DECISION-MAKING FRAMEWORK FOR THE SELECTION OF PROJECT FINANCING IN PT X

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Abstract

PT X as a company engaged in the electricity production sector must have a good investment plan. One of the investments is electric power development projects. However, a large funding budget is required. Determining the source of funding in the project financing stage has many things to consider. Making business development intelligence that includes standard operating procedures is a reference scheme in determining the right source of funding. Business development intelligence has reference parameters, both the characteristics and the credibility of the funding sources that are considered before the economic calculation process. From the results of the analysis of the parameters, the best funding sources will be obtained. From the research analysis that has been carried out, there are 3 loan source candidates who obtained the effective interest rate calculation with details of loan 1 of 4.22 %, then loan 2 of 4.25 %, and loan 3 of 4.45%. From the three loans, the lowest rate is obtained for loan 1 with a rate of 4.22%. Loan 1 is a loan that seeks the smallest reward from borrowing so it is selected and the company can generate better income.

Keywords
Financial close, funding sources, business development intelligence, effective interest rate.

1. Introduction
PT X is a company that focus on electrical, maintenance, and business of national power plants in Indonesia. PT X has main business segment as a provider of electricity through nine Generation Units. It have a mission to build company competitiveness. In order to achieve that, so PT X's resources must be used effectively and efficiently. Especially, the investment planning of power plants. Because each power plant only have 30 years economic lifetime. PT X aims to develop and renew old and new generators as needed. Furthermore, on May 2015 based on RPJMN 2015-2019 the government launch a 35.000 MW program to improve country's electrical capacity. The investment for the program are estimated about IDR 1,000,000,000,000. To develop power plants required high budget from internal or external funding sources. Internal funding sources derived from operating income and depreciation of fixed assets. While external funding sources in the form of two-step loans, government loans through investment fund accounts, issuance of bonds, and other commercial banking loans (Santosa 2012).

In PT X business development unit is the one who is making the investments. This is done with the aim of capturing business development opportunities in order to maximize the contribution of PT X in the development of the power generation industry. The business flow of the PT X business development unit consists of four main lines consisting of the initial project initiation or planning stage, the development stage or advanced project planning by considering the resources needed, the construction stage or project development stage, and the stage of project development completion or final finalization and trial run of the project. The most crucial stage to determine the sustainability of the project in the future is the development stage which assesses the feasibility of the project through commercially or legally, within procurement, land, permits and licenses. Other than that the process of determination funding sources are required in the preparation of proposals for electricity buying and selling transactions.

The current system for project financing are only comparing a few trusted sources, calculate total funds, and choose the funding sources with minimum interest rate. This research aims to optimize the determination of funding resources. In order to have a wide view of the whole perspectives, not only seen from financial benefits but other parameters as well. The parameters include funding resources' credibility, funding resources' scope, funding resources' regulation, and funding resources' financial scheme and benefits. There are previous research that discusses similar problems such as the decision-making process in the selection process; there are various alternative solutions that are considered in solving them. The first alternative is modeling the evaluation system with fuzzy multi criteria decision making (MCDM) as decision support by weighting and comparing one criterion to another to obtain priority criteria, as well as the research of Lin et al. (2017). The second alternative is making Standard Operating Procedures as well as SOP for financial decision making from Ratnadi et al (2017) research. Standard Operating Procedures also helps developing Management Information Systems (MIS) and control the unstandardized processes based on research of Herdiyanti et al (2018). While the third alternative is to create a business development intelligence that contains standard operating procedures that helps managers decision making (Riahi 2017). Business development intelligence also helps financial services sector based on the research of Dawson and Belle (2013) and helps banking industry evaluation based on research of Moro et al (2014).

Based on these three alternatives, several criteria for consideration were prepared to select the best alternative in solving existing problems. The criteria are accuracy, performance, risk, and completion time. The four criteria helps us to select determination process. The analysis of each criteria was carried out through a questionnaire that given to stakeholders or supervisors in the unit concerned to fill in the weighting of the criteria. Next, based on the results of the questionnaire, it is processed using the best-worst method. The alternative is chosen based on the criteria for the highest level of accuracy, namely the third alternative, by making business development intelligence which includes Standard Operating Procedures in it as a form of scheme that becomes a reference in determining the right funding source.

1.1 Objectives
This research objectives are helps the company to optimize project financing in choosing the right funding sources and helps the company to seize strategic opportunities by collecting and analyzing relevant information or data to facilitate decision making in choosing funding sources.

2. Literature Review
Project financing is a funding arrangement in which the available funds are used for the construction of project, with payment of fees that are adjusted to the project's cash flow (Tant and Vong 2001). The key to success in project financing is structuring project financing through guarantees of adequate credit support from funding sources, so as to avoid credit risk (Nevitt and Fabozzi 2000). Project financing is one of the supporting factors for accelerating the financial close process of a project.

a.   Financial Close
Based on the procedures for granting PT Perusahaan Listrik Negara (PERSERO) Business Feasibility Assurance For The Development of Power Plants in chapter 1 General Provisions, Article 1 Verse 6 that the Financial Close is the stage where the PLS (Pengembang Listrik Swasta) or Private Electricity Company has signed a loan or a credit agreement and has received disbursement funds (drawdown) for financing the Power Plant Project on the date as stipulated in the PJBTL (Perjanjian Jual Beli Tenaga Listrik) or Power Purchase Agreement. One of the things that must be considered in this financial close stage is how the process of determining the funding sources which is the best lender or credit to increase the benefits to be obtained. Based on Gatti (2008) in the book titled Project Finance in Theory and Practice, funding sources can be divided into 4, namely Export Credit Agency (ECA), Commercial Loan, Development Financial Institution (DFI) and Multilateral. The four funding sources each consist of several types of loans or ECAs. To deal with the impact of the risk of financial close, it is necessary to consider the characteristics and credibility of each type of funding sources to be selected, such as scope, costs and schemes, as well as related regulations to obtain the most optimal funding source candidate (Sorge 2004, Gatti 2008). In determining the appropriate funding sources, an appropriate alternative decision support is needed.

b.   Standard Operating Procedure (SOP)
Marimin, Tanjung, and Prabowo (2006) defines SOP as standard operating guidelines in implementing decisions in a structured and accountable action. SOP are guidelines for identifying the necessary changes, describing desired

performance, and evaluating operational performance for increased operational efficiency, accountability, and increased security (Caballero et al. 2003). Firmansyah (2019) conducted research on the finance department of PT X Sleman Regency and drafted a Fund Application SOP, because there were no better work guidelines and guidelines for each employee. Then the results of the SOP are able to create new workflows that are more effective and efficient. Efianti (2019) also designed standard operating procedures for the financial division at Smartelco Solution Technology Company, as well as to find out the process of recording financial transactions in producing financial reports at the Smartelco Solution Technology Company. However, this SOP only provides the scheme or flow of a process. So that the application of SOP in a more complex decision-making process related to data needs to be combined with other decision support systems, such as the Business Intelligence System.

c. Business Intelligence (BI)
BI system is a combination of tools, such as a data warehouse, online analytical processing and dashboards. Data warehouses collect accurate, clean, and detailed data from multiple sources for in-depth analysis (Yoon et al. 2007), whereas online analytical processing supports multidimensional analysis in real time and allows users to implement operations such as aggregation, filtering, rolling, and drilling down for breakdown (product, customer, time, country, region) and spin (Bach et al. 2016).

Retnowardhani et al. (2019) explained that a BI can be used to assist in the decision-making process and has been implemented by many organizations and institutions. He also reviewed the BI comparisons from several articles. From this comparative study it can be seen that research in the BI sector continues to develop and keep up with technological trends. Arribathi et al. (2017) tried to examine what stages must be carried out in building a structured and appropriate BI in building BI in an organization, as well as understanding important aspects that must be considered. One conclusion is that the business must be based on the conditions and needs of the organization in achieving the desired goals, where if these conditions occur, the decision-making process will be better and more accurate. Ain et al. (2019) also succeeded in assessing comprehensive knowledge about what was found in the domain of BI system adoption, utilization and success based on various literatures. Based on 111 studies that have been identified and reviewed from 2000 to 2019, the results obtained show that BI research has made significant progress with various BI implementations in sectors / industries consisting of government services, transportation, insurance, communications, health care, banking, agriculture, construction and professional services sector. Then, Serumaga-Zake (2017) tried to examine how user satisfaction influences the relationship between system quality, information quality and service quality on the one hand and perceived net benefits on the other in South Africa. As a result, it was found that users were satisfied in terms of the quality of systems and services that implemented BI.

Based on research by Rezaie et al. (2018), BI implementation is designed in the banking industry to help process and better decision-making management in the market, such as helping to get data and information in a timely manner for analysis. So it can help banks to boost relationship with customers, attract potential customers, and increase growth. BI is also integrated with the Fuzzy Delphi Technique method in that research to select the factors to be considered so that BI can be implemented effectively. Foshay and Kuziemsky (2014) also apply BI as decision support in the healthcare industry, to analyze accurate, quality, and timely data and information to support healthcare organization's decisions. Positioning of this research is implementing BI in funding sources decision making to fund power plan projects. BI implementation is limited to a framework design related to information on the characteristics and credibility that need to be considered in choosing funding sources which are integrated with SOPs that show the flow of the decision making process.

3. Methods
The method used in this research is business development intelligence includes SOP as a schematic for determining the funding sources (Riahi 2017). SOP starts by looking at the type of project to be executed. After that, consider the types of funding sources that can fund the project, credibility, activities, area of coverage, loan limits, interest rates, financing fees, repayment scheme, and regulation of funding sources. Furthermore, the data from prospective funding sources can calculate economically to obtain the low effective interest rate for comparison between funding sources to be selected later and and fulfillment of the debt portion analysis. The data comes from books, journals, websites, previous studies, and companies obtained by conducting searches on the internet and conducting interviews or discussions with companies.

4. Data Collection

In this data collection, there are some data needed in this study. The first is data on the type of project to be executed. Next is data on four funding sources, namely from ECAs, Commercial Loans, DFIs, and Multilaterals to finance the type of category projects determined by the company (Fight 2005). After that, the third data are each parameter and sub-parameter of the characteristics of existing funding sources, where there are five characteristics, namely activity, area, loan limits, interest rates, financing fees, repayment scheme, and regulation. Next, the data for each parameter and sub-parameter of credibility are capital adequacy ratio, asset quality, management efficiency, earning efficiency ratio, liquidity ratio, and sensitivity to market analysis (Ghazavi and Bayraktar 2017). These parameters are determined based on literature studies conducted with information searches via web sites or previous research that could be monitored or captured into information.

This study also obtained data from companies in the form of project information to be carried out, project financing, and financing fees from 3 different types of funding sources in Figure 1.

General Information		
Project Cost	129,090,795	USD
Construction Period	18	Month

Project Financing			
Project Cost		129,090,795	USD
Equity Portion	20.00%	25,818,159	USD
Debt Portion	80.00%	103,272,636	USD

Financing Fee		Loan 1 (Commercial Loan)		Loan 2 (Commercial Loan)		Loan 3 (Regional Agency)	
Commitment Size	Direct loan	50% of Debt		50% of Debt		25% of Debt	
	B-loan covered by ADB Partial Risk Guarantees	0%		0%		40% of Debt	
Tenor		16 Years	32 Semester	16 Years	32 Semester	20 years	40 Semester
LIBOR		3 Month	-	3 Month	-	3 Month	
Loan Margin		2.70% p.a	1.35% p.s	2.70% p.a	1.35% p.s	3.15% p.a	1.58% p.s
Upfront Fee		1.75% flat	-	1.50%	-	1.50%	-
Commitment Fee		1.08% p.a	0.54% p.s	1.08%	-	0.50%	-
Partial Risk Guarantee Fee		0%	-	0%	-	1.10%	-

Figure 1. Project Information and Funding Sources

5. Results and Discussion

In this part, results and discussion is about determination of funding sources scheme, business intelligence, proposed improvements, and validation.

5.1 Determination of Funding Sources Scheme

Here is the determination of funding sources scheme using Standard Operating Procedure. From the Standard Operating Procedure that shown in Figure 2, it will produce the right funding source for the project from PT X. The standard operating procedure is carried out in the project financing process. The steps are:
a. Determining the type of project in focus
b. Determining the financial close of the project
c. Considering the type of funding sources
d. Considering the credibility of the funding sources
e. Considering the scope of the funding sources
f. Considering the regulation of the funding sources
g. Considering the cost scheme of the funding sources
h. Calculating the lowest cost, and determining the most appropriate source of funding.
i. Calculating the lowest cost is based on the lowest interest rate

5.2 Business Intelligence

After understanding the scheme for determining funding sources through SOPs, the selected funding sources are considered based on their credibility and characteristics. The role of business intelligence in this case is to summarize data on the parameters of credibility and characteristics to become information that can be considered in the selection of funding sources. In addition to containing the contents of the relevant parameters, this Business Intelligence also contains sources that can be monitored if there is a change in the related data.

Each sub-parameter of the CAMELS parameter (Capital Adequacy Ratios, Asset Quality, Management efficiency, Earnings Efficiency Ratios, Liquidity Ratios, and Sensitivity to market analysis) plus Precedent Project Financing Structure in the Market based on Table 1. is analyzed in relation to increase in at least the last 5 years. So that it can be obtained output sources of funding that are truly credible to minimize the risk of project funding sources.

After obtaining a credible funding source, it is analyzed based on the characteristic parameters in Table 2. which consists of 4 types of funding sources, namely ECA (Export Credit Agency), Commercial Loans, Development Financial Institution (DFI), and Multilateral. These four sources of funding have each characteristic consisting of activity, area, sector, loan limit, interest rate, and financing fee. So that after the funding sources are analyzed based on consideration of their credibility and characteristics, several good and optimal alternative sources of funding are found to finance the project, such as loan 1, loan 2, etc. sub parameter is based on Table 1. its increase is analyzed at least in the last 5 years. Thus, a truly credible funding source output can be obtained to minimize risk. So that after the funding sources are analyzed based on the consideration of their credibility and characteristics, several good and optimal alternative funding sources are found to finance the project, such as loan 1, loan 2, etc.

Procedure	Initiation	Development
1.Determine the type of the project (PLTG/GU, PLTU, Renewable, dan PLTA)	1	
2. Determine the financial close of the project		2
3. Considering the types of funding sources that are available (ECA, Commercial Loan, Regional Agency, and Multilateral Agency)		3
4. Considering the credibility of funding sources that appropriate company standards. The credibility of the funding source must be very good.		4
5. Considering the scope of the funding source (including activities from the funding source, area, and loan limits) that are appropriate for the ongoing project		5
6. Considering the regulation of funding sources that are appropriate for the ongoing project		6
7. Considering the cost scheme from funding sources, including interest rates, financing fees, and repayments		7
8. Calculate the lowest cost		8
9. Determine the most appropriate and the most optimal funding sources		No 9 Yes
10. Financial close finished		10

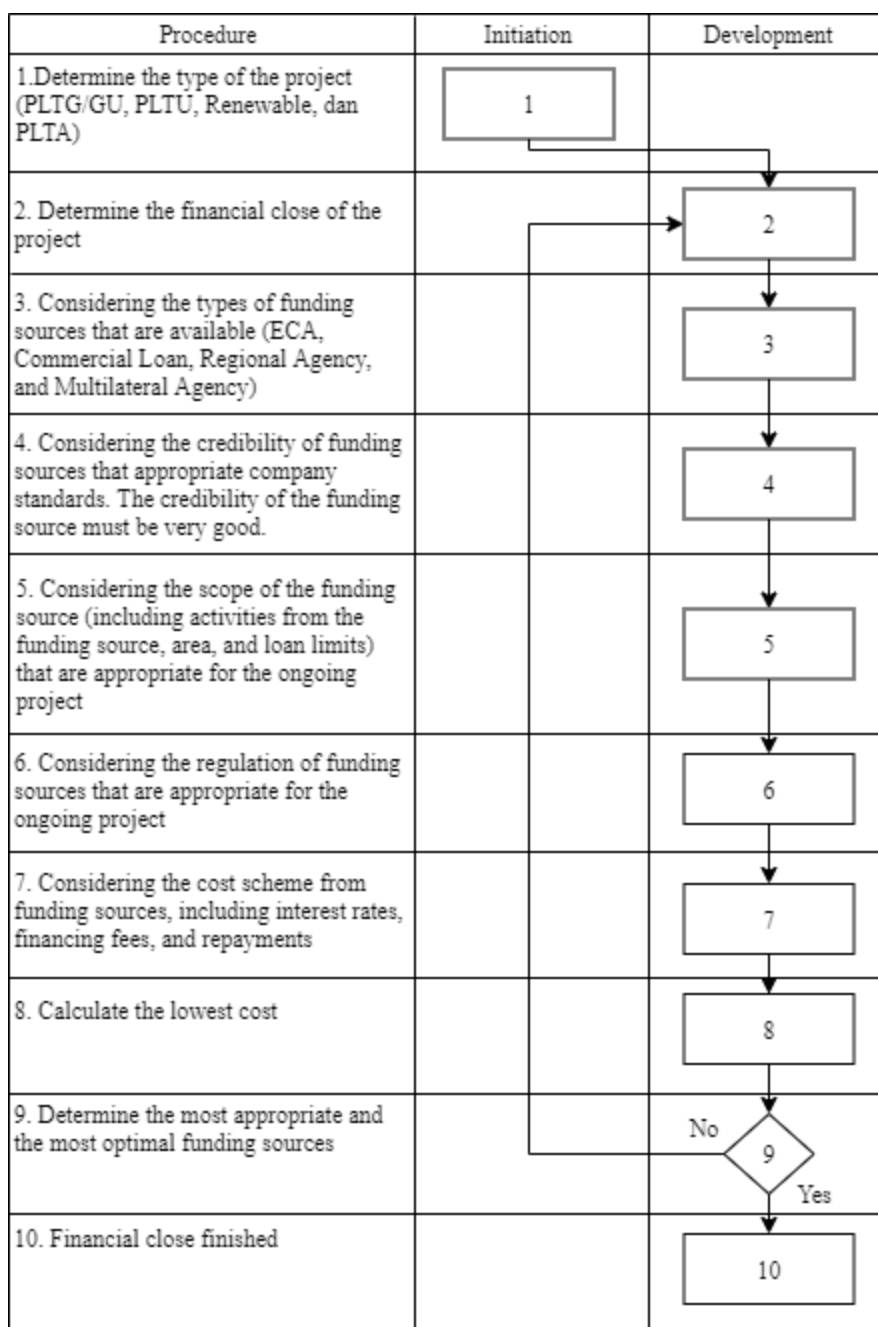Figure 2. Standard Operating Procedure

Table 1. Business Intelligence based on Credibility Funding Sources

Parameter	Sub parameter
Capital Adequacy Ratios	The ratio of total equity to total assets? The ratio of total equity to long-term debt? The ratio of total equity to total liabilities?
Asset Quality	The ratio of loan provision for net interest income? The ratio of loans to total assets? The provision for loan losses to total loans?
Management efficiency	The ratio of operating expenses to total assets? The ratio of the load staff to total assets?
Earnings Efficiency Ratios	The ratio of return on assets? The ratio of return on equity? The ratio of efficiency of activity of operation?
Liquidity Ratios	The ratio of liquid assets to total deposit? The ratio of loans to total deposit? The ratio of liquid assets to total assets? The ratio of deposit futures to the total of the deposit?
Sensitivity to market analysis	The ratio of total assets to the total assets of the sector?
Precedent Project Financing Structure in the Market	The implementation structure and the experience of the Bank?

Table 2. Business Intelligence based on Characteristics Funding Sources

Characteristics	Component	Funding Source			
		ECA	Commercial Loan	DFI	Multilateral
Activity	Direct Loan	✓	✓	✓	✓*
	Guarantees	✓			✓
Area	Projects in Developing Countries				✓
	Applicable to all countries	✓*	✓	✓	✓
Sector	Information Technology			✓	✓*
	Power Plants	✓	✓	✓	✓
	Transmission and Distribution Telecommunications		✓		✓*
	Renewable Energy	✓	✓	✓	✓
	Climate Change Mitigation And Adaptation	✓			✓
	Water Projects	✓	✓		✓*
	Gas, gas pipeline, LNG Oil, Petrochemicals Mining, Smelting Power Generation		✓		✓
Loan Limit	85% of export content + 30% local content	✓			
	25% direct loan + 40% risk guarantee				✓
	Up to 80% total project cost		✓		
	Up to 40% of total project cost			✓	
Interest Rate	CIRR (Commercial Interest Reference Rates)	✓			
	LIBOR (London Interbank Offered Rate)		✓	✓	✓
Financing Fee	Commitment Fee	✓	✓	✓	✓
	Agency Fee	✓	✓		
	Arrangement Fee	✓	✓		
	Facility Fee		✓		
	Premium	✓			
	Partial Risk Guarantee Fee				✓
	Prepayment Fee		✓		
	Front-end Fee			✓	✓
	Service Fee				✓

Notes: *with certain conditions

Table 2. Business Intelligence based on Characteristics Funding Sources (Cont.)

Characteristics	Component	Funding Source			
		ECA	Commercial Loan	DFI	Multilateral
Repayment Scheme	8.5 years for Category 1 countries (countries with a per capita GDP of more than US $ 5,685)	✓			
	8 and 10 years for Category 2 countries (all countries not included in Category	✓			
	From 5 to 25 years and are structured in different ways depending on use		✓		
	Maturity (include grace period) : not over 13 years Grace/Availability Period : depends on the project			✓	
	It differs depending on the policies of each MDB. For example: ADF: Principal payment of 2% per year for the first 10 years after grace period and 4% per year thereafter				✓
Regulation	OECD (Organization for Economic Co-operation and Development)	✓			
	World Bank		✓	✓	✓

Notes: *with certain conditions

5.3 Proposed Improvements

Here is the numerical results for this research. The numerical result include the calculation of loan 1, loan 2, and loan 3. The calculation consider year, semester, residual payment, LIBOR, applicable margin, interest rate, repayment balance, construction period, interest during construction, and financing fee.

The first one is the calculation of loan 1 on Table 3 as an example. There are 2 years for the project execution or more precisely 3 semesters and 16 years for completion of loan payments or more precisely 32 semesters. Loan 1 gives effective interest rate at 4.22%. Next, the calculation of loan 2 with identic formula for loan 1. There are 2 years for the project execution or more precisely 3 semesters and 16 years for completion of loan payments or more precisely 32 semesters. Loan 2 gives effective interest rate at 4.25%. Last, the calculation of loan 3 with the same formula for loan 1. There are 2 years for the project execution or more precisely 3 semesters and 20 years for completion of loan payments or more precisely 40 semesters. Loan 3 gives effective interest rate at 4.45%. The first one is the calculation of loan 3. There is also a recap of effective interest rate for each loan on Table 4.

In financial calculations, only the effective interest rate is calculated as a consideration for the decision to choose funding sources. because if it has been done managerially properly, accordingly and on time, only the effective interest rate needs to be considered to see which funding source generates the least profit, so we can choose this source of funding because it will be more profitable for the company.

All loan is already sorted using steps on standard operational procedure, consider loan credibility, scope, regulation, and cost scheme parameters. This section focus on cost scheme parameter and to found the loan that generate lowest cost by calculating effective interest rate. Calculation of effective interest rate conclude repayment period, construction period, interest during construction, and, financing fee. This is the last step to choose the funding sources. From Table 4, the results of the calculation of the effective interest rate loan 1, loan 2, and loan 3. They are calculated using Microsoft Excel and the same calculation example as loan 1, so it can be concluded that the loan chosen is loan 1, because it has the lowest interest rate which means that the costs are also as low as possible and the benefits are maximized. Although it has longer repayment period than loan 3, loan 1 is the effective and efficient answer because the consideration of the interest rate factor is more influential on the benefits than other factors. After that the sources of funding are sorted from lowest to highest to be determined the fulfillment of the debt portion of the project cost.

Table 3. Loan 1 Calculation

Subject	Amount	Unit	Repayment Period								
Year			-2	-1		1		...		16	
Semester			-3	-2	-1	1	2	...		31	32
Residual Payment						32	31	...		2	1
LIBOR (3month)			2.44%	2.44%	2.43%	2.43%	2.43%	...		2.25%	2.24%
Applicable Margin			1.35%	1.35%	1.35%	1.35%	1.35%	...		1.35%	1.35%
Interest Rate			3.79%	3.79%	3.78%	3.78%	3.78%	...		3.60%	3.59%
Repayment Balance											
Debt Amount	51,636,318	USD									
Beginning Balance						51,636,318	50,780,208	...	...	5,256,658	2,674,794
Debt Service	89,118,984	USD				2,810,107	2,807,854	...	...	2,771,069	2,770,925
Interest	37,482,666	USD				1,953,997	1,918,373	...	...	189,204	96,131
Principal	51,636,318	USD				856,110	889,481	...	...	2,581,864	2,674,794
Ending Balance		USD				50,780,208	49,890,727	...	...	2,674,794	-
Construction Period											
Disburse			17,212,106.04	17,212,106	17,212,106						
Interest During Construction											
Acc. Disburse			17,212,106	34,424,212	51,636,318						
IDC	3,908,683		651,484	1,304,233	1,952,967						
Financing Fee											
Disburse	55,545,002		17,863,590	18,516,339	19,165,073						
Acc. Disburse			17,863,590	36,379,929	37,681,412						
Disburse Balance			37,681,412	19,165,073	-						
Commitment Fee	306,971		203,480	103,491	-						
Upfront Fee	903,636		903,636								
Cash Flow	(46,517,028)		(15,453,507)	(15,804,382)	(15,259,139)	2,810,107	2,807,854	...		2,771,069	2,770,925
Effective Interest Rate	4.22%										

The following is an example of calculating the effective interest rate for loan 1 using Microsoft Excel software:

Effective Interest Rate = IRR Cash Flow (Period Construction: Period Tenor)
= IRR Cash Flow (Period (–3) : Period (32))
= 4.22%

Table 4. Effective Interest Rate Recap

Type of Loan	Effective Interest Rate	Commitment Size	Cover Loan Portion (USD)	Debt Portion (USD 103,272,636)
Loan 1	4.22%	50 %	51,636,318	51,636,318
Loan 2	4.25%	50 %	51,636,318	51,636,318
Loan 3	4.45%	25 %	25,818,159	-

5.4 Validation

This section will explain the validation test using expert judgment with an assessment questionnaire given to the company (Taherdoost 2016). The model will be judged by the Supervisor directly, related to the company's business development. The questionnaire is in the form of a short statement with an answer choice range of numbers 1 to 5. Number 1 means very dissatisfied, number 2 means unsatisfied, number 3 means doubtful, number 4 means satisfied, and number 5 means very satisfied.

Table 5. Recap of the Questionnaire Results

Statement	Result
The SOP provided can determine financial close procedures	4
The parameters and values given can capture the data needed in determining the financial close	4
The CAMELS method and some of the sub-parameters provided make it easy to judge the credibility of the funding resources	5
The user interface of the proposed excel model is clear	4
The existing system makes it easy to compare the most optimal costs in the process of determining the right source of funding	4
The system can provide solutions to problems in the existing close financial process	4
The system can shorten the time in determining the existing close financial process	4

Based on Table 5, the stakeholders were satisfied and very satisfied based on the answer scores of 4 and 5 on the questions given. With details, there are six statements with a score of 4 and one statement with a score of 5. So it appears that the company is satisfied with the results of the proposed solution. Therefore, it can prove that the model made is suitable for the company and has been validated. However, there are criticisms and suggestions for adding or developing other funding variations.

6. Conclusion

The chosen alternative is to create business development intelligence to process existing data into important information needed for the company so that it can make it easier for company to monitor up to date information within a certain period of time. In addition, creating a scheme or stage of the funding source selection process based on certain parameters to obtain optimal benefits. The application of Business Development Intelligence helps company to make better decisions by providing decision-makers with rich, accurate, and up-to-date information regarding external industrial environmental conditions. As well as shorten the time between thoughts and actions of the company in determining the source of funding. From the research analysis that has been carried out, there are 3 loan source candidates who obtained the effective interest rate calculation with details of loan 1 of 4.22%, then loan 2 of 4.25%, and loan 3 of 4.45%. From the three loans, the lowest value is obtained for loan 1 with a value of 4.22%. This proves that loan 1 is the loan that demands the smallest reward in borrowing, so it is selected and the company can generate better income. Based on the research and conclusions previously described, there are several suggestions that the authors can give. The company is expected to have technological resources for the development of business development intelligence, which is more complex and covers all matters that affect the determination of funding

sources. For further research, it is necessary to extend the business development intelligence to other sections related of the company and then integrate them with this recent result.

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