ACCELERATE DECISION-MAKING PROCESS THROUGH THE IMPLEMENTATION OF FINA: FINANCIAL FEASIBILITY STUDY IN HAND

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ABSTRACT

A financial feasibility study is sometimes a time-consuming process that makes management often misses opportunities or even make mistakes in making a decision. This paper describes the urgency of digitalization using an application or an automated tool that makes the investment decision process easier for everyone through dynamic financial analysis features, which is then called FiNA (financial feasibility study in hand). It aligns with the objective of Industry 4.0 and Indonesia Making 4.0 Agenda which requires digitization through continuous innovation. This paper explains the FiNA development process, how the application works in performing investment feasibility sensitivity calculations, and how to interpret the resulting information. However, FiNA as a tool that can accommodate many assumptions and considerations is still a long way to go and needs further development for improvement.

Keywords: *Feasibility Study, Financial Analysis, Decision Making, Fina, Industry 4.0*

1. INTRODUCTION

The existence of a company cannot be separated from their investment activities. The importance of investment is often juxtaposed with the amount of capital expenditure issued, hence it is necessary for a Company to determine whether an investment is deemed feasible before a go/no-go decision is made. Based on feasibility evaluation analysis data for investment projects as of December 30, 2022, on PT Hutama Karya (Persero) Dashboard, it is observed that the Internal Rate of Return (IRR) has decreased compared to the plan, which may be translated to an increase in costs or occurring inefficiencies in ongoing projects. Related inefficiencies may be mitigated if a financial evaluation process is carried out carefully and precisely, in order to mitigate foreseeable risks that may cause long-term losses to the company. Feasibility analysis is an effective analytical tool to evaluate investments through various aspects, namely market, financial, economic, social, and legal aspects. The predominant factor of a feasibility study is oftentimes the financial feasibility analysis. This is due to most investment projects will not be made if they are deemed unable to generate profits for the company. Several relevant assumptions must be determined when assessing the financial feasibility of an investment. Changes often occur while calculating assumptions, hence updates are needed. Therefore, the use of a mathematical model in calculations is necessary to make the analysis process easier and faster. Such effective and efficient analysis is required to accommodate the need for immediate management decision-making regarding corporate actions. Inquiries that were conducted on several officers of Hutama Karya performing financial analysis calculations for an investment project concluded that several as-is conditions in the internal financial feasibility study

are as follows: (1) Limited availability of human resources with competencies in investment financial analysis; (2) Analysis is run manually through Ms. Excel, which involved an officer's assumptions input and manual calculations from year to year based on existing assumptions; (3) Lack of Understanding in Calculation Results Interpretation; (4) Inability of an Investment's Fast Decision-Making Process especially for doing dynamic sensitivity to existing. As a result, the management's decision-making in investment is delayed and cannot be made immediately. In line with the concept of "Goes to Digitalization Innovation", a program that facilitates an effective and efficient process of feasibility analysis of an investment is urgently needed to speed up the process of making management decisions regarding corporate actions. This paper will present an overview of FiNA application which is able to provide support to company's management in accommodating investment feasibility calculations based on data from project initiators, company capabilities, and assumptions that may support the sensitivity of calculations within one's hands.

2. LITERATURE REVIEW

Investment decisions need to be made wisely through a series of analytical processes commonly known as feasibility studies. As the name implies, a feasibility study determines the viability of a proposed investment through several analytical processes [1]. It helps management to determine whether a proposal offers a reasonable return compared to its risk before proceeding with the investment so that the study can prevent the company from making mistakes [2].

Typical factors in a feasibility study include [3]:
1. Description of the product or services
2. Market feasibility
3. Technical consideration
4. Financial (economic) feasibility
5. Organization structure & managerial feasibility
6. Study conclusions
7. Go / no go decisions.

From all factors of a feasibility study, financial feasibility becomes a predominant factor in the decision-making process. Investments are commonly not realized once they do not generate profitable returns in the future. To conduct a financial feasibility study, companies need to prepare projection financial statements including income statements, balance sheets, and cash flows.

The next step in financial analysis is to calculate common evaluation measures as follows [4]:

1. *Net Present Value (NPV),* NPV is defined as the present value of an investment's expected cash flow discounted at risk-adjusted rate cost of capital. An investment will be accepted if the NPV evaluation result is positive (> 0). The formula of NPV:

$$NPV = CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_N}{(1+r)^N}$$

2. *Internal Rate of Return (IRR)* IRR, is a discount rate that forces the NPV to equal zero. If the IRR exceeds the cost of capital, the proposed investment will benefit the company. Otherwise, if the IRR below the cost of capital, the proposed investment is not profitable to proceed.

$$NPV = CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_N}{(1+IRR)^N} = 0$$

3. Discounted Payback is used to calculate the number of years required to recover its initial investment from its discounted cash flows. Compared to ordinary payback, this calculation considers the time value of money and rejects negative NPV simultaneously.
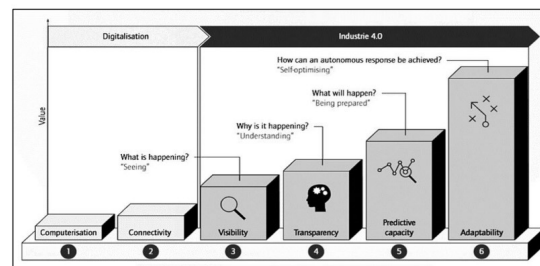

Figure 1. Stages in Industry 4.0 [5]

Quick decision-making in the case of a financial feasibility study is urgently needed through digitalization which is in line with Industry 4.0 and Making Indonesia 4.0 agenda [6]. The Making Indonesia 4.0 initiative was launched on April 4th, 2018, by the President of the Republic of Indonesia, Mr. Joko Widodo as a response to the global phenomenon of the industrial revolution over 4.0, accompanied by the Minister of Industry Mr. Airlangga Hartarto. Industry 4.0 is a major project in the National MediumTerm Development Planning 2020-2024 (Presidential Regulation Number 18 Year 2020). Industry 4.0 refers to the intelligent

networking of machines and processes for the industry with the help of information and communication technology [7]. For Industry 4.0, it is not the computer that is the core technology, but rather the Internet. It aims for more efficient and better decisions [8].
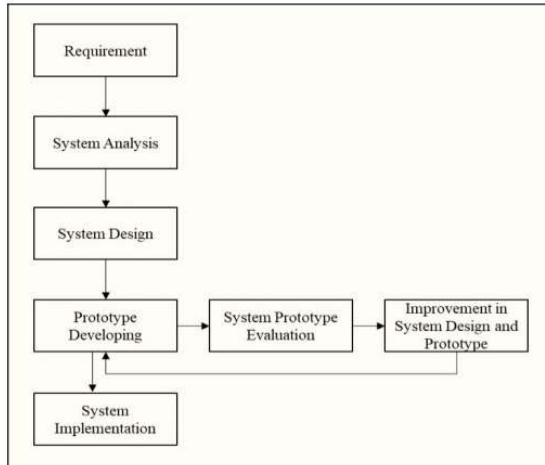
3. METHODOLOGY

Figure 2. SLDC Prototype (Source: Personal Data)

This paper used System Development Life Cycle (SDLC) Prototype, a common methodology that is used to develop a system. This method enables the developer team and user to interact with each other in system development [9]. The stages of this methodology are as follows:

1. *Requirement Search*. The initial stage of making this application is a requirement search, by exploring the needs of the FiNA module system through inquiry, involving Financial Analysts from the Investment Business Development Division, PPP Division, and Corporate Planning Division. An example of an Excel file that contains calculations and formulas for calculating investment feasibility for a project may also be requested as baseline material for data input, calculation processes, and output generated from input data constructed in the application [10]. The output of Requirement Search is a Business Requirement Document (BRD).

2. *System Analysis*. Following requirement search, system analysis is conducted to produce functional and non-functional requirements for

FiNA. This stage will also be included in the BRD.

3. *System Design*. Based on functional and non-functional requirements, we design the proposed system. This stage produces a Software Design Document (SDD). FiNA application has the following functional features:

1. Login feature. To run the application, users must first log in by entering their Corporate Email (@hutamakarya.com) and respective Password. This login feature is required because FiNA is a premium app that are exclusive to Hutama Karya employees only, hence non-employees are unable to use the application when it is published later on the Play Store and App Store. This Login feature will also implement Single Sign On (SSO).

2. Scenario Form feature. This feature is used to input analytical data for investment feasibility analysis which includes:
   a. Project Value: Project Value of Investment. This field is stated in the Decimal (Rupiah) unit. Field input is mandatory.
   b. Ownership: Investment Ownership Portion of Project Value. This field is stated in the Decimal unit. Field input is mandatory.
   c. Investment: Investment Value resulting from Multiplication between Project Value and Ownership. Field Data Display is optional.
   d. Annuity: Instalment Amount for Repayment of Investment Value. This field is stated in Integer unit. Field input is mandatory.
   e. Period: Number of Years of Investment made. This field is stated in Integer (Year) unit. Field input is mandatory.
   f. Loan Portion: Debt Portion of Investment Value. This field is stated in Decimal (Percentage) unit. Field input is mandatory.
   g. Interest: Interest attached to Loan Portion. This field is stated in the Decimal (Percentage) unit. It can be filled if the Loan Portion has a value of more than 0. Field input is mandatory.
   h. Approx. Net Share – 1st Operation: Estimated Initial Revenue from Operations. This field is stated in the

Decimal (Rupiah) unit. Field input is mandatory.

i. Approx. Net Share – Growth: Investment Increase Percentage. This field is a dropdown containing the "Assumption" and "Bloomberg" options. Field input is mandatory. If Assumption is selected, the user needs to fill in the Assumption Field to enter the Growth value. If Bloomberg is selected, the user does not need to fill in the Field because the Growth value is already integrated with the Bloomberg API.

3. Add a Scenario feature. This feature is used to add a new Scenario Form to enable comparison of scenarios. Additionally, a trash can icon is available to delete Scenario Forms.

4. FiNArch Sector feature. This feature is used to search for business sectors from the Bloomberg API. The selected Business Sector will display Trend Revenue data which is used as a reference for revenue growth analysis based on historical data.

5. Scenario Comparison feature. This feature has sections including.
   a. Graphic Comparison. This section is used to view details of cash flow movements for each scenario from year to year.
   b. Legend. This section is used to view Hutama Karya's WACC data. In addition, there is information from indicators whether an investment is deemed feasible, by comparing the Internal Rate of Return (IRR) to WACC.
   c. IRR and PBP. This section displays the IRR and Payback Period (PBP) results for each running scenario.

6. Download File feature. This feature is used to export Excel or PDF files of all the results of the running Scenario comparisons.

Non-functional features are as follows:

1. Software Quality Attributes
   a. Availability: The system must be available during business hours and holidays at Hutama Karya
   b. Efficiency: System access does not take too long.
   c. Flexibility: The system can be developed following the changes that may occur in the future
   d. Integrity: The system will secure information and prevent possible fraud
   e. Maintainability: The system can be refined in accordance with the procedures applied
   f. Reusability: Several components of previously developed systems are usable in other projects
   g. Testability: The system must go through testing before being used by all employees h. Usability: The system created is not too complicated and easy for users to understand.

2. Performance Requirements
   a. FiNA application must be available 24 hours a day, 7 days a week.
   b. Bloomberg API must be available 24/7 while always checking the subscription status.
   c. Employees can use the application within the HK Tower area or outside the HK Tower area
   d. Utilization of Security System from the Flutter Framework.

3. Safety Requirements
   a. The application can only be accessed by Hutama Karya employees with a Corporate Email with Domain @hutamakarya.com.
   b. Other application data is kept secure to prevent hacking and misuse from external parties.

4. Applied Technology
   a. Application Programming Technology uses the Dart Language with Flutter Framework. We use a Framework that can be used for Cross Mobile Programming to enable one Development to produce both Android Applications and iOS Applications.
   b. Integration with Bloomberg uses Bloomberg API, which is wrapped in HTTP API, providing data communication between applications using JSON in such a manner as to allow recognition by the Flutter Framework. This technology is termed Bloomberg HTTP API. This technology also provides documentation for integration with other applications.

4. Prototype Developing Following system design, a prototype of the FiNA module is developed by adjusting it to the previously analyzed functional and non-functional requirements designed in the System Design stage. This stage includes the development of applications that will be used as modules in the FiNA application.

5. System Prototype Evaluation Evaluation of the FiNA Module prototype will be carried out periodically after the prototype developing stage is completed. The results of this evaluation will later become the material for improvement in making further prototypes. This evaluation is carried out internally with the development team and externally with the users. This stage is carried out by carrying out a series of Testing Phases starting from Unit Testing, System Integration Testing, and User Acceptance Testing.

6. Improvement in System Design and Prototype If drawbacks in the FiNA Module prototype occur, the system design and prototype improvements will be repeated. This stage is carried out by the developer team based on the results of the System Prototype Evaluation stage.

7. System Implementation When the proposed FINA module has fulfilled the functional and non-functional needs and is accepted by users of Central HK employees, the Deployment Phase stages is carried out, which include Data Migration to Production Environment, Creating Production Servers and User Manuals. The stage is followed by socialization to Users and the Go Live application, to prepare the implementation of FiNA use within Hutama Karya.

4. RESULT AND DISCUSSION

FiNA is short for "Financial feasibility study iN hAnd". The creation of FiNA was referred to as practicality, as a tool to facilitate the process of analyzing the financial feasibility of an investment in the form of a mobile app that can be accessed easily anywhere and anytime. Users who can use this application are the management and all employees of Hutama Karya. The following images are the mock-up of FiNA:
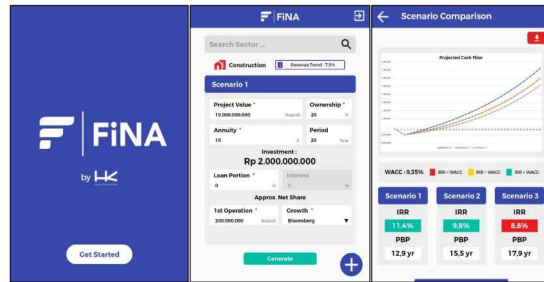

Figure 3. Splash Screen App, Scenario Form, and Scenario Comparison (Source: Personal Data)
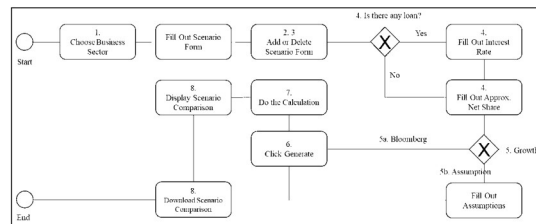

Figure 4. Flowchart FiNA Modul (Source: Personal Data)

The flowchart figure above shows the workflow of the FiNA module. The mandatory stage for users prior to using the FiNA module is to be registered as a Hutama Karya employee. Detailed explanations of the FiNA module flowchart are as follows:

1. After opening the FiNA application, the user enters the Scenario Form page. On this page, the user fills in the data available on the Scenario Form. Several fields are listed from Project to Approx. Net Share which includes 1st Operation and Growth is mandatory.

2. To perform Scenario comparisons, the user must first add the Scenario Form. The user should click the circle button with a plus icon in the middle, and the application will display a new Scenario Form.

3. Users can also delete existing Scenario Forms by clicking the trash can button available next to the Title Scenario Form.

4. If the Investment to be simulated does not use a Loan Portion, the Loan Portion Field must be filled in with the number 0. If the Loan Portion is filled with more than 0, then the Interest Field will be displayed and is mandatory for the user to fill.

5. After filling in the Loan Portion, continue with filling in the 1st Operation and select Growth. The 1st Operation field should be filled with normal numbers. Growth has 2 options as follows:

a. If Bloomberg is selected, the Growth figures are obtained from the Bloomberg API. The get data process is run by calling the Get Data URL from the Bloomberg API and preparing a model file in FiNA to accommodate requests from the Bloomberg API. The Bloomberg API will consequently send a data request in the form of a JSON file containing data used in FiNA, such as trend revenue.

b. If Assumption is selected, one more field will appear, which the user must fill in the Growth assumption.
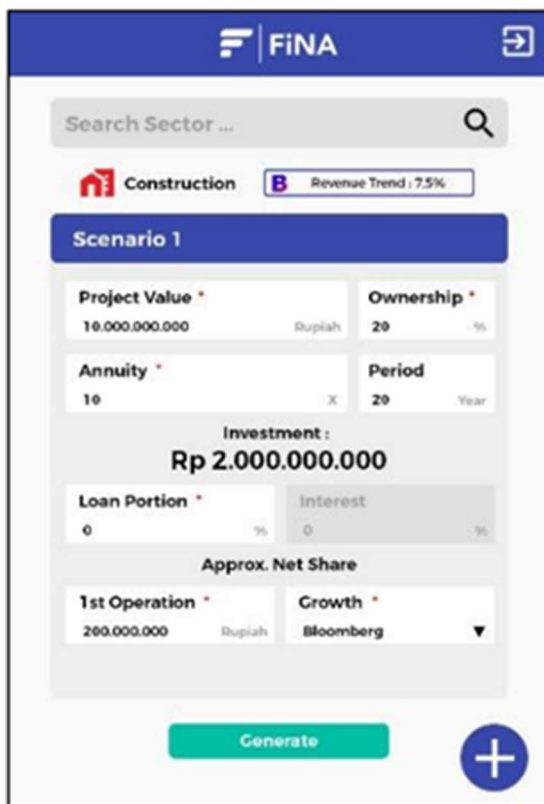

Figure 5.   Fill out the data in Scenario (Source: Personal Data)

6. To display the Scenario Comparison or the results of the feasibility analysis, the user should click the Generate button.
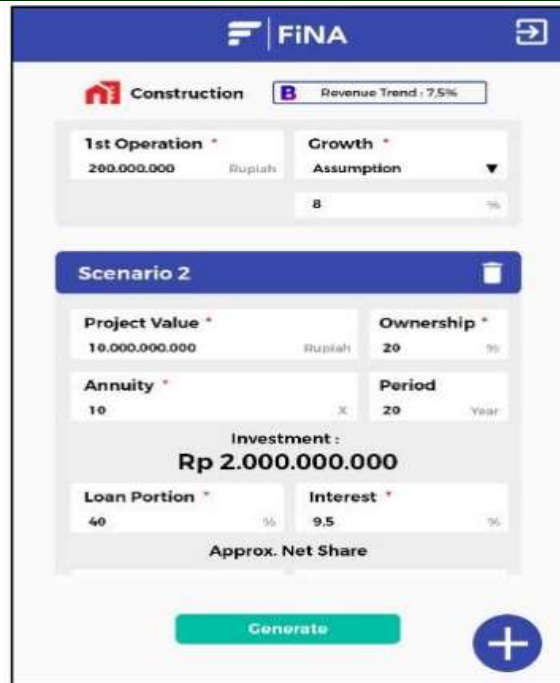

Figure 6.   Add Scenario Form (Source: Personal Data)

7. The system will perform calculations according to the formula and display the results generated from one or more Scenario Forms.
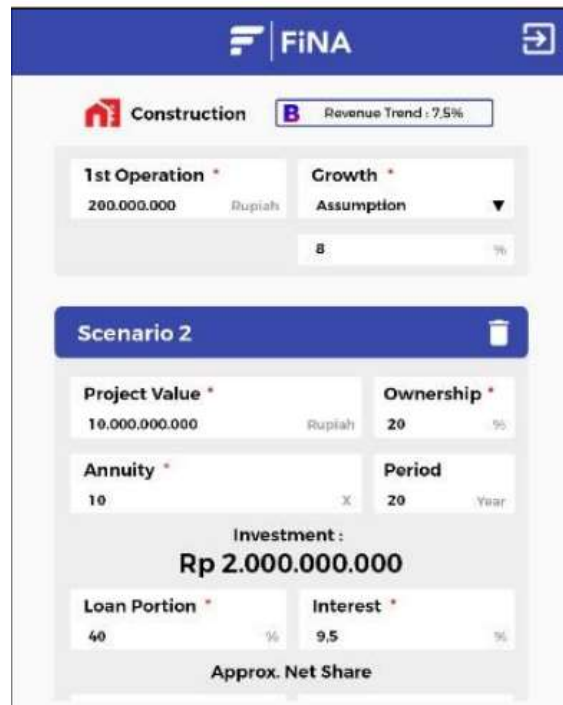

Figure 7.   Selecting Growth based on User Assumption (Source: Personal Data)

8. Scenario Comparison displays a graphical comparison of scenarios of feasibility analysis and IRR and PBP values. Users can download the comparison results file which contains all the data displayed.

FiNA offers several advantages as follows:

1. Easy to Use Through FiNA, users only need to fill in the necessary assumptions without the need to manually create projected cash flows from each specified scenario.

2. Integrated with Bloomberg API In the several assumption columns provided, such as revenue growth, users can directly access this information through the Bloomberg API integrated into FiNA. In this manner, the process of obtaining such information can be carried out simultaneously without having to run a separate process.

3. Given Weighted Average Cost of Capital (WACC) Data Variable WACC information of existing companies due to calculations by different users causes inconsistency in data input, which affects the analysis carried out. However, through FiNA, the company's WACC data is listed in the application and updated regularly, hence separate input and calculations to find out a company's WACC are not required.

4. Instant Analysis Following input assumptions, FiNA instantly generates the results of the project's financial feasibility analysis from various scenarios in the form of projected cash flow, IRR, and project payback period. Interpretation of IRR value and payback period is explained through green and red colors which indicates the feasibility or infeasibility of a project. This enables users to easily draw conclusions and read the interpretation of the calculation results.

5. Download Analysis Result Feature Not only getting analysis conclusions instantly in the application, FiNA also facilitates users with a download feature of the feasibility analysis results.

Figure 8. Display Scenario Comparison (Source: Personal Data)

5. CONCLUSION

Utilization of FiNA application will assist the management in terms of investment decisions in a timely and accurate manner using only a personal cell phone. This application will also assist companies in cost savings to obtain a qualified investment feasibility calculation program, which is mastered by only a few personnel within the company.

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