

PROFIT FORECASTING ANALYSIS AND VISUALIZATION OF CEMENT COMPANIES LISTED IN THE INDONESIA STOCK EXCHANGE

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ABSTRACT

This study aims to determine the amount of profit in the next 5 years from 2022-2026 by forecasting profits using a simple linear regression method. Presentation of profit forecasting data needs to be processed so that it is simpler and easier to understand by stakeholders. Therefore, this study visualizes data using Microsoft Power BI based on historical data of cement companies in Indonesia that are listed on the IDX in 2017-2021. This type of research is Research and Development (R&D). Methods of data collection using the method of documentation. This study uses simple linear regression method to determine sales forecasts. While the stage of making the dashboard uses ADDIE method. The results of the study concluded that the profit forecast for 2022-2026 at PT Indocement Tunggal Prakarsa Tbk, PT Solusi Bangun Indonesia Tbk, and PT Semen Indonesia Tbk experienced increase in profits while PT Semen Baturaja Tbk, PT Wijaya Karya Beton Tbk, and PT Waskita Beton Precast Tbk experienced loss. The contribution of this research is expected to provide information as a basis for stakeholder analysis. While the practical implications of this research are the need to expand sales targets by exporting cement abroad to increase profits and overcome the oversupply of cement in Indonesia. The research period is limited to 5 years. Future researchers should display net profit, operating profit, gross profit, and revenue to increase the usefulness of the information in decision making.

Keywords: *forecasting profit, historical data, Microsoft Power BI*

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui besarnya laba 5 tahun mendatang dari tahun 2022-2026 dengan melakukan peramalan laba menggunakan metode regresi linier sederhana. Penyajian data peramalan laba perlu diolah agar lebih sederhana dan mudah dipahami oleh pemangku kepentingan. Oleh karena itu penelitian ini memvisualisasikan data menggunakan Microsoft Power BI berdasarkan data historis perusahaan semen di Indonesia yang terdaftar di BEI tahun 2017-2021. Jenis penelitian adalah *Research and Development* (R&D). Metode pengumpulan data menggunakan metode dokumentasi. Penelitian ini menggunakan metode regresi linier sederhana untuk menentukan peramalan penjualan. Sedangkan tahap pembuatan dashboard menggunakan metode ADDIE. Hasil penelitian menyimpulkan bahwa peramalan laba tahun 2022-2026 pada PT Indocement Tungal Prakarsa Tbk, PT Solusi Bangun Indonesia Tbk, dan PT Semen Indonesia Tbk mengalami peningkatan laba sedangkan PT Semen Baturaja Tbk, PT Wijaya Karya Beton Tbk, dan PT Waskita Beton Precast Tbk mengalami kerugian. Kontribusi penelitian ini diharapkan dapat memberikan informasi sebagai dasar analisa pemangku kepentingan. Sedangkan implikasi praktis penelitian ini perlu dilakukannya perluasan target penjualan dengan ekspor semen ke luar negeri untuk meningkatkan keuntungan dan mengatasi kelebihan pasokan semen di Indonesia. Periode penelitian terbatas selama 5 tahun. Peneliti selanjutnya sebaiknya menampilkan laba bersih, laba operasi, laba kotor, dan pendapatan untuk meningkatkan kegunaan informasi dalam pengambilan keputusan.

Kata Kunci: peramalan laba, data historis, Microsoft Power BI



Jurnal Akuntansi Universitas Jember

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1. INTRODUCTION

Forecasting is important for companies to increase business effectiveness. Forecasting is capacity planning to efficiently allocate scarce resources and set goals to measure company performance (Taylor & Letham, 2017). Profit forecasting is used to determine the amount of profit in the coming year based on historical profit data for the past year. However, the presentation of profit forecasting produces data that is complex and difficult to understand, therefore it is necessary to simplify the data so that it is easy to understand and stakeholders can make decisions quickly.

Data visualization is the process of using visual elements such as charts, graphs or maps to represent data. Through data visualization you can translate complex, high-volume, or numerical data into visual representations that are easy to process. Presentation of profit forecasting data needs to be processed into concise information that facilitates decision making for interested parties. Business Intelligence (BI) is becoming more and more needed by top management of any company to visualize, analyze, and prepare strategies to increase future profits (Gowthami & Kumar, 2017).

According to the Jakarta-based CNBC Indonesia, the cement industry in Indonesia is oversupplied (Yanwardhana, E. (2021). Where domestic manufacturers' production capacity is very high but domestic consumption and exports are still much lower. If this situation persists, it may have an impact on the financial stability of the company. Meanwhile, PT Semen Indonesia Tbk is a company in the industry with the largest market

share. Market leader means the company that dominates in sales, price changes, new product introductions, distribution coverage, and promotion spending. However, from 2019 to 2022 the cement company's market share tends to decrease, currently it is 48% from the previous 52% (Binekasri, 2022). A decrease in market share will have an impact on business effectiveness and decrease in company profitability. In this condition, it is important for companies to do profit forecasting to find out the amount of profit in the future. Presentation of profit forecasting data needs to be processed to make it simpler and easier for stakeholders to understand.

The findings of this study are consistent with previous research by Wijaya & Gantini, (2019) researching sales forecasting analysis with the implementation of business intelligence dashboards. In this study, predicting sales data using the single moving average and single exponential smoothing methods makes a sales data dashboard using Microsoft Power BI. Meanwhile, Indahyanti & Wijaya, (2014) examined the ability of the profit component to predict future earnings using multiple regression techniques.

This study aims to determine the amount of profit for the next 5 years from 2022-2026 by forecasting profits using a simple linear regression method. Presentation of profit forecasting data needs to be processed to make it simpler and easier for stakeholders to understand. Therefore, this study visualizes data using Microsoft Power BI based on historical data of cement companies in Indonesia that are listed on the Indonesia Stock Exchange in 2017-2021. The novelty in this research is to use a combination of profit forecasting analysis theory using simple linear regression with data visualization on cement companies in Indonesia that are listed on the Indonesia Stock Exchange in 2017-2021. Contribution research in this study are expected to provide information as a basis for analysis to stakeholders in order to expand sales targets. Practical implications of research in this study is expansion of sales targets can be done by carrying out cement export activities abroad to increase company profits and overcome oversupplied cement in Indonesia.

2. LITERATUR REVIEW

Profit Forecasting

Forecasting is a critical data science task. Organizations from all industrial sectors, for example, should participate in capacity planning to allocate scarce resources more efficiently and set goals to measure performance relative to the baseline (Taylor & Letham, 2017). Profit forecasting is one of several defense strategies available to target companies. Profit forecasting is a technique for estimating future financial periods, so the manager can estimate the costs needed in the coming period (Rahmawati, 2016). In this study, forecasting profit is calculated using simple linier regression analysis based on historical net income from the year data from Indonesian cement companies' financial statements.

Simple Linear Regression

Regression analysis is a statistical method used to examine the relationship between variables bound Y and a set of independent variable x. The goal of this method is to predict the Y value given the x value (Hijriani *et al.*, 2016). The following is a simple linear regression formula based on Aggarwal, R., & Ranganathan, (2017).

$$Y = a + b (x)$$

where:

Y = simple linear regression

a = intercepts

b = slope

x = coefficient

Simple linear regression is one of the methods for forecasting future profits. Y is the dependent variable in this study, it describes the results of profit forecasting using simple linear regression. Values of a represent intercepts, while values of b represent slopes derived from the equations y and x. Where the y equation represents profit and the x equation represents the predictor number, denoted by the numbers -2, -1, 0, 1, 2, 3, 4, 5, 6, 7. In this study, the coefficient is the predictor number.

Business Intelligence

Business Intelligence is a set of methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information used to enable more effective strategic, tactical, and operational insights and decision making (Williams, 2016). Business intelligence describes a concept and method for improving the quality of decision-making using data-driven systems. Its scope includes several decision support system activities such as querying, reporting, OLAP, statistical analysis, forecasting, and executive information system (Junaedi *et al.*, 2020). Business Intelligence can be used to support companies in achieving various success criteria such as: helping decision making with speed and better quality, speed up operations, shorten the product development cycle, maximizing the value of available products and anticipating new opportunities, and creating a better and more focused market, also improving relationships with customers and suppliers. Business intelligence is a concept and method for improving the quality of decision making in a business using data-driven systems. This study's data base is the result of profit forecasting at cement companies in Indonesia.

Microsoft Power Business Intelligence

Microsoft Power Business Intelligence is a cloud-based data analysis service developed by Microsoft that can be used for business analysis (Yumni & Widowati, 2021). Microsoft Power BI is made up of five components: power query, power pivot, power view, power map, and power BI desktop. Power query: self-service extract transport and load (ETL) tools are used in Excel Add In to receive, process, and load data from various sources into excel form. Power pivot is a data modeling tool that allows for quick calculations. Power View's drag-and-drop interface is useful for quickly and easily creating data visualizations. Power Map is a three-dimensional shape that serves as a visualization of virgins. Finally, Desktop BI power for report writing and interactive visualization displays is available (Akbar, R., Rasyiddah, D., Anrisya, M., Julyazti, N. F., & Syaputri, 2018). In this study, Microsoft Power BI was used to convert profit forecasting results into brief data visualizations and easy to take decision making.

Hypothesis

The hypothesis is a provisional guess and still has to be proven or tested the truth. The hypothesis can also be stated as a theoretical answer to research problem formulation. It can be concluded that the hypothesis is a temporary answer to the problem formulation. The hypothesis in this study is H1: Simple linear regression is able to predict profit.

3. RESEARCH METHOD

This type of research is Research and Development (R&D). The Research & Development method is a research method that produces a product and tests the effectiveness of the product. The goal of this research is to create products and then test their effectiveness (Saputro, 2017). This research focuses on cement companies listed on the IDX. The cement industry in Indonesia is experiencing oversupply, which could have an impact on financial stability, particularly company profitability. There are six cement companies listed on the IDX and are the object of this research. The following is a list of companies used in this study, which can be seen in Table 1.

Table 1. Companies List

No	Companies List	CompanyCode
1	PT Semen Baturaja (Persero) Tbk	SMBR
2	PT Solusi Bangun Indonesia Tbk	SMCB
3	PT Semen Indonesia Tbk	SMGR
4	PT Waskita Beton Precast Tbk	WSBP
5	PT Wijaya Karya Beton Tbk	WTON
6	PT Indocement Tunggul Prakarsa Tbk	INTP

The data needed is the financial statements of PT Indocement Tunggul Prakarsa Tbk (INTP), PT Semen Baturaja (Persero) Tbk (SMBR), PT Solusi Bangun Indonesia Tbk (SMCB), PT Semen Indonesia Tbk (SMGR), PT Waskita Beton Precast Tbk (WSBP), PT Wijaya Karya Beton Tbk (WTON) which was listed on the IDX in 2017-2021.

This study uses a simple linear regression method to determine profit forecasting. The following is a simple linear regression formula based on Aggarwal, R., & Ranganathan, (2017).

$$Y = a + b (x)$$

where:

Y = simple linear regression

a = intercepts

b = slope

x = coefficient

Meanwhile, the dashboard creation stage uses the ADDIE method. The ADDIE instructional model is a five-phase instructional process that includes analysis, design, development, implementation, and dynamic evaluation (Cahyadi, 2019). The following is an explanation of the ADDIE method:

1. Analysis

At this stage identification and analysis, the aim of research and data needed. In this research, the presentation of profit forecasting data needs to be processed to make it simpler and easier for stakeholders to understand based on historical data of cement companies in Indonesia that are listed on the Indonesia Stock Exchange in 2017-2021. In this stage, data collection using Microsoft Excel.

2. Design

Next is the design, in which the profit forecasting data is filtered according to the data needed. Making the dashboard design aims to make the dashboard look attractive and the information provided is easy to understand. At this stage, Extract Transform Load (ETL) from the data that has been collected into Microsoft Power BI.

3. Development

At this stage, first the process of transforming and enriching the data is carried out in order to change the data obtained into the same format and then continue with ETL to remove unused data and change its appearance. Next, create a data warehouse according to the needs. The second stage is importing the data warehouse into the Microsoft Power BI application and creating a relationship model by creating relationships between tables in the data warehouse. Then create a dashboard according to user needs and finally upload the results of the data visualization dashboard.

4. Implementation

At this stage, the implementation of profit forecasting data visualization dashboards aimed at cement companies and the government is carried out. Furthermore, feedback from users is obtained which is used as a consideration in improving existing dashboards.

5. Evaluation

At this stage it is a response to the feedback that has been given by the user at the implementation stage. The evaluation was carried out for the development of profit forecasting data visualization dashboard to make it more useful for users.

4. RESULT AND DISCUSSION

The following is the result of forecasting profit data calculations for cement companies in Indonesia that are listed on the IDX based on historical data for 2017-2021. In Table 2. Shows the results of calculating profit forecasting at PT Semen Baturaja based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 2. Calculation of Profit Forecasting at PT Semen Baturaja

Year	Profit	Forecasting
2017	Rp 134.717.866	Rp 104.104.137
2018	Rp 73.564.912	Rp 81.594.213
2019	Rp 27.593.178	Rp 59.084.288
2020	Rp 1.189.571	Rp 36.574.364
2021	Rp 58.355.914	Rp 14.064.439
2022		-Rp 8.445.485
2023		-Rp 30.955.410
2024		-Rp 53.465.334
2025		-Rp 75.975.259
2026		-Rp 98.485.183

Source: data processed by writer (2022)

Based on the data above, it shows that PT Semen Baturaja's profit prediction for 2022-2026 will experience a loss. In 2022 the loss reached -IDR 8,445,485, in 2023 the loss reached -IDR 30,955,410, while in 2024 the loss reached -IDR 53,465,334, in 2025 the loss reached -IDR 75,975,259, and in 2026 the loss reached -IDR 98,485,183.

Profit data is derived from the year's net income in the financial statements. The information used is PT Semen Baturaja's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b (x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

In Table 3. Shows the results of calculating profit forecasting at PT Solusi Bangun Indonesia based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 3. Calculation of Profit Forecasting at PT Solusi Bangun Indonesia

Year	Profit	Forecasting
2017	-Rp 758.045	-Rp 830.397
2018	-Rp 827.985	-Rp 386.704
2019	Rp 499.052	Rp 56.989
2020	Rp 650.988	Rp 500.682
2021	Rp 720.933	Rp 944.374
2022		Rp 1.388.067
2023		Rp 1.831.760
2024		Rp 2.275.453
2025		Rp 2.719.146
2026		Rp 3.162.839

Source: data processed by writer (2022)

Based on the data above, it shows that PT Solusi Bangun Indonesia's profit predictions during 2022-2026 will experience an increase in profit. In 2022 the profit increase reached IDR 1,388,067, in 2023 the profit increase reached IDR 1,831,760, while in 2024 the profit increase reached IDR 2,275,453, in 2025 the profit increase reached IDR 2,719,146, and in 2026 the profit increase reached IDR 3,162,839.

Profit data is derived from the year's net income in the financial statements. The information used is PT Solusi Bangun Indonesia's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b (x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

In Table 4. Shows the results of calculating profit forecasting at PT Semen Indonesia Indonesia based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 4. Calculation of Profit Forecasting at PT Semen Indonesia

Year	Profit	Forecasting
2017	Rp 1.650.006	Rp 2.282.062
2018	Rp 3.085.704	Rp 2.327.395
2019	Rp 2.371.233	Rp 2.372.727
2020	Rp 2.674.343	Rp 2.418.059
2021	Rp 2.082.347	Rp 2.463.391
2022		Rp 2.508.723
2023		Rp 2.554.055
2024		Rp 2.599.387
2025		Rp 2.644.719
2026		Rp 2.690.051

Source: data processed by writer (2022)

Based on the data above, it shows that PT Semen Indonesia's profit predictions for 2022-2026 will experience an increase in profit. In 2022 the profit increase reached IDR 2,508,723, in 2023 the profit increase reached IDR 2,554,055, while in 2024 the profit increase reached IDR 2,599,387, in 2025 the profit increase reached IDR 2,644,719, and in 2026 the profit increase reached IDR 2,690,051.

Profit data is derived from the year's net income in the financial statements. The information used is PT Semen Indonesia's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b(x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

In Table 5. Shows the results of calculating profit forecasting at PT Waskita Beton Precast based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 5. Calculation of Profit Forecasting at PT Waskita Beton Precast

Year	Profit	Forecasting
2017	Rp 1.000.330	Rp 1.591.489
2018	Rp 1.103.472	Rp 416.407
2019	Rp 806.148	-Rp 758.674
2020	-Rp 4.759.958	-Rp 1.933.755
2021	-Rp 1.943.362	-Rp 3.108.837
2022		-Rp 4.283.918
2023		-Rp 5.459.000
2024		-Rp 6.634.081
2025		-Rp 7.809.162
2026		-Rp 8.984.244

Source: data processed by writer (2022)

Based on the data above, it shows that PT Waskita Beton Precast's profit prediction during 2022-2026 will experience a loss. In 2022 the loss reached -IDR 4,283,918, in 2023 the loss reached -IDR 5,459,000, while in 2024 the loss reached -IDR 6,634,081, in 2025 the loss reached -IDR 7,809,162, and in 2026 the loss reached -IDR 8,984,244.

Profit data is derived from the year's net income in the financial statements. The information used is PT Waskita Beton Precast's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b (x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

In Table 6. Shows the results of calculating profit forecasting at PT Wijaya Karya Beton based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 6. Calculation of Profit Forecasting at PT Wijaya Karya Beton

Year	Profit	Forecasting
2017	Rp 340.458.859	Rp 484.484.794
2018	Rp 486.640.174	Rp 396.632.650
2019	Rp 510.711.733	Rp 308.780.507
2020	Rp 123.147.079	Rp 220.928.363
2021	Rp 82.944.688	Rp 133.076.219
2022		Rp 45.224.076
2023		-Rp 42.628.068
2024		-Rp 130.480.212
2025		-Rp 218.332.356
2026		-Rp 306.184.499

Source: data processed by writer (2022)

Based on the data above, it shows that the predicted profit for PT Wijaya Karya Beton in 2022 will generate a profit of IDR 45,224,076. Meanwhile, during 2023-2026 PT Wijaya Karya Beton will experience losses. In 2023 the loss will reach -IDR 42,628,068, while in 2024 the loss will reach -IDR 130,480,212, in 2025 the loss will reach -IDR 218,332,356, and in 2026 the loss will reach -IDR 306,184,499.

Profit data is derived from the year's net income in the financial statements. The information used is PT Wijaya Karya Beton's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b (x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

In Table 7. Shows the results of calculating profit forecasting for PT Indocement Tunggal Prakarsa based on historical profit data in 2017-2021 to predict profit in 2022-2026.

Table 7. Calculation of Profit Forecasting at PT Indocement Tunggal Prakarsa

Year	Profit	Forecasting
2017	Rp 1.859.818	Rp 1.583.627
2018	Rp 1.145.937	Rp 1.635.403
2019	Rp 1.835.305	Rp 1.687.179
2020	Rp 1.806.337	Rp 1.738.954
2021	Rp 1.788.496	Rp 1.790.730
2022		Rp 1.842.505
2023		Rp 1.894.281
2024		Rp 1.946.057
2025		Rp 1.997.832
2026		Rp 2.049.608

Source: data processed by writer (2022)

Based on the data above, it shows that PT Indocement Tunggal Prakarsa's profit predictions for 2022-2026 will experience an increase in profit. In 2022 the profit increase reached IDR 1,842,505, in 2023 the profit increase reached IDR 1,894,281, while in 2024 the profit increase reached IDR 1,946,057, in 2025 the profit increase reached IDR 1,997,832, and in 2026 the profit increase reached IDR 2,049,608.

Profit data is derived from the year's net income in the financial statements. The information used is PT Indocement's net income from 2017 to 2021. While forecasting, the following formula is used to obtain results from the simple linear regression method:

$$Y = a + b (x)$$

where:

Y = forecasting

a = intercepts

b = slope

x = coefficient

Table 7. Calculation of Profit Forecasting at Cement Companies in Indonesia

Year	PT Semen Baturaja	PT Solusi Bangun Indonesia	PT Semen Indonesia	PT Waskita Beton Precast	PT Wijaya Karya Beton	PT Indocement Tunggal Prakarsa
2017	Rp104.104.137	-830.397	2.282.062	1.591.489	484.484.794	1.583.627
2018	81.594.213	-386.704	2.327.395	416.407	396.632.650	1.635.403
2019	59.084.288	56.989	2.372.727	-758.674	308.780.507	1.687.179
2020	36.574.364	500.682	2.418.059	-1.933.755	220.928.363	1.738.954
2021	14.064.439	944.374	2.463.391	-3.108.837	133.076.219	1.790.730
2022	- 8.445.485	1.388.067	2.508.723	-4.283.918	45.224.076	1.842.505
2023	- 30.955.410	1.831.760	2.554.055	-5.459.000	- 42.628.068	1.894.281
2024	- 53.465.334	2.275.453	2.599.387	-6.634.081	- 130.480.212	1.946.057
2025	- 75.975.259	2.719.146	2.644.719	-7.809.162	- 218.332.356	1.997.832
2026	- 98.485.183	3.162.839	2.690.051	-8.984.244	- 306.184.499	2.049.608

Based on the data above, it shows that PT Solusi Bangun Indonesia, PT Semen Indonesia, Indocement Tungal Prakarsa experienced an increase in profit. PT Semen Baturaja, PT Waskita Beton Precast, and PT Wijaya Karya Beton will suffer losses for the next 5 years.

The dashboard creation stage uses the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) method. Below is the result of the ADDIE method.

1. Analysis

In this stage, data collection using Microsoft Excel. The profit calculations and forecasting are structured as Figure 1. In order to make it easier for Microsoft Power BI to relate data.

Year	Profit or Loss PT Semen Baturaja	Forecasting PT Semen Baturaja	Profit or Loss PT Solusi Bangun Indonesia	Forecasting PT Solusi Bangun Indonesia	Profit or Loss PT Semen Indonesia	Forecasting PT Semen Indonesia
2017	Rp 134,717,866	Rp 104,104,137	-Rp 758,045	-Rp 830,397	Rp 1,650,006	Rp
2018	Rp 73,564,912	Rp 81,594,213	-Rp 827,985	-Rp 386,704	Rp 3,085,704	Rp
2019	Rp 27,593,178	Rp 59,084,288	Rp 499,052	Rp 56,989	Rp 2,371,233	Rp
2020	Rp 1,189,571	Rp 36,574,364	Rp 650,988	Rp 500,682	Rp 2,674,343	Rp
2021	Rp 58,355,914	Rp 14,064,439	Rp 720,933	Rp 944,374	Rp 2,082,347	Rp
2022		-Rp 8,445,485		Rp 1,388,067		Rp
2023		-Rp 30,955,410		Rp 1,831,760		Rp
2024		-Rp 53,465,334		Rp 2,275,453		Rp
2025		-Rp 75,975,259		Rp 2,719,146		Rp
2026		-Rp 98,485,183		Rp 3,162,839		Rp

Figure 1. Data Collection using Microsoft Excel

Based on Figure 1. Before entering data into Microsoft Power BI, the data must be compiled in Microsoft Excel to make the Microsoft Power BI ETL process easier. Data is arranged by year, profit or loss results, and forecasting results.

2. Design

In this stage, Extract Transform Load (ETL) from the data collection using Microsoft Excel into Microsoft Power BI. Microsoft Power BI will process the data and display the results as shown in Figure 2.

Year	Profit or Loss PT Semen Baturaja	Forecasting PT Semen Baturaja	Profit or Loss PT Solusi Bangun Indonesia	Forecasting PT Solusi Bangun Indonesia	Profit or Loss PT Semen Indonesia	Forecasting PT Semen Indonesia
2017	134717866	104104137,2	-758045	-830397,2	1650006	
2018	73564912	81594212,7	-827985	-386704,3	3085704	
2019	27593178	59084288,2	499052	56988,6	2371233	
2020	1189571	36574363,7	650988	500681,5	2674343	
2021	58355914	14064439,2	720933	944374,4	2082347	
2022		-8445485,29999998		1388067,3		
2023		-30955409,8		1831760,2		
2024		-53465334,3		2275453,1		
2025		-75975258,8		2719146		
2026		-98485183,3		3162838,9		

Figure 2. Extract Transform Load in Microsoft Power BI

Based on Figure 2. The ETL process has been carried out. In this process the excel display has been transformed into Microsoft Power BI.

3. Development

In the development stage. creating a relationship model by creating relationships between tables in the data warehouse. Then create a dashboard according to user needs and finally upload the results of the data visualization dashboard as shown in Figure 3.

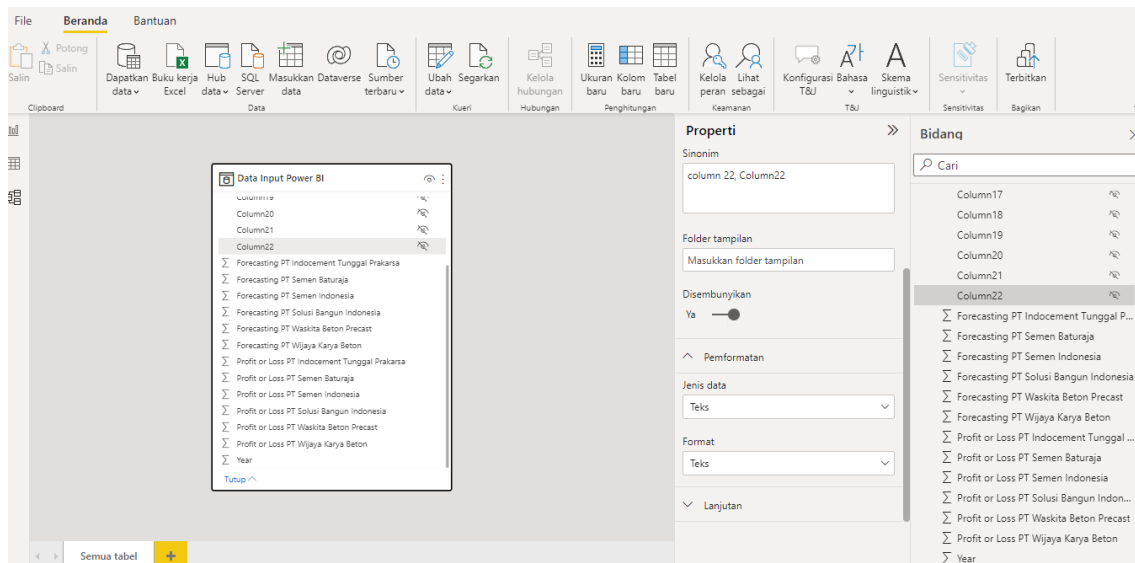


Figure 3. Relationships between Tables in The Data Warehouse

Based on Figure 3. After the ETL process has been done. Thus. relationships between tables in the data warehouse will appear.

4. Implementation

The implementation of profit forecasting data visualization dashboards aimed at cement companies and the government is carried out. Figure 4. Is the result of visualization of profit or loss and forecasting data in 2026 for cement companies in Indonesia that are listed on the IDX based on historical data for 2017-2021 using Microsoft Power BI.



Figure 4. Visualization of Forecasting Profit Cement Companies in 2026

Based on the visualization above, it can be concluded that in 2026 PT Wijaya Karya Beton, PT Waskita Beton Precast, and PT Semen Baturaja are predicted to suffer losses. Meanwhile PT Solusi Bangun Indonesia, PT Semen Indonesia, and PT Indocement Tunggul Prakarsa are predicted to experience increased profit. PT Wijaya Karya Beton is predicted to experience loss of –IDR 306.18 million rupiah. PT Waskita Beton Precast is predicted to experience loss of –IDR 8.98 million rupiah, and PT Semen Baturaja is predicted to experience loss of –IDR 98.49 million rupiah. Then, PT Solusi Bangun Indonesia is predicted to experience increase profit of IDR 3.16 million rupiah. PT Semen Indonesia is predicted to experience increase profit of IDR 2.69 million rupiah, and PT Indocement Tunggul Prakarsa is predicted to experience increase profit of IDR 2.05 million rupiah.

5. Evaluation

The evaluation was carried out for the development of a profit forecasting data visualization dashboard to make it more useful for users. The feedback that has been given by the user at the implementation stage is profit visualization does not only display profit, but needs to display net income, operating income, gross profit, and revenue. This is to increase the usefulness of information in decision making.

5. CONCLUSION

The result of forecasting profit data calculations for cement companies in Indonesia that are listed on the IDX based on historical data for 2017-2021. PT Semen Baturaja and PT Waskita Beton Precast profit prediction for 2022-2026 will experience a loss. Then, PT Solusi Bangun Indonesia's, PT Semen Indonesia, and PT Indocement Tunggul Prakarsa profit predictions during 2022-2026 will experience an increase in profit. PT Wijaya Karya Beton in 2022 will generate a profit of IDR 45.224.076. Meanwhile, during 2023-2026 PT Wijaya Karya Beton will experience losses.

Based on the visualization result, it can be concluded that in 2026 PT Wijaya Karya Beton, PT Waskita Beton Precast, and PT Semen Baturaja are predicted to suffer losses. Meanwhile PT Solusi Bangun Indonesia, PT Semen Indonesia, and PT Indocement Tunggul Prakarsa are predicted to experience increased profit. PT Semen Indonesia's profit predictions for 2022-2026 will experience an increase in profit. If the company's profits continue to rise, it indicates that the company's performance is improving, implying that the company's operations are becoming more efficient. Meanwhile if the company's profits decrease or losses, the company's performance suffers and its operations become less efficient (Novita, 2018).

Contribution research in this study is expected to provide information as a basis for analysis to stakeholders in order to expand sales targets. Practical implications of research in this study is expansion of sales targets can be done by carrying out cement export activities abroad to increase company profits and overcome oversupplied cement in Indonesia. The limitation in this study is the limited research period using historical data for 5 years in 2017-2021. In this study to analyze profit forecasting using a simple linear regression method. So, the next researcher should analyze profit forecasting with other methods and increase the number of periods in order to get more accurate and reliable results. Based on the feedback of users the next researcher should display net income, operating income, gross profit, and revenue. This is to increase the usefulness of information in decision making.

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