



Performance Measurement System Design with Balanced Scorecard Method at PT. Z

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Abstract: *This study aims to determine the performance of PT. Z with a Balanced Scorecard approach for the 2016-2020 period based on four perspectives, namely Finance, Customers, Internal Business Processes, and Learning and Growth. The results of this study provide evidence that the Financial Perspective can be said to have been well characterized by an increase in the amount of income, total net income, total equity, and total assets owned. Judging from the financial ratios used (ROE, ROA, and BOPO), it shows that in general there is also an increase. From the customer perspective, consumers are quite satisfied with the service so far in terms of customer satisfaction attributes, interest in innovation changes, and company image. Overall the performance of PT. Z from an Internal Business Process Perspective on the innovation side is very bad with no product innovation being carried out from 1990-present. Meanwhile, in terms of operating processes, the company has implemented process time efficiency well. From the perspective of training and development, based on the results of interviews with company leaders, the company has never conducted training and development for employees. Judging from the job satisfaction indicator in the learning and growth perspective, the average overall employee answer is 3.74, this means that the employees of PT. Z felt quite satisfied while working at PT. Pabrik Es Siantar.*

Keywords: *performance measurement; balanced scorecard; system design*

I. Introduction

The rapid growth of the food and beverage industry in North Sumatra requires companies to create excellence and success in order to survive in the competition. In a situation like this requires new capabilities that must be owned by manufacturing or service companies. Production growth of the Large and Medium Manufacturing Industries in North Sumatra Province in the third quarter of 2019 increased by 1.26 percent compared to the same period in 2018. Especially in the beverage industry by 33.86 percent. (BPS, 2019).

PT. Z is one of the companies engaged in manufacturing, especially the soft drink industry in North Sumatra. One of the problems faced by the company today is that there has never been a learning/training process provided by the company to its employees. Another fact is also PT. Z is still a lot behind its similar competitors in North Sumatra. Therefore, in selling its products, the Company competes with the emerging soft drink companies. In order to compete with competitors, the Company must understand the current conditions in order to formulate the right strategy to achieve its goals. The achievement of this goal can be seen from the overall performance of the company's organization, both financial and non-financial aspects. However, so far, companies in measuring performance are only based on financial aspects. Performance appraisal from non-financial aspects has never been done. Improving financial performance is prioritized and becomes management's attention. Non-financial performance such as productivity satisfaction, and employee performance in producing products and services that can meet consumer desires have not been taken into account.

Measurements that only have financial benchmarks have weaknesses because of their inability to measure the performance of intangible assets. Kaplan and Norton (2000) assert that the performance of companies that only rely on a financial perspective is not able to fully guide companies in a better direction so that in the era of reform and globalization these financial benchmarks are considered no longer adequate to meet information for the survival of the company.

Given these limitations, to overcome the problem of the weakness of the company's performance measurement system focusing on financial aspects and ignoring non-financial performance, such as customer satisfaction, employee productivity and so on, a performance model was created that not only includes financial but also non-financial, namely the concept of Balanced Scorecard (BSC).

Simply put, the Balanced Scorecard is a scorecard that is used to measure performance by paying attention to the balance between the financial and non-financial sides, between the short and long term and involving internal and external factors. From the results of studies and research conducted, it is concluded that to measure future performance, a comprehensive measurement is needed that includes 4 perspectives, namely: finance, customer, business/internal processes, and learning-growth. Based on this balanced scorecard concept, financial performance is actually a result or result of non-financial performance (customers, internal business processes, and learning).

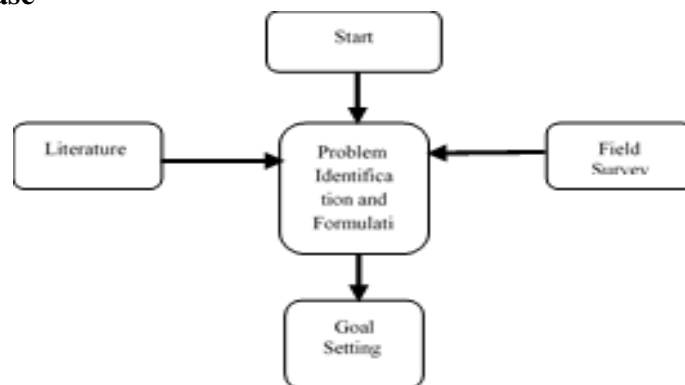
Furthermore, the Balanced scorecard concept can be used as a smart and innovative breakthrough that helps companies to excel and be creative in improving management performance. Realizing the importance of implementing an effective Balanced Scorecard concept in accordance with the management needs of companies engaged in manufacturing.

Therefore, this research will take the title "Design of Performance Measurement System with Balanced Scorecard Method at PT. Z". Based on the problem formulation that has been written previously, the objectives of this research are as follows: 1. Identifying the existing internal and external conditions of the company. 2. Identify strategies that are appropriate to the company's existing conditions by considering 4 perspectives in the balanced scorecard approach.

Based on the research background that has been described, it can be concluded that the formulation of the problem that forms the basis of the research is "How to design performance measurement using the Balanced Scorecard method as an effort to improve performance at PT. Z?"

II. Research Methods

2.1 Research Phase



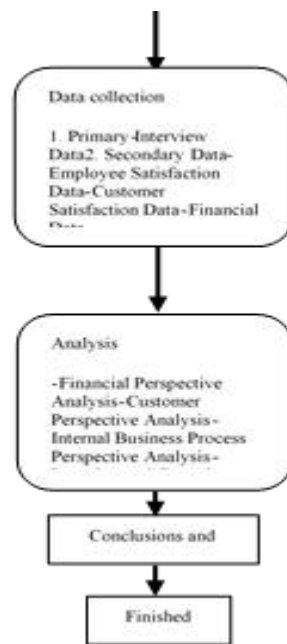


Figure 1. Research Flowchart

2.2 Types and Sources of Data

Sources of data used are secondary data obtained through the internet, questionnaires and records of company documents and primary data obtained through interviews. This research is a quantitative research because there is a survey method. Surveys are conducted when researchers want to know trends, behaviours, or opinions of a population by examining a sample of the target population. Data was obtained through the distribution of questionnaires filled out by respondents or structured interviews. The results are then processed and generalized to the target population.

2.3 Data Collection Techniques

Data collection techniques in this study are:

1. The interview method is a data collection technique carried out by conducting interviews directly with the management of PT. Z
2. Questionnaire method is a data collection technique that is carried out by asking questions about a problem or field to be studied, with the aim of obtaining information that is relevant to the research objectives.
3. Literature Study Collecting data by studying literature books, reports and research results that have been carried out previously related to research problems.

2.4 Data Processing Techniques

a. Validity

Validity is a measure that shows the levels of validity or validity of an instrument. A valid or valid instrument has high validity. On the other hand, an instrument that is less valid means it has low validity (Arikunto, 2010).

b. Reliability

In this study, the reliability test was carried out using the Cronbach Alpha Formula technique. According to Suharsimi Arikunto (2010), the Alpha formula is used to find the reliability of an instrument whose score is not 1 or 0, for example a questionnaire or a question form description.

III. Discussion

3.1 Validity and Reliability Test of Questionnaire

Table 1. Consumer Validity Test

No	Question	r Count	r Table	Validity
Consumer Satisfaction				
1	In our opinion, so far PT. Z give satisfactory service as expected.	0.839	0.279	valid
2	We feel the price rate given by PT. Z according to the product offered.	0.866	0.279	valid
3	We rarely and never even complain about the goods we buy at PT. Z	0.731	0.279	valid
4	PT. Z always responds to our complaints quickly and appropriately.	0.814	0.279	valid
Interest Change Innovation				
5	We are satisfied with the goods/services offered by PT. Z	0.874	0.279	valid
6	In our opinion PT. Z always provides information on the best products/services.	0.831	0.279	valid
Company Image				
7	We always have a great experience pleasant in our interaction with PT. Z	0.892	0.279	valid
8	Overall PT. Ice Factory is a company that has a good and positive image for its customers.	0.881	0.279	valid

Conclusion: Because $r_{count} > r_{table}$, H_0 is accepted, meaning that the questionnaire is a valid instrument and can be used in data collection.

Table 2. Consumer Reliability Test

No	Question	r Count	r Table	Reliability
Consumer Satisfaction				
1	In our opinion, so far PT. Z give satisfactory service as expected.	0.933	0.70	<i>reliable</i>
2	We feel the price rate given by PT. Z according to the product offered.	0.931	0.70	<i>reliable</i>
3	We rarely and never even complain about the goods we buy at PT. Z	0.941	0.70	<i>reliable</i>
4	PT. Z always responds to our complaints quickly and appropriately.	0.935	0.70	<i>reliable</i>
Interest Change Innovation				
5	We are satisfied with the goods/services offered by PT. Z	0.930	0.70	<i>reliable</i>
6	In our opinion PT. Z always provides information on the best products/services.	0.934	0.70	<i>reliable</i>
Company Image				
7	We always have a great experience pleasant in our interaction with PT. Z	0.928	0.70	<i>reliable</i>
8	Overall PT. Ice Factory is a company that has a good and positive image for its customers.	0.929	0.70	<i>reliable</i>

Conclusion: Because $r_{count} > r_{table}$, H_0 is accepted, meaning that the questionnaire is a reliable instrument and can be used in data collection.

Table 3. Employee Validity Test

No	Question	r Count	r Table	Validity
1	The amount of salary I receive is commensurate	0.609	0.339	valid

	with the physical sacrifice and time I give.			
2	The amount of salary I receive allows me to live decently with my family.	0.748	0.339	valid
3	The amount of salary I received was in accordance with the regulations and salary and wages.	0.541	0.339	valid
4	I think the amount of the holiday allowance	0.619	0.339	valid
5	given by PT. Z is decent enough and adequate and fits my needs.	0.473	0.339	valid
6	Leave given to me every year	0.758	0.339	valid
7	Where I work, I always give attention and appreciation when I make a meaningful contribution to the progress of the company.	0.775	0.339	valid
8	I have always been involved in important decision-making processes within the company.	0.499	0.339	valid
9	I think PT. Z always pays attention to raises.	0.507	0.339	valid
10	Overall, I am very satisfied with	0.645	0.339	valid

Conclusion: Because $r_{count} > r_{table}$, H_0 is accepted, meaning that the questionnaire is a valid instrument and can be used in data collection.

Table 4. Employee Reliability Test

No	Question	r Count	r Table	Reliability
1	The amount of salary I receive is commensurate with the physical sacrifice and time I give.	0.783	0.70	<i>reliable</i>

2	The amount of salary I receive allows me to live decently with my family.	0.762	0.70	<i>reliable</i>
3	The amount of salary I received was in accordance with the regulations and salary and wages.	0.794	0.70	<i>reliable</i>
4	I think the amount of the holiday allowance	0.782	0.70	<i>reliable</i>
5	given by PT. Z is decent enough and adequate and fits my needs.	0.801	0.70	<i>reliable</i>
6	Leave given to me every year	0.762	0.70	<i>reliable</i>
7	Where I work, I always give attention and appreciation when I make a meaningful contribution to the progress of the company.	0.760	0.70	<i>reliable</i>
8	I have always been involved in important decision-making processes within the company.	0.813	0.70	<i>reliable</i>
9	I think PT. Z always pays attention to raises.	0.796	0.70	<i>reliable</i>
10	Overall, I am very satisfied with	0.776	0.70	<i>reliable</i>

Conclusion: Because $r_{count} > r_{table}$, H_0 is accepted, meaning that the questionnaire is a reliable instrument and can be used in data collection.

3.2 Performance of PT. Z

a. Financial Perspective

Financial performance measures provide an indication of whether the company's strategy that has been determined, its implementation and implementation contributes or not to the increase in company profits. Performance measurement in this perspective relates to profitability (operating profit and gross margin) as measured by Return On

Equity (ROE), Return On Assets (ROA), and operating costs obtained from the financial statements of PT. Z. Table Below is presented the financial data of PT. Z which includes net income, equity, total assets, operating expenses, and operating income in the last five years.

Table 5. Financial Data of PT. Z (In Million Rupiah)

KET.	2016	2017	2018	2019	2020
Net profit	155.08	157.15	173.80	182.48	204.82
Equity	608.85	616.01	636.19	652.55	683.40
Total assets	2166.50	2395.17	2425.54	2475,48	2600.84
Operating Expenses	732.49	791.06	759.02	773.08	766.51
Operating Income	628.65	691.21	676.71	793.93	887,72

Source: PT. Z., 2021

Based on the financial data above, we can see the financial performance of PT. Z for 2016 to 2020. The financial performance seen in this study is the ratio of ROE (Return On Equity), ROA (Return On Assets), and BOPO (Operating Costs compared to Operating Income). Measurement of financial performance using these ratios is expected to provide a good understanding of the condition of the company to all parties related to PT. Z. The table below presents the condition of these financial ratios.

Table 6. Financial Ratios of PT. Ice Factory 2016-2020

Information	2016	2017	2018	2019	2020	Average
ROE	0.254710	0.255109	0.273189	0.279641	0.299707	0.272471
ROA	0.071581	0.065611	0.071654	0.073715	0.078751	0.072263
BOPO	1.165179	1.144457	1.121633	0.973738	0.863459	1.053693

Table 7. Financial Ratios of PT. Ice Factory 2016-2020
(In Percentage)

Information	2016	2017	2018	2019	2020	Average
ROE	25.47	25.51	27.32	27.96	29.97	27.25
ROA	7.16	6.56	7.17	7.37	7.88	7.23
BOPO	116.52	114.45	112.16	97.37	86.35	105.37

Based on the table above, it appears that the financial ratios of PT. Z from 2016 to 2020 experienced ups and downs. The ROE ratio which has increased over the past five years produces an average of 27.25%. This indicates that PT. Z is able to generate an average profit of 27.25% compared to the amount of equity owned. With ROE that continues to increase, it shows that the amount of net profit obtained has continued to improve during the five years. The ROE ratio which has increased is caused by the total value of the company's equity which has also continued to rise during the five years. But in terms of numbers, PT. Z has been able to achieve a steadily increasing net profit, as well as an increasing amount of equity.

ROA Ratio of PT. Z generally increased during the study period. ROA only decreased in 2017 but was not significant, and rose again in 2018. During these five years, the average ROA ratio was 07.23%. This indicates that PT. Z is able to generate an average profit of 07.23% compared to the number of assets owned. Although ROA has fluctuated, the amount of profit earned during that period continues to rise. Table 6 shows

that the amount of net profit earned continued to increase during the five years. The ROA ratio that experienced fluctuations was caused by the number of company assets that also continued to increase during the five years, only the increase in net income and the increase in equity were not proportional, causing the ROA ratio to fluctuate. But in terms of quantity, PT.

BOPO ratio of PT. Z generally decreased during the study period. During these five years, the average BOPO ratio was 105.37%. This indicates that PT. Z is able to perform operational cost efficiency and an average of five years only costs 105.37% compared to the total revenue generated. Judging from the amount of revenue generated in Table 6, in general, it continued to increase during the year of observation, only in 2018 it decreased from 691.21 million to 676.71 million, but increased again to 793.93 million in 2019, and continues to rise in 2019. year 2020.

In general, the financial performance of PT. Z as seen from Profit, Equity, Assets, Costs, and Income, in general during the five years of observation (2016 to 2020) is good. The amount of Profit generated, the amount of Equity and the number of Assets owned and the amount of income generated continues to increase. In terms of the use of operational costs proportionally decreased seen from the comparison between the amount of income generated with the total operating costs incurred.

b. Customer Perspective

The customer's perspective is the perception of customers in this case is the consumer of PT. Z regarding the company's performance where the company determines in advance the determination of the market segment that will be the target or target and identifies the wants and needs of consumers who are in that segment, so that the benchmark can be more focused. The benchmark for customer/consumer performance is Customer Statistics (customer satisfaction level). Customer Statistics measures how far consumers are satisfied with the company (both regarding service, image and reputation) which includes customer satisfaction, interest in innovation changes, and company image.

Judging from the customer satisfaction provided by PT. Z, based on the respondents' answers in the table, it appears that on average the respondents gave a fairly good assessment. Of the four statements used in measuring customer satisfaction, the average consumer answer is 3.72. This indicates that consumers of PT. Z have experienced quite well the various service processes so far and they feel happy and comfortable being consumers of PT. Z in terms of various things, and a given product.

Table 8. Customer Satisfaction

No.	Question	Average
1	In our opinion, so far PT. Z give satisfactory service as expected.	3.78
2	We feel that the rates given by PT. Z according to the product offered.	3.78
3	We rarely and never even complain about the goods we buy at PT. Z	3.96

4	PT. Z always responds to our complaints quickly and appropriately.	3.34
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Overall Average 3.72

Judging from all the items used in measuring customer satisfaction indicators, all the statements used got quite good answers from respondents with an average value of all above 3.72. This indicates that PT. Z has provided satisfactory service as expected, has provided tariffs that are in accordance with the products offered, has heard complaints and customer responses, and also many other things given by PT. Z to consumers.

Table 9. Interest in Innovation Change

No.	Question	Average
1	We are satisfied with the goods/services offered by PT. Z	3.74
2	In our opinion PT. Z always provides information on the best products/services.	3.64
Overall Average		3.69

The table above presents consumer answers related to the interest in changing innovation of PT. Z in the eyes of consumers which includes satisfaction about the goods and services offered and the best product information provided. The results of consumer answers indicate that the average is 3.69, which indicates that consumers are quite satisfied with the products of PT. Z so that companies must continue to innovate and develop their products, both small and large, to continue to retain their customers.

Table 10. Company Image

No.	Question	Average
1	We always have a great experience pleasant in our interaction with PT. Z	3.48
2	Overall PT. Ice Factory is a company that has a good and positive image for its customers.	3.86
Overall Average		3.67

The table above presents consumer answers regarding the image of PT. Z in the eyes of consumers which includes experience in interaction with the company, and the image of PT. Z in the eyes of consumers. The results of consumer answers indicate that the average

is 3.67, which indicates that consumers trust PT. Z with its image so far as a company that is quite safe, comfortable, friendly, and of good quality. Image of PT. Z in the eyes of consumers is quite good so that makes PT. Z as a company that is quite attractive to the public.

Overall the performance of PT. Z from the perspective of customers in this case is a pretty good customer. The three indicators used in measuring this perspective all resulted in a fairly high respondent's answer score (above all 3). This indicates that PT. Z has managed to achieve a fairly good performance in managing consumers so that consumers feel happy and believe in being consumers of PT. Z.

3.3 Internal Business Process Perspective

To see the performance of internal business processes, this study uses two parts of measurement, namely Innovation and Operations. The innovation process is divided into two, namely identifying market needs, and creating services to meet market needs. These two things are very important and cannot be separated. This perspective is measured by conducting interviews with leaders PT. Z which includes the company's innovations. Furthermore, the operation process is seen in process efficiency, consistency and timeliness of services provided to consumers. Measurement of the operation process consists of processing time, inspection time, transfer time and waiting time. This indicator by looking at the time efficiency carried out by PT. Z is by looking at the ratio of Manufacturing Cycle Efficiency/MCE.

a. Innovation Process

Innovation is an activity related to the identification of customer needs and the company's product development efforts. In order to meet the needs of the community for products. PT. Z provides products. In fact, changes in the flow of times or globalization have led to the production of beverages from PT. Z decreases and the type of taste of the drink produced also decreases. Initially there were eight drinks produced but before 1990 only two drinks were produced namely sarsaparilla and sparkling water. Reduced beverage production of PT. One of the reasons is the entry of foreign drinks which are in great demand by the public. However, in 1990-present, the rhinoceros stamp drink produced by PT. Z remains the prima donna for residents of Pematang Siantar, Medan, South Tapanuli and areas around North Sumatra, especially for sarsaparilla drinks.

Overall the performance of PT. Z in terms of innovation is very bad with no product innovation carried out from 1990-present. Therefore, things that need to be done by PT. Z is to create an innovative product by leveraging its strengths, so that existing products offer more choices to consumers. In addition, PT. Z must also pay attention to the quality of the products offered and maintain a distinctive taste so that consumers can more easily remember products based on existing characteristics. It should be noted that by developing a product, PT. Z must first pay attention to the needs of the existing market so that the products offered can meet the needs and wants of the market.

b. Operation Process

The operation process focuses more on process efficiency, consistency and timeliness of products provided to consumers. Measurement of the operation process consists of processing time, inspection time, transfer time and waiting time. To see this, the time efficiency used by PT. Z is by looking at the ratio of Manufacturing Cycle Efficiency/MCE with the following formula:

The time standard set by PT. Z in processing the product in the form of a rhino stamped drink is 30 minutes. Based on the observations of researchers during this research,

it was found that the average time needed to make a product which includes processing time is 9 minutes, inspection and transfer time is 10 minutes, and waiting time for consumers is 10 minutes. Based on these data, it can be calculated the level of MCE at PT. Z is: $MCE = 1.03$. Based on the MCE time above 1 (but still close to 1), then PT. Z has performed time efficiency well, where the actual time used to process the product is below the standard time set, but still in close range. The default time set is 30 minutes, $30/(9+10+10) = \frac{30}{9+10+10}$

$$MCE = \frac{\text{Standar Waktu Proses}}{w.\text{pemrosesan} + w.\text{inspeksi dan pemindahan} + w.\text{menunggu}}$$

Viewed from the side of the internal business processes in the operation process, PT. Z has implemented process time efficiency well. Product processing time which is used as a measure of business processes in this study shows that PT Factory Es Siantar has been able to provide services to consumers quickly and well. On the other hand, the results of the respondents' answers in (Table 4.6) can also be used which results in PT. Z always responds to consumer complaints quickly and precisely. The results of the average consumer answers said that PT. Z has processed transactions accurately, quickly, and safely.

Overall Internal Business Processes of PT. Z is on the innovation side very bad for lack of innovation and on the operations side it is good.

3.4 Learning and Growth Perspective

Learning and growth perspective is a perspective that measures company performance in terms of employees, information systems and company policies. In this perspective, the measure is the ability of employees and job satisfaction. Based on the results of interviews with the leadership of PT. Z that the company has never conducted any training and development for the employees of PT. Z. Whereas training and development of employees is very important and can affect the performance of company employees.

Therefore, things that need to be done by PT. Z is to start doing training and development for employees in order to improve the ability of employees of PT. Z. Because training and development for employees is one of the most important things to pay attention to and has a big impact on the progress of a company.

Table 11. Job Satisfaction

No.	Question	Average
1	The amount of salary I receive is commensurate with the physical sacrifice and time I give.	3.88
2	The amount of salary I receive allows me to live decently with my family.	3.44
3	The amount of salary I received was in accordance with the regulations and salary and wages.	3.74
4	I think the amount of the holiday allowance given by PT. Z is decent enough and adequate and fits my needs.	3.56

5	In my opinion, the amount of work accident insurance applied by PT. Z is in accordance with the work risks that I face.	3.91
6	I think PT. Z is always given opportunities for employees whose work results are satisfactory for the next career level.	3.76
7	Where I work, I always give attention and appreciation when I make a meaningful contribution to the progress of the company.	3.44
8	I have always been involved in important decision-making processes within the company.	3.74
9	I think PT. Z always pays attention to raises.	3.94
10	Overall, I am very satisfied with PT. Z where I work.	4.03
Overall Average		3.74

Judging from the job satisfaction indicators in the learning and growth perspective based on the table above, the average overall employee answers are at 3.74, this means that the employees of PT. Z felt quite satisfied while working at PT. Z. In general, employees are satisfied with their work, which can be seen from the system of salary increases, benefits, leave, tranquility and comfort in the working environment, and the feeling of being at work.

Judging from the statement items used, all items resulted in respondents' answers in numbers above 3. This indicates that the employees of PT. Z were quite satisfied with all the items measured. These results indicate that PT. Z has satisfied its employees enough, but in the management and development of employees it is still very bad because there has never been any training and development that has been able to improve their work abilities. PT. The Siantar Ice Factory is still improving performance from a learning and growth perspective so that it is able to make PT. Z is more in demand by the public.

IV. Conclusion

In general, the Financial Performance of PT. Z as seen from Profit, Equity, Assets, Costs, and Income, in general during the five years of observation (2016 to 2020) is good. The amount of Profit generated, the amount of Equity and the number of Assets owned as well as the amount of income generated continues to increase. In terms of the use of operational costs proportionally decreased seen from the comparison between the amount of revenue generated with the total operating costs incurred.

Overall the performance of PT. Z from the perspective of customers in this case is a pretty good customer. The three indicators used in measuring this perspective all resulted in a fairly high respondent's answer score (above all 3). This indicates that PT. Z has managed to achieve a fairly good performance in managing consumers so that consumers feel happy and believe in being consumers of PT. Z.

Overall the performance of PT. Z from the Internal Business Process Perspective on the innovation side is very bad with no product innovation being carried out from 1990-present. Therefore, things that need to be done by PT. Z is to create an innovative product by utilizing its strengths, so that existing products offer more choices to consumers. Meanwhile, in terms of internal business processes in the operating process, PT. Z has implemented process time efficiency well. Product processing time which is used as a measure of business processes in this study shows that PT Factory Es Siantar has been able

to provide services to consumers quickly and well.

From the Perspective of Training and Development based on the results of interviews with the leadership of PT. Z that the company has never conducted any training and development for the employees of PT. Z. Whereas training and development of employees is very important and can affect the performance of company employees. Therefore, things that need to be done by PT. Z is to start conducting training and development for employees in order to improve employee abilities. Meanwhile, judging from the job satisfaction indicator on the learning and growth perspective, the average overall employee answer is 3.74, this means that the employees of PT. Z felt quite satisfied while working at PT. Z.

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