and Impact Assessment

Risks that have been identified whether the risk can be evaluated, tolerated, or not based on the level of risk or level of risk. If the risk has been assessed into the criteria established, the risk must get treatment; otherwise, if the risk is not included in the criteria determined, then the treatment of risk is not necessarily reconsidered.

Risk mapping is carried out by applying a process mapping on a matrix that illustrates the relationship between likelihood or frequency of events and the impact caused by each risk that occurs.

Likelihood	5					
	4				R1	
	3		R4		R2	
	2				R3	
	1		R6	R5		
		1	2	3	4	5
		Impact				

Table 7: Risk Matrix Assessment

Information:

R: Risk

R1: High cost in research and development

R2: The discrepancy between income and break event point target

R3: COVID-19 effect on launching event

R4: The discrepancy between Research and development actual timeline and timeline target

R5: Crash on the system such as bugs, malfunction, disconnection, security, etc.

R6: Website usage not efficient

5.2.3. Risk Treatment

Given the level of risk, each risk will need a different type of treatment. Table 6 explain how SINI should treat the risks from the threat that may impact the company.

SINI Risk Treatment				
Number	Risk Identification		Threats	Treatment
	Aspect	Detail		
1	Business Risk	High cost in research and development	Low Rate of Return	Minimize the cost of research and development, make an efficient and effective plan for the cost of research and development, and maximize the sales number
2		Sales Decreasement	Low Rate of Investment	Plan the cash flow per year and set the break event point plan, do control on sales and promotion to keep up the income
3	Market Risk	COVID-19 effect on market condition	Messed up the event timeline	Reschedule and replan the launching method, use the online platform more effective and plan the offline launching event when the situation got better
4	Operational Risk	The discrepancy between Research and Development actual timeline and timeline target	Delay in product launch	Set the control on the timeline, check the compatibility between the timeline target and the actual timeline, evaluate and improve the timeline monthly
5		Crash on system such as bugs, malfunction, disconnection, security etc.	Quality decrease on product and application	Maintain the information security lacking the device connected to the application, regularly check and fix the bug error and malfunction for both application and device
6		Website usage not efficient	Low on Asset Turnover	The development of our digital product development will across not only our website and apps but also into our marketing channels include a cross partnership with other technology startup companies.

Table 8: Risk Treatment

According to the risk analysis, SINI recommended putting more effort into maintaining the application, website, and investments. With an organized maintenance protocol and standard and disciplined timeline, the risks can be minimized. The risk analysis, the mitigation plan cost, and the threat that may impact the company can be a consideration to continue the investment or not.

6. Capital Budgeting

6.1. Sales Projection

SINI Company consists of 2 types of products, which are device tracker and complementary leather product. The device tracker is classified in the consumer electronics industry, whereas the leather is included in the leather industry. Based on the forecast, the revenue of consumer electronics is expected to be having an annual growth rate (CAGR 2020-2024) of 14.0% (statista.com, 2020). Meanwhile, for the leather, revenue in the Luxury Leather Goods segment amounts to US\$434m in 2020. The revenue of this industry market is expected to grow annually by 8.0% (CAGR 2020-2025) (statista.com, 2020). Considered from historical sales in SINI (see: Figure 3), SINI can expect the volume of sales up to 10 sales of device tracker per month and three leather sales. SINI's strategic plan to increase the production capacity by 50 devices per 2 years. Based on that, the researcher assumes the sales projection, as Table 9 shows.

Sales Projection						
Year	Pessimistic		Most Likely		Optimistic	
	Volume of Device Sales (units)	Volume of Leather Sales (units)	Volume of Device Sales (units)	Volume of Leather Sales (units)	Volume of Device Sales (units)	Volume of Leather Sales (units)
1	100	50	100	50	100	50
2	123	41	164	54	246	81
3	140	44	187	58	280	87
4	197	47	263	63	395	94
5	225	51	300	68	450	102
6	294	55	392	73	588	110
7	335	60	447	79	670	119
8	420	64	559	86	839	129
9	478	69	638	93	957	139
10	583	75	777	100	1166	150

Table 9: Sales Projection

6.2. Cash Flow Projection

The projection is produced in three scenarios, which are pessimistic, most likely, and optimistic. The sales projection is considered from increasement in production capacity. The period of the cash flow is ten years. The cash flow is produced for calculating the net present value (NPV), internal rate of return (IRR), and payback period. The calculation of cash flow is using the rate of the cost of capital from the cost of equity in consumer electronics at a rate of 8.55% (people.stern.nyu.edu, 2020).

Cash Flow Projection			
IDR			
Year	Pessimistic	Most Likely	Optimistic
0	(84,000,000)	(84,000,000)	(84,000,000)
1	(3,802,090)	(8,230,090)	(17,086,090)
2	2,427,168	12,482,868	32,288,268
3	4,032,226	14,317,426	35,604,226
4	21,274,784	37,571,984	69,997,184
5	23,505,342	40,641,342	74,913,342
6	43,318,300	67,171,900	114,753,100
7	49,166,858	74,608,058	126,188,858
8	72,471,815	106,077,815	173,271,815
9	82,186,773	118,719,573	192,350,373
10	181,703,731	252,047,731	392,037,331

Table 10: Cash Flow Projection

6.3. Capital Budgeting Analysis

Based on the three scenarios for the cash flow, the analysis of capital budgeting calculated using excel formulas, and the result of the approval of the investment is shown in Table 11 below.

Capital Budgeting Analysis				
	Payback Period	IRR	NPV	Investment Approval
Approved Criteria	< 10 years	> Cost of Capital: 8.55%	NPV > 0	
Scenario	in Years		in IDR	
Pessimistic	6.0	24.47%	159,660,746	approve the proposal.
Most Likely	5.1	33.35%	290,032,624	approve the proposal.
Optimistic	3.0	46.58%	551,224,474	approve the proposal.

Table 11: Capital Budgeting Analysis

6.4. Investment Decision Making

Process of generating investment decision making include several steps of analysis, which are:

- Influencing factor in financial decision making is the analysis of the Risk Analysis and Capital Budgeting Analysis
- Given the analysis of the Risk Analysis, Investment defined into three levels of risks, which are low level, medium level, and high level. For the Capital Budgeting Analysis, Investment defined into 2 type of approval, which approves the investment and reject the investment based on the value of net present value (NPV), internal rate of return (IRR), and payback period.
- Reconcile the analysis theories and the analysis result
- Given the level of Risk Analysis, there is a necessity to give more treatment to be having the maintenance control timeline and procedures. Given the acceptance of the investment, there is a necessity to make a timeline for the investment control plan and procedures.

Based on the investment decision-making process, SINI has defined the process of investment decision making. The visualization of the process depicted in the flow chart in Figure 3

Figure 3: Investment Decision Making Flow Chart

From the flow chart, SINI can decide to approve the investment or not using the decision of risk analysis and capital budgeting analysis. The investment opportunity that can be considered to be invested will need to be parallelly analyzed using risk analysis and capital budgeting analysis. Considered by the level of risk and the value of each capital budgeting analysis, the investment can be decided into two decisions, which are an investment not accepted and investment accepted.

7. Conclusion and Recommendation

Given the method of analyzing the risk, the results are that SINI is currently facing six risks, identified one high-level risk, three medium level of risks, and two low levels of risks. SINI's strategy on minimizing the risk is to put more effort into maintaining the application, website, and investments. With an organized maintenance protocol and standard and disciplined timeline, the risks can be minimized.

SINI uses the cost of common stock equity as the cost of capital, which is calculated at 8.55%. Assumed the cash flow details in Table 9, SINI's net present value (NPV), internal rate of return (IRR), and payback period for 10 years are

detailed in Table 10. The result is that the current investment project in SINI can be approved, but with a great effort on managing the increasement of production capacity and exposure marketing strategy to support the level of sales projection to be realized.

The guideline for investment decision making in SINI Company will use the flowchart from parallelly assessing the risks and analyze the cash flows in 10 years with three methods of capital budgeting, which are net present value (NPV), internal rate of return (IRR) and payback period. Given the result of risk analysis and capital budgeting, SINI may decide the acceptance of the investment afterward. For the implementation of the analysis, SINI needs to set a timeline, plan the cost and budget, maintain the strategies and controls using key performance indicators (KPI) regularly.

This research is defining the breakdown of the risk analysis and capital budgeting to discover the guidelines for the investment decision making in SINI Company. It is limited for SINI Company in the technology industry in Bandung. The data for this research is limited to financial data in internal SINI Company, which is based on Bandung. This research can be a benchmark for startups that have uncertainty on their investment using analysis of risk and capital budgeting, further analysis for SINI's finance. A new study needs to analyze the capital structure, solidity of the team, psychologically business owner risk-taking type to determine the investment decision making better.

8. References

- i. Alkaraan, F. (2016). Strategic investment decision making - scanning and screening investment opportunities (Vol. 24). Emerald Group Publishing Limited. doi:10.1108/MEDAR-01-2016-0007
- ii. Bennouna, K., Meredith, G. G., & Marchant, T. (2010). Improved Capital Budgeting Decision Making: Evidence from Canada.48, 226. doi:10.1108/00251741011022590
- iii. bi.go.id. (2020, July 18). Retrieved from <https://www.bi.go.id/id/ruang-media/siaran-pers/Documents/Press-Release-SP-Revises-Outlook-April-2020.PDF>
- iv. Bujoreanu, I. N. (2012). RISK ANALYSIS SERIES PART ONE - WHY RISK ANALYSIS?. 3(1), 140.
- v. Burja, C., & Burja, V. (2009). THE RISK ANALYSIS FOR INVESTMENTS PROJECTS DECISION. 11(1). Retrieved from <https://search.proquest.com/docview/807501970/fulltextPDF/3575B99ECD204F23PQ/1?accountid=31562>
- vi. Chen, Y., Yan, X., & Fan, W. (2015). Examining the Effects of Decomposed Perceived Risk on Consumer Online. *Inzinerine Ekonomika-Engineering Economics*, 26(3), 315-326. doi:10.5755/j01.ee.26.3.8420
- vii. Correia, C., & Cramer, P. (2008). An Analysis of Cost of Capital, Capital Structure and Capital Budgeting Practices: A Survey of South African listed Companies. 16, 33. doi:10.1108/1022529200800011
- viii. crunchbase.com. (2020, July 18). Retrieved from <https://www.crunchbase.com/organization/tile#section-investors>
- ix. Durand, D. (1986). Comprehensiveness in Capital Budgeting. 10(5). Retrieved from <https://search.proquest.com/docview/205253654/72EBAEB39ED24E2FPQ/6?accountid=31562>
- x. Gitman, L., & Zutter, C. (2012). Principles (13 ed.). Pearson.
- xi. Gul, S., Gul, H., & Haider, M. (2018). The Review And Use Of Capital Budgeting Investment Techniques In Evaluating Investment Projects: Evidence From Manufacturing Companies Listed On Pakistan Stock Exchange (Pse). 8(2). Retrieved from <https://search.proquest.com/docview/2102341540/559662F0E08E4DC4PQ/9?accountid=31562>
- xii. Husein, G., & Imbar, V. R. (2015). Analisis Manajemen Resiko Teknologi Informasi. *Jurnal Teknik Informatika dan Sistem Informasi*, 1(2).
- xiii. Kakkar, K., Shah, R., & Kakkar, M. (2013). Risk Analysis in Mobile Application Development. *Confluence 2013: The Next Generation Information Technology Summit*. doi:10.1049/cp.2013.2351
- xiv. Kengatharan, L. (2016). Capital Budgeting Theory and Practice:. *Applied Economics and Finance*, 3(2). doi:10.11114/aef.v3i2.1261
- xv. Lezki, S., Aydin, S., & ER, F. (2015). A Solution to Rational Decision Making via Compositional Data Analysis: A case study using students cellular phone tendencies. *Alphanumeric Journal*, 3(1). doi:10.17093/aj.2015.3.1.5000107125
- xvi. Marshall, R., Bibby, D., & WoonBong, N. (2013). Making Sense of Complex Marketing Decision Systems: Decision System Analysis. *International Journal of Business and Economics*, 12(2). Retrieved from <https://search.proquest.com/docview/1511615637/A0744CD2B04D4347PQ/8?accountid=31562>
- xvii. Okoruwa, A., Cox, A., & Thompson, A. (1994). Three Treatment of Debt Financing for capital budgeting decision. *The appraisal journey*. Retrieved from <https://search.proquest.com/docview/199940592/E491689307D9479BPQ/6?accountid=31562>
- xviii. Olsson, C. (2002). Risk Management in Emerging Market. Pearson Education Limited.
- xix. Pavlicko, J. (2007). The relationship of ROI-based justification practices and structured development methodologies to information systems technology project outcomes. *Dissertations Publishing*.
- xx. Peltier, T. R. (2004). Risk Analysis and Risk Management. 44. Retrieved from <https://search.proquest.com/docview/229616999/D4D32270CF5C47D2PQ/4?accountid=31562>
- xxi. people.stern.nyu.edu. (2020, July 19). Retrieved from http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm
- xxii. Peteros, R., & Maleyeff, J. (2013). Application of Behavioural Finance Concepts to Investment Decision-Making: Suggestions for Improving Investment Education Courses. *International Journal of Management*, 30(1). Retrieved from <https://search.proquest.com/docview/1315212889/F7F8C6F6832A423CPQ/1?accountid=31562>

- xxiii. Schall, L., & Sundem, G. (1986). Capital Budgeting Methods and Risk: A Further Analysis. *Financial Management* Vol. 9 Iss. 1, 9(1).
- xxiv. Schall, L., Sundem, G., & Geijsbeek, W. (1978). Survey and Analysis of Capital Budgeting Methods. *Journal of Finance*. Retrieved from <https://search.proquest.com/docview/205247947/B4C7ADC70BFB43E6PQ/1?accountid=31562>
- xxv. Samuel, H., Wijaya, S., & Devie. (2019). The Analysis Website Quality, Intention to use. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(25). Retrieved from <https://www.ijrte.org/wp-content/uploads/papers/v8i2S/B10200782S19.pdf>
- xxvi. Speakes, J. (1984). Fixed-Income Risk Measurement and Risk Management. *Journal of Portfolio Management*, 10(2), 66.
- xxvii. statista.com. (2020, July 18). Retrieved from <https://www.statista.com/study/71622/coronavirus-covid-19-impact-on-the-electronics-industry-and-supply-chain/>
- xxviii. statista.com. (2020, July 19). Retrieved from <https://www.statista.com/outlook/251/120/consumer-electronics/indonesia>
- xxix. statista.com. (2020, July 19). Retrieved from <https://www.statista.com/outlook/21010000/120/luxury-leather-goods/indonesia>
- xxx. Tummala, & Schoenherr. (2011). Assessing and managing risks using the supply chain risk management process (SCRMP). 16. doi:10.1108/13598541111171165
- xxxi. Wan, C., Yan, X. P., Zhang, D., & Yang, Z. (2019). Analysis of risk factors influencing the safety of Maritime container supply chains.