



## Evaluation of Business Feasibility of Construction and Building Services Business at CV. Nirwatama

Gusti Ayu Diah Arini Dewi\*, Iriani

Department of Industrial Engineering, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Jl. Rungkut Madya No.1, Gunung Anyar, Surabaya 60294 Indonesia

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### A B S T R A C T

In developing a construction service business, it must consider various possibilities and developments in the future. Evaluation of business feasibility from various aspects is carried out in order to have clear goals and directions. CV. Nirwatama is a construction service industry company that belongs to the small class (K) category. Evaluation of business feasibility is carried out with two aspects, namely non-financial aspects and financial aspects. In the non-financial aspect, the CV. Nirwatama company can be said to be feasible enough to continue running in the next few years. While in the financial aspect of finance, the payback period (PP) value is obtained as much as 4 years 8 months 5 days < 5 years. Then at a net present value (NPV) of IDR. 14,114,466 and an internal rate of return (IRR) value of 14% > MARR = 12%. So it can be concluded that the construction services business of the CV. Nirwatama company is said to be very profitable and feasible to run or invest. One of the projects undertaken by CV. Nirwatama, namely the Light Rehabilitation of the Non-Rise Building of the Great Mosque, has significant problems regarding time delays in project work so that the contractor must coordinate again with the architect planner. To overcome time delays and minimize fines, this research uses the Critical Path Method (CPM). The result of the CPM method is that the optimal time duration for project work is 19 days so that the company is not subject to fines.

\*Corresponding Author

Gusti Ayu Diah Arini Dewi  
E-mail: arndewii@gmail.com

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### 1. INTRODUCTION

In economic operations, particularly in development activities, the potential of the construction services industry is highly significant (Rapaccini et al., 2020). Owners of building construction service businesses must increase the quality of their services in order to

support national growth and development in the industrial era 4.0 (Saniuk et al., 2022; Nagy et al., 2018). Future innovations and potential options must be taken into account while creating a construction service firm. It is done to assess the viability of a firm from a variety of angles in order to have clear objectives and

guidelines (Dattée, 2018). Assess the feasibility of building projects by determining whether the company has the necessary resources, including the right experience, solid legal standing, and the right equipment, technology, and human resources, which are the company's major drivers.

CV. Nirwatama is a company engaged in building construction services which was established on February 15, 2018. CV. Nirwatama provides architectural design services such as making building layout designs, building mass design, landscape architectural design, mechanical, wall treatment, window treatment, floor treatment, lighting, and so on as well as construction services which include the construction of physical facilities for public facilities such as houses, office buildings, factories, buildings, and so on. CV. Nirwatama has worked on several projects including the Physical Planning of the Penjaringan Sari Surabaya Village Building, Planning for U Ditch Channel 60.80.120.8 and Cover 76.60.10 (One Side), Planning for the Rehabilitation of SDN Siwalanpanji Sidoarjo Building, Construction of 5 m Wide New Box Motif Paving Road and 40/60 Channel with Double Side Cover, and Construction of Rusunawa Wonorejo Blok WD Surabaya City. One of the projects undertaken by CV. Nirwatama, namely the Light Rehabilitation of the Non-Rise Building of the Great Mosque, has a significant problem regarding delays in the timing of the project so that the contractor must coordinate again with the architect planner. This resulted in losses in the form of fines and greatly affected the course of the company's business, especially in relation to various business aspects of the company (Settembre-Blundo et al., 2021). From the above problems, a business feasibility evaluation is needed to be used as an evaluation material in running and developing this business (Lau et al., 2020).

This research conducts a business feasibility evaluation at the CV. Nirwatama company in order to evaluate the feasibility and potential of this company for the next few years. The feasibility study here is a consideration and evaluation material in running and developing this business. The evaluation in this study

consists of non-financial and financial aspects. Evaluation of financial aspects using the Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR), and Return on Investment (ROI) methods (Gafli & Daryanto, 2019).

From this explanation, a business feasibility evaluation and forecasting study was conducted at the CV. Nirwatama company. This research is expected to get evaluation results that can measure whether the CV. Nirwatama business has the opportunity to continue or will stop at a certain point in the next few years. This research can also find out the picture of this business development will be profitable non-economically or not both, and can better compete with other companies in the future.

## 2. LITERATURE REVIEW

The ability of a business plan or project to be implemented to offer advantages, both financially and socially, is the definition of feasibility in assessment as a feasibility study (Kerzner, 2019). A business feasibility study is an activity that involves identifying, planning, and deepening all activities and enterprises that are for profit. Also social good by supplying the goods and services required for the economic system, with an output in the form of a determination of whether or not a firm is feasible (Sup, 2021). There are a number of topics that need to be covered in relation to business feasibility studies and the choice of whether to operate a firm. The pertinent factors are then evaluated, measured, and examined in line with established criteria and accepted, enacted laws. It is necessary to conduct in-depth work on a number of business feasibility issues, including:

### 2.1 Legal Aspects

The legal component must be addressed first since, if it is determined that a company proposal cannot be implemented legally, further examination of other aspects is not necessary (Durden et al., 2018). The legal component looks at the laws that must be followed in order to operate a business. Depending on the intricacy of the business, different legal requirements apply to different types of businesses (Reinkemeyer, 2020).

### 2.2 Market and Marketing Aspects

Simply said, a market is a location where buyers and sellers get together to transact business. According to this concept, the market is located somewhere in particular (Piranda et al., 2022; Zamani & Giaglis, 2018). In actuality, a market can be defined in much more general terms. This implies that transactions can be carried out entirely online or through other electronic means without the need for buyers and sellers to physically meet. The goal of marketing is to recognize and satisfy social and human needs. The American Marketing Association (AMA) is a coIDRorate function and a set of procedures for creating, conveying, and delivering value to consumers as well as for managing customer relationships in a way that is advantageous to the company and its stakeholders (Rudawska, 2018; Nedumaran, 2020).

### 2.3 Technical and Technological Aspects

A technical and technological analysis is necessary to prevent future business failures brought on by technical issues. The location of the business, the design of the interior of the building, the choice of technology, and other factors all need to be understood in relation to technical and technological considerations (Razkenari et al., 2020; Jia et al., 2019).

### 2.4 Management and Human Resources Aspects

Almost all businesses have a management team made up of seasoned professionals. A business, especially one that is just getting started, will not be able to run regularly and consistently without management in it since management in the business sector is highly important. Resource management refers to all of the preparations made by the business for HR performance, namely in the assignment of job positions in accordance with their particular domains (Chakraborty & Biswas, 2020; Mulang, 2021). Things like rules, processes, and practices for managing other people in order to accomplish goals are all strongly tied to the idea of HR management (Wilton, 2019).

### 2.5 Environmental Aspects

All development activities basically cause impacts on the environment in the form of both positive (beneficial) and negative (adverse) impacts (Malm et al., 2019). Based on (UU No.

39, 2009) the environment is a unit of space with all objects, forces, conditions, and living things, including humans and their behavior that affect nature itself, the continuity of life and the welfare of humans and other living things.

### 2.6 Financial Aspects

Financial analysis is an analysis that compares costs and benefits to determine whether a business is profitable forever and takes into account the possibility of bearing losses. Financial analysis aims to determine the estimated funding and cash flow so that it can be known whether or not the business is running.

## 3. RESEARCH METHOD

This research was conducted at CV. Nirwatama which is located at Gununganyar Tengah Sekolahan No. 3 RT 01 RW 02 Kel. Gununganyar Kec. Gununganyar Surabaya City. The following are the steps in this research:

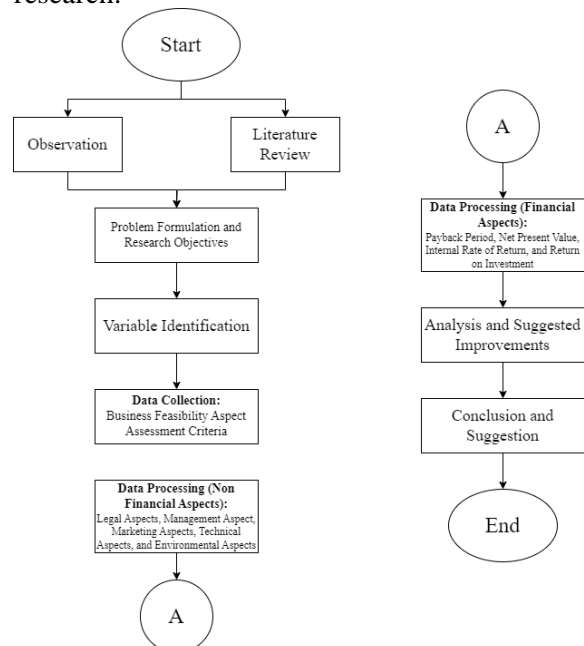


Fig. 1. Research flow

This aspect of business feasibility consists of 2 aspects, namely non-financial and financial. After that, analysis and suggestions for improvement are made to CV. Nirwatama.

## 4. RESULT AND DISCUSSION

### 4.1 Collection Data

1. Criteria for Legal Aspect Feasibility Assessment

- The company has completeness and validity of company documents such as Company Registration Certificate, Deed of Establishment, NPW (Taxpayer Identification Number), NIB (Business Identification Number), SIUP and Domicile Certificate
  - The company has the classification and qualifications of a construction planning service business entity.
  - The company complies with legal provisions and is able to fulfill all applicable licensing requirements.
2. Management Aspect Feasibility Assessment Criteria
- The company has a clear management system in the form of a company organizational structure, workforce scheduling.
  - The company is able to provide clearly identified job descriptions and specifications in the company. The company is able to provide a minimum compensation of the Surabaya City Regional Minimum Wage.
3. Market Aspect Feasibility Assessment Criteria
- The company conducts marketing strategies using SWOT analysis to achieve targeted marketing.
  - The company has a good and competitive market demand.
  - The company forecasts the company's sales effectively and efficiently to be able to compete in the market and expand market share.
4. Technical Aspect Feasibility Assessment Criteria
- The company's project has a clear and detailed Draft Budget Cost and time schedule.
  - The project undertaken by the company has an optimal cost and time.
  - The company has a detailed budget of the costs required in the project.
5. Environmental Aspect Feasibility Assessment Criteria
- The company has OHS or safety guidance or SOP related to work accidents or natural disasters.

- Environmental impact assessment (EIA)
6. Financial Aspect Feasibility Assessment Criteria
- PBP, the Payback Period result has a positive value.
  - NPV, the Net Present Value analysis results have a positive value.
  - IRR, the results of the calculation of the Internal Rate of Return > the value of the bank loan interest rate at the time of the study.
  - ROI, Return on Investment calculation is positive.

4.2 Data Processing

1. Legal Aspects

The following are the results of the company's eligibility criteria based on legal aspects:

**Table 1.** Legal aspects

Indicator	Feasibility Criteria	Analysis Result	Description
<b>Completeness of Company License</b>	The company has clear legality and is supported by licensing documents.	It can be fulfilled and said to be feasible.	The company has a Company Establishment Deed, Tanda Daftar Perusahaan (TDP), Nomor Pokok Wajib Pajak (NPWP), Nomor Induk Berusaha (NIB), Surat Izin Usaha Jasa Konstruksi (IUJK).
<b>Company Classification and Qualification</b>	The company has a construction services business license that is in accordance with the project being undertaken	It can be fulfilled and said to be feasible.	The company has K1 and K2 classifications and qualifications for Architectural Planning, Engineering Planning, Engineering Supervision, Implementation.
<b>Government Regulations and Policies</b>	The company complies with applicable	It can be fulfilled and said to be feasible.	The company always reports income tax every year

Indicator	Feasibility Criteria	Analysis Result	Description
	government regulations and policies		

2. Management Aspects

The following are the results of the company's eligibility criteria based on management aspects:

Table 2. Management aspects

Indicator	Feasibility Criteria	Analysis Result	Description
<b>Organization Structure</b>	The company is able to establish a clear management structure and system.	It can be fulfilled and said to be feasible.	The company has a clear organizational structure, where there is a Director, Secretary & Adm. Finance, Team Leader, Architectural Design Project Expert, Structural Engineering Expert, Mechanical and Electrical Plumbing Expert, Drafter, Estimator.
<b>Job Description</b>	Job descriptions and specifications in the company are clearly identified	It can be fulfilled and said to be feasible	The company has very clear and detailed job descriptions for each position in the company
<b>Employee Salary</b>	The company is able to provide compensation at least equal to the Surabaya City Regional Minimum Wage	It can be fulfilled and said to be feasible	The company has paid its obligations to pay employees with at least the Surabaya City Regional Minimum Wage. However, foremen and coolies are paid on a piece-rate system per day.

3. Marketing Aspects

The following are the results of the company's eligibility criteria based on marketing aspects:

Table 3. Marketing aspects

Indicator	Feasibility Criteria	Analysis Result	Description
<b>Market Demand</b>	The company has good and competitive market demand.	It can be fulfilled and said to be feasible	Based on data from BPS, market demand in the construction sector in Surabaya City has increased every year.
<b>Marketing Strategy</b>	The company's marketing strategy is carried out effectively and efficiently to compete in the market and expand market share.	It can be fulfilled and said to be feasible	The company can increase efforts to introduce its business to customers by integrating various partners of other construction service companies through social media platforms, and conducting gradual promotions to strengthen brand awareness.

4. Environmental Aspects

The following are the results of the company's eligibility criteria based on environmental aspects:

Table 4. Environmental aspects

Indicator	Feasibility Criteria	Analysis Result	Description
<b>OHS SOP</b>	The company's OHS SOPs can be clearly identified and detailed.	It can be fulfilled and said to be feasible	The company has implemented OHS procedures in running the project so that work accidents can be minimized.
<b>Environmental Impact Assessment /EIA</b>	The company has not been able to design the project	It cannot be fulfilled and said to be feasible.	Physical-chemical components such as air quality, traffic disturbance, noise can be

Indicator	Feasibility Criteria	Analysis Result	Description
	time schedule.		continuously monitored and efforts to minimize the impact by referring to the benchmark rules that have been set so that the creation of environmentally friendly construction can be realized.

5. Technical Aspects

The technical aspects consist of a cost budget plan and a network diagram. The following are the cost of budget plan:

**Table 5.** Cost of budget plan

No	Type of Work	Total Price (IDR)
1	Preliminary Work	3,000,000
2	Earthwork and Foundation	29,475,353
3	Structural Works	30,799,916
4	Architectural Work	97,931,703
5	Truss and Roof Covering Works	36,905,060
6	Electrical Installation Works	8,467,436
7	Sanitary Work	28,258,361
8	Final Work	500,000
	<b>Total</b>	<b>235,337,828</b>

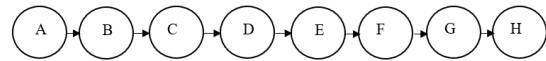
This diagram has a dependency relationship between jobs that can be seen as follows:

**Table 6.** Relationship jobs

Code	Type of Work	Predecessor	Duration (days)
A	Preliminary Work	-	3
B	Earthwork and Foundation	A	8
C	Structural Works	B	7
D	Architectural Work	C	5
E	Truss and Roof Covering Works	D	3

F	Electrical Installation Works	E	2
G	Sanitary Work	F	2
H	Final Work	G	1

From the table, the project work network diagram is obtained as follows:



**Fig. 2.** Work network diagram

In the work network diagram, the activity path or activities carried out are A - B - C - D - E - F - G - H. The project above was delayed for 6 days from the agreed contract of 25 days to 31 days. Therefore, a fine of 0.01% per day is imposed with details of the fine per day of IDR 25,887.16. The total fine imposed for 6 days is IDR 155,322.97. Therefore, it is necessary to propose Time Schedule improvements using the CPM method so that project work can save completion time and reduce fines. The following are the results of the company's eligibility criteria based on technical aspects:

**Table 7.** Technical aspects

Indicator	Feasibility Criteria	Analysis Result	Description
<b>Cost Budget Plan (CBP)</b>	The company's project has a clear and detailed Cost Budget Plan.	It can be fulfilled and said to be feasible	The CBP on the Surabaya Great Mosque Light Rehabilitation Project is very clear and detailed based on the prevailing price when the project is carried out.
		It cannot be fulfilled and said to be feasible.	The Surabaya Great Mosque Light Rehabilitation Project has delayed the project work time from the contract so that fines are imposed. Therefore, an improvement proposal is needed using
<b>Time Schedule</b>	The company has not been able to design the project time schedule.	It cannot be fulfilled and said to be feasible.	The Surabaya Great Mosque Light Rehabilitation Project has delayed the project work time from the contract so that fines are imposed. Therefore, an improvement proposal is needed using

Indicator	Feasibility Criteria	Analysis Result	Description
			the CPM method.
<b>Machinery and Equipment</b>	Required machinery and equipment are in place and up to standard	It can be fulfilled and said to be feasible	The company has several machines and equipment that are up to standard and are also in good condition to support the company's projects.

6. Financial Aspects

The financial aspect consists of Payback Period, Net Present Value, Internal Rate of Return, and Return on Investment.

- Payback Period

The Payback Period (PP) method is used to measure how quickly an investment can return. In this study, the calculation of the Payback Period (PP) is carried out with a Discount Factor of 12% in accordance with the calculation of the MARR margin that has been determined. The following is a table for calculating the payback period (PP) of CV. Nirwatama:

**Table 8.** Payback period

Year	Cash Inflow	DF (12%)	Net Cash Flow	Cash Cumulative
2023	81.526.669	0,8929	72.791.669	72.791.669
2024	73.864.917	0,7972	58.884.660	131.676.328
2025	92.065.216	0,7118	65.530.202	197.206.531
2026	70.226.442	0,6355	44.630.173	241.836.704
2027	86.699.741	0,5674	49.195.761	291.032.466

$$\begin{aligned}
 N &= 4 \\
 A &= \text{IDR. } 276.918.000 \\
 B &= \text{IDR. } 241.836.704 \\
 C &= \text{IDR. } 291.032.466 \\
 PP &= N + \frac{A-B}{C-B} \times 1 \text{ year}
 \end{aligned}$$

$$\begin{aligned}
 &= \\
 4 + &\frac{\text{IDR.}276.918.000 - \text{IDR.}241.836.704}{\text{IDR.}291.032.466 - \text{IDR.}241.836.704} \times 1 \\
 &\text{year} \\
 &= 4 + (0,713095 \times 1 \text{ year}) \\
 &= 4 \text{ year } 8 \text{ months } 5 \text{ days}
 \end{aligned}$$

- Net Present Value

This Net Present Value method calculates the difference in investment value with the present value of future net cash receipts. The following is a Net Present Value calculation table:

**Table 9.** Net present value

Year	Cash Inflow	DF (12%)	Net Cash Flow
2023	81.526.669	0,8929	72.791.669
2024	73.864.917	0,7972	58.884.660
2025	92.065.216	0,7118	65.530.202
2026	70.226.442	0,6355	44.630.173
2027	86.699.741	0,5674	49.195.761
	<b>Total</b>		<b>291.032.466</b>

$$\begin{aligned}
 NPV &= \sum PV \text{ Net Cash} - \sum PV \text{ Investment} \\
 &= \text{IDR. } 291.032.466 - \text{IDR. } 276.918.000 \\
 &= \text{IDR. } 14.114.466
 \end{aligned}$$

- Internal Rate of Return

Basically, IRR must be sought by trial and error, so it is necessary to find NPV with different i% to get NPV close to 0. From various calculations that have been carried out by the author, it can be seen that NPV with DF = 14% and NPV with DF = 15% which results in the NPV value is close to 0. The following is the calculation of NPV with a Discount Factor of  $i_1 = 14\%$  dan  $i_2 = 15\%$ :

**Table 10.** Positive NPV value

Tahun	Cash Inflow	DF (14%)	PV Net Cash
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2023	IDR 81.526.6 69	0,8772	IDR 71.515.194
2024	IDR 73.864.9 17	0,7695	IDR 56.839.054
2025	IDR 92.065.2 16	0,6750	IDR 62.144.021
2026	IDR 70.226.4 42	0,5921	IDR 41.581.076
2027	IDR 86.699.7 41	0,5194	IDR 45.031.845
<b>Total</b>			<b>IDR 277.111.190</b>
			<b>IDR 193.190</b>

**Table 11.** Negative NPV value

Year	Cash Inflow (IDR)	DF (15%)	PV Net Cash (IDR)
2023	81.526.6 69	0.8696	70.895.591
2024	73.864.9 17	0.7561	55.849.264
2025	92.065.2 16	0.6750	62.144.021
2026	70.226.4 42	0.5718	40.155.480
2027	IDR 86.699.7 41	0.4972	IDR 43.107.111
<b>Total</b>			<b>IDR 272.151.467</b>
			<b>- IDR 4.766.533</b>

$$\begin{aligned}
 IRR &= i_1 + \left[ \frac{NPV_1}{NPV_1 - NPV_2} \right] (i_2 - i_1) \\
 &= (0,14) + \left[ \frac{193.190}{193.190 - (-4.766.533)} \right] (0,15 - 0,14) \\
 &= 0,14 + [0,0389] (0,01) \\
 &= 0,14 + 0,000389 \\
 &= 0,140389 \approx 14 \%
 \end{aligned}$$

- Return on Investment  
This Return of Investment method is

used to analyze how much profit the company generates from each rupiah that has been invested. So the higher the percentage of ROI, the greater the profit that will be generated. The following is the calculation of Return of Investment:

**Table 12.** Return on investment

Year	Net Profit After Tax	Total Investment	ROI
2023	IDR 81.526.669		29%
2024	IDR 73.864.917		26%
2025	IDR 92.065.216	IDR 276.918.000	33%
2026	IDR 70.226.442		25%
2027	IDR 86.699.741		31%

$$\begin{aligned}
 ROI &= \frac{\text{Net Profit After Tax}}{\text{Total Assets}} \times 100\% \\
 &= \frac{81.526.669}{276.918.000} \times 100\% \\
 &= 29 \%
 \end{aligned}$$

### 4.3 Suggested Improvement

From the problem analysis that has been done, there is a problem with the time schedule. Previously, the company was required to pay a fine for completing the project late. Then the critical path method (CPM) was carried out to provide suggestions for improvements to the company. CPM is a work network diagram that contains the trajectory of activities and the sequence of activities to be carried out during project implementation. Through the network diagram, it can be seen which work path is included in the critical path. The work network diagram presents activities, activity names, predecessors, workers, and implementation time. The dependency relationship between jobs can be seen in the following table:

**Table 13.** Relationship Jobs

Code	Type of Work	Predecessor	Duration (days)
A	Preliminary Work	-	3
B	Earthwork and Foundation	A	8
C	Structural Works	A	7
D	Architectural Work	A	5



E	Truss and Roof Covering Works	B	3
F	Electrical Installation Works	C,E,D	2
G	Sanitary Work	F	2
H	Final Work	G	1

From the results of the table, a project work network diagram can then be drawn as follows:

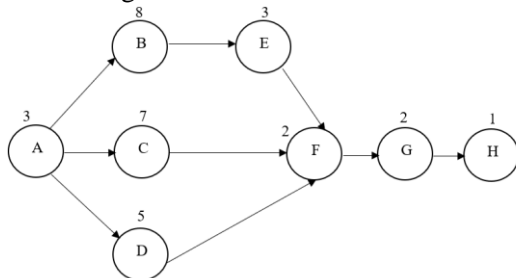


Fig. 3. Suggested network diagram

This diagram contains several paths with the following activities:

- A-B-E-F-G-H ( $3+8+3+2+2+1 = 19$ )
- A-C-F-G-H ( $3+7+2+2+1 = 15$ )
- A-D-F-G-H ( $3+5+2+2+1 = 13$ )

In the Surabaya Great Mosque Light Rehabilitation project, researchers used the critical path method (CPM). The use of CPM is considered to save completion time. In the Surabaya Great Mosque Light Rehabilitation construction project, the critical path is A-B-E-F-G-H, with the longest project completion time of 19 days. The optimal time duration of the Surabaya Great Mosque Light Rehabilitation project is 19 days. The time duration is the optimal time after being accelerated using the CPM method. The opportunity for the Surabaya Great Mosque Light Rehabilitation project to get an improvement of 100% is because in the previous data processing and discussion, the company received a fine of IDR 155,322.97 for completing the project 6 days late with a project contract time of 25 days. By using the CPM method, the company can speed up the project so that the company will not get a fine.

### 5. CONCLUSION

The following are the conclusions of this research: In non-financial aspects, namely legal aspects, management aspects, market aspects and environmental aspects of the CV.

Nirwatama company can be said to be feasible enough to continue running in the next few years. While in the financial aspect of finance, the Payback Period (PP) value of 4 years 8 months 5 days  $< 5$  years is obtained, the positive NPV value is IDR. 14,114,466, and the IRR value is  $14\% > MARR = 12\%$ , and the ROI value is in the range of  $26-33\% > 0$  each year. So, it can be concluded that the construction services business of the Nirwatama company can be said to be very profitable and very feasible to run. Based on the analysis of the problems that have been identified, there are problems in the technical aspect, namely the time schedule. To overcome time delays and minimize fines, researchers use the CPM method which results in an optimal time duration for project work for 19 days so that the company is not subject to fines.

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