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Strategy planning for optimization of production facilities in manufacturing companies

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ABSTRACT

PT. XYZ is a steel manufacturing industry that operates in the field of Engine and Valve spare parts with Investment Casting production. The number of product requests that fluctuates every year causes PT. XYZ needs to design optimization of production facilities to meet demand. However, with the investment value required being quite high, there is a need for analysis related to optimizing production facilities for the long term. This research aims to determine the strategic planning of operations and business planning needed to increase production capacity and to determine the corrective steps taken to increase production capacity. This research uses a long-term planning method, namely strategic planning, where with Strategic Planning you can plan organizational goals in detail regarding determining strategies, policies, and strategic programs needed to ensure that strategies and policies have been implemented. Apart from strategic planning, investment value analysis is carried out using Return of Investment (ROI) to measure the level of profit that the company invests in capital. Strategic planning begins by looking at the strengths and weaknesses of the company's current condition using the SWOT method, then continues with operational and business planning, quality policy and planning, quality costs, as well as monitoring and evaluation. The reengineering points in this research are related to strategic planning on optimizing production capacity and investment. Previously 50% of production capacity was planned to be carried out by vendors, whereas after reengineering the focus was on 90% of production capacity provided by internal

Keywords: Strategic planning; optimization; production facilities

1. INTRODUCTION

One of the goals of establishing a company is so that it can operate well and consistently, meaning it can continue to operate, grow, enjoy profits, and have a long life [1]. The longer the life of a company, the better. In practice, many companies are hundreds of years old, but some companies only last a matter of years [2].

To run a business, good planning is needed, and strategic planning can provide clear direction to the company. Strategic planning is a step to translate mission, vision, goals, basic beliefs, basic values, and strategy into comprehensive and coherent strategic targets [3]. In strategic planning, each strategic target is then determined by the measurement of achievement and targets that will be realized within a certain period in the future. The existence of strategic planning will help the company in directing its business and evaluating the business. The implementation of strategic planning in the company is expected to increase the company's competitive advantage. Paroli [4] say that competitive advantage is a situation where a company can create a good defensive position over its competitors. Sihombing [5] researched on the relationship between strategic planning and company competitive advantage at banks in Jordan. The results of the research conducted show that the strategic planning carried out has



a positive and significant relationship with competitive advantage. The better strategic planning is carried out, the better the company will have a competitive advantage.

It is hoped that the competitive advantage possessed by this company will ultimately be able to improve the company's performance. Paroli [4] says that company performance refers to how well the company can achieve its market goals and financial goals. Good strategic planning will have an impact on the company's competitive advantage, which will ultimately create a competitive advantage.

Nowadays, industrial development is growing very rapidly [6]. One of them occurred in the development of the foundry industry. Foundry has become a very important industry in Indonesia. It is recorded that around 70% of manufactured products are made using a metal casting process, such as in the manufacture of automotive components, electronics, heavy equipment, and others. Many factors have caused the casting process to develop very rapidly, these factors include cheap production costs, a simple process, the ability to produce products with complex geometries, and a fairly wide product size interval [7].

PT XYZ is a company that has several products whose specifications are determined by customers. So the production process varies and each product has a different production process flow, but almost uses the same machine. In general, the machining process is carried out using a manual Lathe, CNC Lathe, and CNC Milling machines and some products also go through a welding process. However, due to high product variance and the job order demand system, production capacity becomes unstable, sometimes high and sometimes low. Apart from that, there are also products whose demand is sustainable and are processed with the same machine. So this causes overlapping needs. However, a dilemmatic condition also occurs due to job orders whose demand is uncertain and the production process is different for each order. It is felt that there is a need for a change in policy direction from management in terms of providing production facilities. The capacity requirements in hours per month can be seen in Table 1.

Table 1. Production capacity requirements per month 2021-2022 (hours per machine)

Machine	Okt	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Agu	Sep
Manual Lathe	2112	1600	1500	2400	2400	2640	1900	2200	1700	2300	2100	2300
CNC Lathe	1700	1572	1802	1420	1522	1522	1837	1520	1432	1112	1345	1214
CNC Milling	973	872	1056	972	1120	1120	1002	1345	887	965	1102	772
Drill	600	702	512	823	772	903	412	612	513	702	332	400
Balancing	232	201	109	312	332	201	256	192	172	230	250	228
Polishing	2970	3000	2342	2568	1900	2870	4132	3216	2501	2212	2831	2772
Welding	2143	2203	796	883	992	1027	1234	2143	2206	1970	2300	2112

Table 1 can be seen that there is instability in capacity requirements for each machine every month. And this continues to happen on an ongoing basis, plus the significant sales growth will further worsen this situation. The large number of requests for new goods will also have an increasingly influential effect. Meanwhile, if we look at capacity availability (Table 2). Available production capacity is not yet in line with demand. This results in a capacity gap. This problem needs to be corrected to obtain appropriate capacity

Table 2. Availability of production capacity per month 2021-2022 (hours per machine)

Machine	Okt	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Agu	Sep
Manual Lathe	1450	1595	1595	1523	1305	1523	1378	1305	1523	1523	1450	1450
CNC Lathe	1305	1436	1436	1370	1175	1370	1240	1175	1370	1370	1305	1305
CNC Milling	870	957	957	914	783	914	827	783	914	914	870	870
Drill	580	638	638	609	522	609	551	522	609	609	580	580
Balancing	290	319	319	305	261	305	276	261	305	305	290	290
Polishing	2320	2552	2552	2436	2088	2436	2204	2088	2436	2436	2320	2320
Welding	870	957	957	914	783	914	827	783	914	914	870	870

The difference between capacity and demand creates variance. There is a variance or difference between capacity requirements and availability, the data of which can be seen in Table 3. This variance is caused by production capacity not being able to meet production demand

Table 3. Difference in need and availability of production capacity per Month 2021-2022 (hours per Machine)

Machine	Okt	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Agu	Sep
Manual Lathe	-662	-5	95	-878	-1095	-1118	-523	-895	-178	-778	-650	-850
CNC Lathe	-395	-137	-367	-50	-498	-152	-597	-346	258	258	-40	91
CNC Milling	-103	85	-99	-59	-457	-207	-176	-562	-52	-52	-232	98
Drill	-20	-64	126	-214	-250	-294	139	-90	-93	-93	248	180
Balancing	58	118	210	-8	-71	104	20	69	75	75	40	62
Polishing	-650	-448	210	-132	188	-434	-1928	-1128	224	224	-511	-452
Welding	-1273	-1246	161	31	-209	-114	-408	-1360	-1057	-1057	-1430	-1242

Based on conditions like this, strategic planning is needed to be able to deal with current problems. This research aims to determine the strategic planning of operations and business planning needed to increase production capacity and to determine the corrective steps taken to increase production capacity.

2. METHOD

There are several elements needed in making strategic planning. The series of plans that can be adopted according to Edward Sallis are as follows Figure 1 [8].

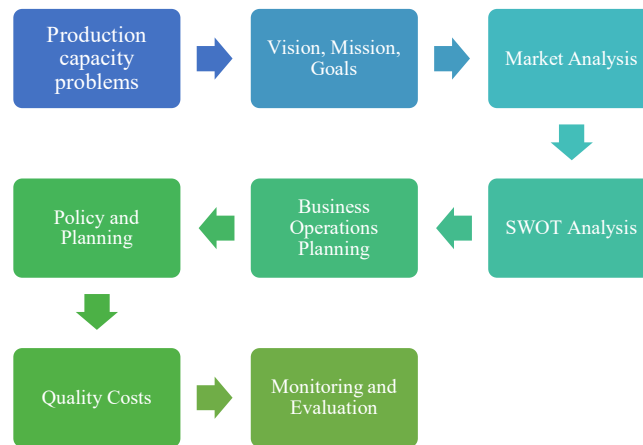


Figure 1. Research framework

Based on the strategic planning method used in this research, the main target or objective is to find out and find out how strategic planning is carried out by PT XYZ. Therefore, the results of this investigation are expected to be able to contribute to PT XYZ to optimize production capacity under conditions of fluctuating capacity demand. The series of plans that can be adopted according to Edward Sallis are as follows [8].

a. Vision, mission, goals

Some organizations distinguish between vision, mission, values, and goals to clarifying what type of institution they hope to become and clarify the direction they want to go.

b. Market analysis/research

Market research is a key way to listen to customers and potential customers. The phrase perceived quality will not mean anything without market research. Market research can be used to determine quality issues from the customer's perspective.

c. PEST analysis and SWOT analysis

PEST is an analysis or strategic planning tool used to evaluate the impact of Political, Economic, Social and Technological factors on a project. Basically, PEST analysis can help us determine how Political, Economic, Social and Technological factors will affect business performance and activities in the long term. PEST Analysis It is often used in conjunction with other analytical business tools

such as SWOT analysis and Porter's Five Forces to provide a clear understanding of a situation and the associated internal and external factors [9]–[12].

d. Operations and business plans

Business and operations plans are detailed short-term plans, usually one year, to achieve certain aspects of a long-term institutional strategy [13].

e. Quality policy and quality plan

Quality policy is a statement of commitment conveyed by the institution. The next stage is developing a quality plan. Furthermore, the quality plan must have objectives related to quality and the methods used to translate management commitment into performance. The quality plan must detail the improvement projects that will be implemented by the educational institution.

f. Quality costs and benefits

Quality financing is a benchmark for the benefits of improving quality. Every quality improvement project should be approached with the expectation that it will provide a return that will cover the costs. The true cost of quality is eliminating everything other than quality [14], [15].

The goal of quality financing is to eliminate costs.

g. Monitoring/supervision and evaluation

Quality systems always require a series of feedback loops. A feedback mechanism must exist in the quality system.

h. ROI analysis

To measure the level of profit that a company invests in capital, it is necessary to measure ROI (Return of Investment), this can show whether the investment made will be profitable or vice versa, the formula is as follows:

$$\text{ROI} = \text{income}/\text{value of your investment}$$

3. RESULT AND DISCUSSION

In strategic planning to increase production capacity optimization by referring to strategic planning steps including determining Vision and Mission, Market Analysis, SWOT Analysis, Operational and Business Planning, Policy and Planning, and Quality Costs which we measure with ROI and continue with Monitoring and Evaluation.

Vision and mission

In this research, the vision and mission refer to the vision and mission of the existing company, where this research was also carried out to support and implement the vision and mission of the company that has been built at this time.

a. Vision

To become a highly competitive company in the global market that also makes a positive contribution to the welfare of all stakeholders

b. Mission

Our mission is to create value and provide solutions for our customers. Excellence in quality is our commitment along with proactive support and service for our customers. we believe in dynamic growth and continue to innovate to become a leader in the market.

Market analysis

Market analysis is carried out by referring to several aspects, including:

a. Target market

Product marketing currently covers local markets and global markets, for the sub-OEM investment casting market which is the focus of this research, including Table 4.

Table 4. PT XYZ OEM SBU Market Share

No	Customer	Market
1	Gas and Oil Companies	Local

No	Customer	Market
2	Power Generation Company	Local
3	Weapons Manufacturer	Local
4	Engine Manufacturer	Global
5	Gas and Oil Companies	Global
6	Oil Company	Global
7	Engine Manufacturer	Global

Based on the data above, it can be seen that the market share is quite broad and is targeted at the global market, covering all parts of the world, namely Europe and Africa

b. Market needs

Judging from the history of requests received for Stainless Steel products at the OEM SBU, as shown in Figure 2.s

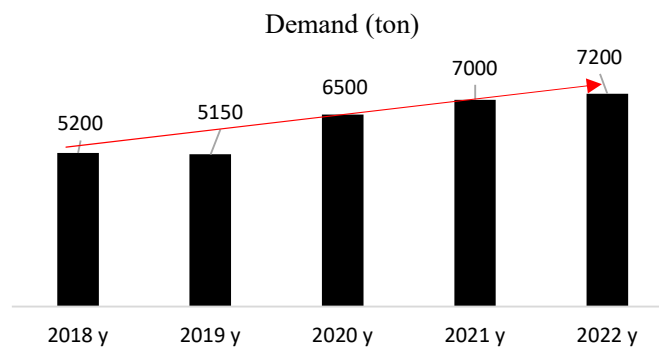


Figure 2. PT XYZ OEM SBU market demand

Figure 2, the increase in demand every year continues to grow, reaching more than 10% per year. Therefore, market prospects are expected to continue to increase every year.

c. Competitor analysis

There are still relatively few players in the stainless-steel industry, in Indonesia there are only six companies involved in the Investment Casting sector, including Metinca Prima, Pelopor Teknologi, Stainless Steel Primavole, Peronii, Trieka and Zinith Allmart

PEST analysis and SWOT analysis

External and internal factors that are considered to have an influence on company and business activities are analyzed using the PEST and SWOT methods, both of which will provide an overview of external issues that will influence the strengths, weaknesses, threats and opportunities that can be taken into consideration when preparing strategic planning.

a. PEST analysis

PEST analysis is carried out to analyze and determine political, economic, social, and technological factors related to company activities. The main goal is to understand what external forces can influence the company's organization and find out the factors that can create opportunities or threats to the company. The following are results of the PEST analysis can be seen in Table 5.

Table 5. PEST analysis

Politic - Investment policies are simplified - Facing a political year	Economic - Inflation is quite stable for less than 3 years (>3%) - National and global economic growth
Social - Public awareness of mass transportation - Population growth - Environmental issues	Technology - Increased use of fast trains - The need for mass transportation is increasingly massive

b. SWOT analysis

SWOT Analysis is carried out to determine strengths and weaknesses as well as threats and opportunities. SWOT analysis is a strategic planning analysis used to monitor and evaluate the company's environment, both external and internal, for a business goal to be achieved. The following is a SWOT analysis for optimizing production capacity (Table 6).

Table 6. SWOT Analysis

Strengths	Weakness	Opportunities	Threats
Able to make products according to customer needs so that they are trusted by each other	High employee turnover	Market growth increases by 10% per year	Requests related to service quality, time, and costs
Strengths	Weakness	Opportunities	Threats
- Competitive products - adequate technology	- Production facilities do not use advanced technology - Lack of innovation in supporting tools	Technology investment development	- Global manufacturers are starting to expand with competitive prices and quality - Competitors use advanced technologies in production

Operations and business planning

PT XYZ is a company that produces stainless steel based on orders from consumers. In carrying out the production process, currently, the company has seven types of machines. The management's current production facilities are targeted to be able to meet a minimum of 50% of total capacity requirements based on customer demand. Meanwhile, 50% of capacity requirements are transferred to vendors. Based on the results of the PEST and SWOT analysis, reengineering of operations and business planning can be carried out as follows:

a. Capacity requirements analysis

To be able to determine good capacity planning, it is necessary to look at the deviation between availability and demand. The following are the capacity deviations that occur can be seen Table 7.

Table 7. Deviation between availability and capacity requirements

No	Machine	Amount	Average capacity shortage	Need for additional machines
1	Welding	3	-89	2.7
2	Manual Lathe	5	-43	2.1
3	Polishing	8	-18	1.5
4	CNC Milling	2	-16	0.3
5	CNC Lathe	3	-14	0.4
6	Drill	2	-3	0.1
7	Balancing	1	-23	-0,2

Table 7, the need for production capacity availability is quite high. Welding needs to reach 89% (2.7 machines) of current capacity, Manual Lathe 43% (2.1 machines) and Polishing 18% (1.5 machines).

b. Reengineering strategy formulation

The formulation of operations and business planning strategies refers to the company's vision and mission that have been established above. Strategy formulation is made by referring to the role of Porter's Generic Strategy as follows (Table 8)

Table 8. Strategy Formulation

Aspect	Business plan	Operational plan
Low cost	Competitive	- Reduce subcon costs - Make long-term investments

Differentiation	Create value and provide solutions for customers	- Increasing HR competency Able to create products according to customer needs supported by the best facilities
Focus	Shared commitment with proactive support	- Able to offer solutions to products that customers need - Quality and punctual service

Policy and planning

Based on the strategy formulation above, policy and planning reengineering can be carried out in [Table 9](#):

a. Policy reengineering

Policies related to the provision of facilities and production capacity which are targeted to meet 50% of total capacity requirements, to reduce subcontractor (vendor) costs have been changed to be able to meet 90% of total capacity requirements. By considering long-term investment and adding adequate and sophisticated production facilities to technological developments and customer needs.

b. Planning reengineering

To provide competitive and proactive services, it is necessary to invest in machines according to actual capacity requirements.

Table 9. Reengineering planning

Machine	Machine requirements	Plan
Welding	2.7 machine	Invest in a welding robot with a capacity equivalent to 3 manual welders with the best quality and accuracy of results. Estimated price 1 billion Development of HR competencies
Manual lathe	2.1 machine	Invest in a CNC lathe with a capacity equivalent to 3 manual lathes with the best quality and accuracy of results. Estimated price 1 billion
CNC lathe	0.4 machine	Development of HR competencies

Monitoring and evaluation

a. Monitoring

Monitoring is carried out to monitor and ensure the consistency and effectiveness of predetermined plans and strategies. Monitoring is carried out periodically and structured through a target which is translated in the form of a Key Performance Indicator (KPI). KPI achievements are monitored every month to detect early problems that cause quality targets not to be achieved and analysis is carried out.

b. Evaluation

Evaluations should be carried out periodically every quarter, semester, or year. In this evaluation, the determined targets and results are reviewed. Evaluation is usually carried out in a Management Review Meeting (RTM). Then evaluation of investment policies can be done by calculating the Return of Investment (RIO). The value generated from this investment is the loss of outsourcing (vendor) costs every month. Where the value of outsourcing every month is Rp. 400,000,000 per month. So the ROI calculation is as follows:

$$ROI = \text{Income} / \text{Investment Value}$$

$$RIO = 400,000,000 / 2,000,000,000 = 25\%$$

4. CONCLUSION

Strategic planning in operations and business planning is needed to increase the optimization of production capacity, namely by referring to the role of Porter's Generic Strategy, including increasing competitiveness by reducing process costs by minimizing subcontract costs, making long-term investments to support production, developing and training human resources for reducing labor costs (consultants, hire professional employees). Creating value and providing solutions for customers through the ability to create products according to customer needs supported by adequate facilities and

capacity through the ability to offer solutions to products needed by consumers and quality services, timeliness and product qualifications. Improvement steps taken to increase production capacity include Welding machines, and investment in Robotic Welding whose capacity is equivalent to 3 existing manual machines, with better accuracy and quality of results as well as developing human resources to support it. In Manual Lathe and CNC Lathe machines, CNC Lathe investment has a capacity equivalent to 3 manual lathe machines currently available, with better accuracy and quality of results and development of human resources to support it.

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