COMPETITIVE ANALYSIS AND STRATEGIC IMPROVEMENT OF POLYPROPYLENE POLYTAM PF-1000 IN INDONESIA

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Abstract. This research intends to assess the competing capabilities of Polytam PF-1000 with other products available in the market Indonesia and suggest alternative approaches to strengthen its market position. A mixed approach was conducted combining survey with 305 respondents and detailed interviews, then using Analytic Hierarchy Process (AHP) method. Multiple regression results suggest that the Demand Conditions variable is the most determinant in competitiveness ($\beta = 0.990$, $p < 0.05$), then Related and Supporting Industries ($\beta = 0.812$), Firm Strategy, Structure, and Rivalry ($\beta = 0.218$), and lastly Factor Conditions ($\beta = 0.159$). It elaborates the necessity of understanding the market, collaboration in the business industry, formulating business strategy, and resource allocation in enhancing competitiveness of Polytam PF-1000. Further AHP (analytical hierarchy process) analysis using 55 stakeholders managed to rank two other group's components and their weight: Factor Conditions was prioritized and received the most weight at 0.518, followed by Demand Conditions which was rated by 0.261. From the interviews, technological advancement, supply chain improvement, and expansion of market coverage formed the primary strategies. One of the angles of perspective that was surprising is that the consumers want a quicker response to their needs, while the internal stakeholders want investment in the needed resources and infrastructure. Along with regulatory changes and energy efficiency, these are new alternative strategies that were outside Porter's Diamond

Keywords: Competitiveness, Polytam PF-1000, Competitive Strategy, Porter's Diamond, AHP

I. INTRODUCTION

The petrochemical industry is one of the drivers of economic growth in Indonesia by providing the necessary inputs to various downstream industries such as plastic, packaging, automotive, and consumer goods. As elucidated by Presidential Regulation No. 109 of 2020, the Indonesian government is well aware of the prominence of this sector and, therefore, has put in place mechanisms for accelerating the development of strategic national projects such as the production of petrochemicals (Kemenperin, 2020). Because of the growing population and industrial activity, the domestic demand for polypropylene (PP) in Indonesia is increasing. In light of these factors, it is the intention of the government to increase local production and lessen reliance on foreign goods. However, only 43% of domestic demand is currently met through local supply, which means that imports are required to fill the void (BPS, 2023).

Because of its strength, flexibility, and chemical resistance, polypropylene (PP) has a wide scope of application. In the local market of PP products, Polytam PF-1000, manufactured by PT Pertamina Petrochemical Trading, is one of the major Polymers already utilized across various industries. However, Polytam PF-1000 is relatively at a significant competiton disadvantage in comparison to both import and local substitute products. Quality inconsistency, poor production volume, and ineffective SCM practices have all contributed to the inability of Polytam PF-1000 to achieve signffucant market growth. More recently competitive companies such as PT Chandra Asri Petrochemical (CAP) and PT Polytama Propindo have enjoyed a much more favorable position due to their sustained high levels of production output combined with pace of product innovation development resulting in cognitive advantage in the Indonesian market (Platts S&P global 2023)

Beyond the limits imposed on production, Polytam PF-1000 suffers from product quality issues. According to a report, the performance of Polytam PF-1000 is deficient in several areas such as adhesion to end films and static properties, while also having long settling times coupled with the appearance of black spots and yellowish resin color (PT Kilang Pertamina Internasional, 2023). It has also been demonstrated during field trials that the friction and blocking force properties of Polytam PF1000 are not as good as those of competitive products like HF10TQ from PT Chandra Asri Petrochemical. One of the specific features of polypropylene films is openability, which depicts the ease of peeling or opening the plastic with little effort. The measurements of friction and blocking forces suggest that Polytam PF-1000 is more resistant to these forces than leading brands, making the product less favorable to consumers (Research & Technology Innovation, 2023).

The thickness of Polytam PF-1000 defines its competitiveness. Performance metrics claim that its thickness

is 30 microns. However, major competitors such as HF10TQ and MASPLENE MAS5637 have a 10 and 12 microns respectively, which contributes to ductility and transparency of the products (Pertamina, 2023; Polytama, 2023). These weaknesses are accompanied by shifting customer preference because industries require polypropylene that possesses enhanced mechanical properties and is easier to process, especially in flexible packaging applications.

The previous research done on Indonesia's petrochemical industry focused on supply chain studies, market demand estimation, and government policies fostering industrial development. However, there is little information accompanying the competitive analysis of Polytam PF 1000 along with the strategies to enhance its market acceptance. The primary use of Michael Porter's Diamond Model of industrial competitiveness recognition has been around the Indonesian framework, but its application within the polypropylene industry has not been done extensively. Moreover, very few studies examined quantitative and qualitative methods of consumer preference as well as stakeholder impressions in the context of the petrochemical industry (Porter, 1990).

This research focuses on determining the competitive strengths and weaknesses of Polytam PF-100 in Indonesia's polyproplene industry. Moreover, this study aims to formulate recommendations that will improve the company's competitiveness using Porter's Diamond Model and the Analytic Hierarchy Process (AHP) to as the basis for identifying essential conditions for success in the market. This study adds value by focusing on the Indonesian context of the polyproplene industry, using Porter's Diamond Model as a base of understanding competitive international business. This model has not been previously applied within this context, thus making this research quite relevant. The study combines both quantitative and qualitative approaches. Surveys and regression analysis were employed as quantitative methods, while interviews with relevant stakeholders and AHP analysis were used qualitatively to formulate effective business strategies. The results enable the industry and Polytam PF-1000 in particular, as well as other manufacturers, legislators and supply chain practitioners to develop strategies to enhance market competitiveness for Polytam PF-1000. This research intends to establish a connection between the theoretical frameworks of competitiveness and practices within the sphere of business in Indonesia's petrochemical industry to enhance self-reliance and dominate the markets of Southeast Asia.

Porter's Diamond Model

Michael Porter's Diamond Model is a strategic framework that examines competitiveness factors on the global and industrial level. It was introduced in The Competitive Advantage of Nations (1990), published by Michael Porter. At variance with traditional models centered on comparative edge, this model centers around competitive edge through the identification of interrelated factors that promote industry growth. The four primary determinants include factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry.

Additionally, government policies and chance events influence the model's dynamics. Cho and Moon (2000) and Grant (1991) argue that the effectiveness of these parameters inputted determines the sustained competitiveness of the country or industry as a whole. The input parameters include infrastructure, human and technological capital as well as labor. In order to provide us with a high level of efficient and innovate solutions, a robust infrastructure as well as advanced technical capabilities and high quality human capital are needed (Lin, 2011; Sun et al., 2010; Vlados, 2019). Demand conditions define the internal market that enables firms to improve their products and innovate. In the competitive market, a strong and sophisticated domestic market is expected. Businesses gain from advanced domestic market as it facilitates the development of competitive products that meet her high market expectations. Proactive firms that undertake the initiative to understand consumer needs and preferences manage to attain long-term competitive success and dominance (Porter, 1990). Competitivity in industries, as in succeding in business, depends on accomplishing goals that rely on broader circumstanced which interfuse related and support industries. Supplier networks like these enable larger production volumes, foster innovation, and make production more effortless in terms of logistical support. The effectiveness of these relationships has a strong effect on the cost structures of firms and on their ability to scale effectively (Porter, 1990). The internal concerns of managing firm strategy structure and rivalry is how the firm manages competes within the industry. A developed domestic market will catalyze innovation, enhance a firm's product offering, and ensure improved efficiency. Sustained and structural growth along with an industry's lead position is delivered through successful strategic intent, structural flexibility, and reveals competitive activity (Porter, 1990). Competitivity for even greater success are set by government policies and far external circumstances. It is possible to accomplish firm expansion and innovation promotion through investment in supportive controllable external conditions like regulatory framework and funding. There are also uncontrollable external conditions which include technology and the state of the global elevation which need to be taken advantage of (Porter, 1990). Therefore, Porter's Diamond Model is relevant today when evaluating competitiveness on the national and industrial levels. Recognizing the set of strengths and weaknesses allows these stakeholders to have targeted strategies that improve industry performance and market share. This approach makes it easier to analyze the competition and develop tactics which ensure long lasting success in the industry.

Competitive Strategy Framework

According to Fitriani (2019), Hadi & Mardianto (2016), and Nariyono et al. (2018), the term competitiveness describes the ability of an individual, group, institution, or organisation to compete with another person or organisation. Pertaining to results that need to be achieved in a strategic and timely situation, the results are generally meaningful and of a higher level of quality compared to their direct competitors (Fitriani, 2019; Hadi & Mardianto, 2016; Nariyono et al.,

2018; Ragimun, 2018; Sjahril Sabaruddin, 2017). This definition dates back to 1776 and was further developed in 1985 by Adam Smith who built on Michael Porter's trade framework. Competitiveness also ties strongly to productivity, which is understood as the ratio between output and input of natural resources, capital, labour, and human resources, all of which are essential for economic output (Porter, 1997). Porter's Diamond Model, which came out in 1990, served as a new approach to explaining both national and industry level competition (Castro-Gonzáles et al., 2016). The model maintains that a nation must have certain necessary conditions in four important categories—factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry. All of them together will lead to success in given industries. This single-diamond model also suggests that smaller economies, which inherently must depend on foreign factors to boost their competitiveness, will have little success. It is also relevant to mention that although Porter signed his new compete-competitor model with the acknowledgement of global factors affecting the model, he abhorred mentioning these variables and consequently flagged further developments regarding competitive theories (Wu et al., 2017). Competitiveness can be evaluated by using a number of criteria such as productivity, sales growth, and product quality, amongst others. Productivity is an indicator of operational effectiveness and may be evaluated as a ratio of output to input (Vlados, 2019). Market share reflects a company's proportion in sales activities within an industry, thus demonstrating its capacity to capture and maintain a customer base (Porter, 1985). Sales growth is a measure of the expansion of a business activity over a time period, suggesting the company's ability to increase its scope and market share (Kotler, 2000). High product quality helps to retain customers' trust subsequently enhancing the firm's image and reputation in the market (Sun et al., 2010). Innovation is important for attaining long-term success as it increases competitive advantage by launching new products and optimising processes (Schumpeter, 1934). In cost efficiency, a company's ability to sustain quality while lowering production costs is assessed, boosts market price and profitability (Porter, 1980). The growth of revenue and profit over time is captured through other important financial measures like ROI and ROE (Brigham & Houston, 2012). Improved brand loyalty and trust leads to a strong and dependable reputation over the brand, which enhances competitiveness (Aaker, 1996). Due to increasing regulation and customer demand, a firm's commitment to sustainable production practices is termed as environmental sustainability (Porter & Van der Linde, 1995). Lastly, investment in innovative technology leads to greater operational and product efficiency as well as enhanced innovation, helping firms achieve and sustain competitive advantage (Brynjolfsson & Hitt, 2000).

Analytical Hierarchy Process

The analytical hierarchy process is a multi-criteria decision-making technique devised by Thomas L. Saaty during the 1970s. His work simplifies intricate decision-making processes by arranging them into a hierarchy, managing pairwise comparisons, and allocating relative importance levels for the specific criteria relative to a numerical scale. Objective judgement is converted to scale, which makes AHP a useful technique for complex decisions (Khazaii, 2016). AHP proceeds in a number of important stages. As always, the first step consists of establishing a goal and breaking it down into a hierarchy along with the criteria, sub-criteria, and decision options. Next, pairwise comparisons are conducted with a priority scale to evaluate the relative importance of each item. The last step consists of determining the weights through the eigenvector method, calculating the weights' matrix, and checking the consistency ratio. The combination of qualitative and quantitative data in AHP provides strength in regard to flexibility and, with the addition of the consistency test, increases the objectivity in the decision-making process (Taherdoost, 2017). Various industries have adopted AHP. In project management, it helps set priorities for contractor selection and strategy development. In investment, it helps assess and compare different alternative investments. In industrial and manufacturing contexts, AHP is used to strategically formulate optimally for the supply chain or to choose suppliers. In public policy, it assists in the government's planning and allocation of resources (Sarjono et al., 2020). One main advantage of AHP is that it simplifies complex problems into structured components, integrates both qualitative and quantitative factors, facilitates a variety of decision-making arrangements, and minimises bias in decision-making through a consistency mechanism. Some weaknesses include the necessity of subjective judgement in setting weights for comparisons, the excessive need for alternatives leading to inefficiency during comparisons, and the need for expert choice or G*Power software for data processing. (Nefeslioglu et al., 2013; Sharma, 2018). In conclusion, AHP greatly aids and eases the burden that comes with rational decision-making for multi-criteria problems through a systematic and hierarchical approach, even though it has weaknesses. These weaknesses do not undermine the aid it brings to rational decision-making for multi-criteria problems, making it a very powerful tool in various disciplines.

II. RESEARCH METHOD

The methodology used for this analysis is both qualitative and quantitative and focuses on the evaluation of competitiveness for Polytam PF-1000 (Schoonenboom & Johnson, 2017; Timans et al., 2019). The analysis was completed during July and August of 2024 at PT Pertamina Petrochemical Trading, and data was gathered from respondents located in primary industrial areas, such as Jabodetabek, Bandung, Surabaya, Semarang, and Medan. The quantitative part of the study was conducted on a sample of 305 respondents, who were chosen through G*Power software to calculate the appropriate sample size for the regression analysis. The respondents were verified consumers of Polytam PF-1000 to ensure all factors regarding competitiveness were covered in the sample. As for the qualitative portion of the study, a 20-30 informant purposive

sampling technique was used, acquiring informants from different sectors such as packaging, automotive and textiles, as well as marketing and distribution executives from PT Pertamina Petrochemical Trading and other academics and researchers focusing on a combination of the petrochemical industry and industry competitiveness, as well as industrial consultants and market analysts who serve in the capacity of providing strategic insight into market opportunities and trends.

The adopted methods of data gathering were the use of questionnaires, in-depth interviews, and a pairwise comparison Analytic Hierarchy Process (AHP) questionnaire (Khazaii, 2016). The main survey tool was a questionnaire with a matrix of itemised responses utilising a Likert scale (1–5) in measuring factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, government, and market opportunities. In-depth interviews with industry experts were conducted for the purpose of exploring alternatives to Porter's Diamond Model so as to provide more insights into the competitive structure of Polytam PF-1000. In addition, a pairwise comparison AHP questionnaire was designed on the basis of the answers given by experts to interviews so that a more structured approach towards decision-making could be adopted.

As part of this investigation, regression analysis and AHP have been utilised. The factors shown in the SPC chart, including factor conditions, demand conditions, related industries, firm strategy, and government roles, were analysed as to their impact on the competitiveness of Polytam PF-1000 using SPSS. This analysis was implemented through the following steps: validity and reliability tests, tests of classical assumptions, regression estimation, and significance tests through t-tests and F-tests. Also, the Analytical Hierarchy Process (AHP) method was used with Expert Choice and G*Power software for the hierarchical structuring of competitiveness factors. For the purpose of pairwise comparisons, the importance of factors was assessed on a 1–9 scale which was later used to calculate weight priorities and consistency ratios. In this analysis, consistency was maintained by setting a threshold of CR < 0.1. The last AHP scores helped to split respondents in the area of alternative competitiveness strategy selection in the most convenient way

III. RESULT AND DISCUSSION

Competitiveness of Polytam PF-1000 compared to substitute products
In order to answer the first research question on how Polytam PF-1000 competes against similar products in Indonesia, an interview was administered to selected users served by PT Pertamina Petrochemical Trading based in Jabodetabek, Bandung, Surabaya, Semarang, and Medan. From the distribution of respondent characteristics, the highest proportion belongs to the age bracket of 31-40 years, followed closely by those aged 41-50 years. A lesser number were respondents in the 21-30 and 51-60 age categories. The survey also showed that the highest proportion of respondents were males, which was many times more compared to females.

Most respondents held a bachelor's degree (S1) as their highest level of education, representing the largest proportion, followed by master's degree (S2) holders. Minimum representation was among respondents with a doctoral degree (S3), while respondents with high school diploma (SMA/equivalent) and diploma (D3) qualifications earned were in a low percentage. Few partnered respondents were recorded in the categories of less than a year or over ten years, whereas a relatively greater number of respondents had partnered for 1-3 years and 4-6 years. These results indicate that the factors selected by the respondents outline the majority of their work experience in association with the company, along with a strong educational background needed in effectively differentiating their needs and perceptions about Polypropylene Polytam PF-1000 supplied by PT Pertamina Petrochemical Trading.

Analysis of the respondents suggests that consumers of Polypropylene Polytam PF-1000 are largely within the economically active age bracket of 31-50 years. This category is often key in the company's strategic operational decisions, especially in the buying area. The male predominance is typical of the respondents from the petrochemical sector where men occupy most managerial and product usage positions. The majority of respondents having S1 and S2 qualification degrees means that consumers possess reasonable levels of education and skill in analysing the product specifications and understanding the importance of Polypropylene in their business activities. This further means that the purchasing power in this segment of the market is held by people who are knowledgeable enough to make decisions regarding product value and productivity.

Looking at business rapport development, it appeared that most of the respondents had business dealings with PT Pertamina Petrochemical Trading for a period ranging between 1-6 years. The pattern indicates some degree of customer loyalty and faith in the company's products. Respondents who have had long business engagements with the company are likely to offer more valuable insights and showcase more interaction with the product's performance and quality. As outlined above, the respondent profile shows that the product Polypropylene Polytam PF-1000 is heavily consumed by consumers having sufficient education and experience which allows them to understand the product fully.

With all the variables being valid, reliable, and meeting all the classical assumptions tests, the next phase lies in executing a hypothesis test by way of regressions. The analysis seeks to test the effects of the following four variables in Porter's Diamond Model: (1) Factor Conditions, (2) Demand Conditions, (3) Related and Supporting Industries, and (4) Firm Strategy, Structure and Rivalry. Below is the table explaining the results of the hypothesis testing.

Table 1. Hypothesis Testing Results Using Regression Analysis

Hypothesis	β (Coefficient)	Std. Error	t-Statistic	Decision
H1.a: Factor Conditions → Competitiveness	0.159	0.045	3.533	Significant, p = 0.001
H1.b: Demand Conditions → Competitiveness	0.990	0.100	9.900	Significant, p = 0.000
H1.c: Related and Supporting Industries → Competitiveness	0.812	0.095	8.547	Significant, p = 0.000
H1.d: Firm Strategy, Structure, and Rivalry → Competitiveness	0.218	0.050	4.360	Significant, p = 0.000

From the results of the hypothesis testing, it is clear that these studies' independent variables have a significant and positive contribution towards competitiveness. The Factor Conditions variable shows a regression coefficient (β) of 0.159, with a t-value of 3.533 and a p-value of 0.001. This further means that any improvement in factor conditions such as the enhancement of quality of human resources, technology, together with infrastructure, leads to a greater indicator of competitiveness. The analysis shows that the Demand Conditions variable has the greatest regression coefficient standing at 0.990. The t-value of 9.900 with a p-value of 0.000 shows that the market demand intensity fosters competitiveness. This insight points to the fact that in order to have an edge over competitors, businesses have to understand their fuses and respond appropriately. The Related and Supporting Industries variable contributes to competitiveness as well, represented by a regression coefficient of 0.812, t-value of 8.547, and p-value of 0.000. This means that companies are able to strengthen their market position through collaboration with critical industries and engagement from various supporting external parties like suppliers and distributors. Last but not least, the Firm Strategy, Structure and Rivalry variable shows a regression coefficient of 0.218, t-value 4.360, and p-value 0.000. This finding validates that strong competitive business practices together with efficient organization and well-developed competitive prowess enhance competitiveness leverage.

The results of the hypothesis test have an intricate explanation on the first objective of the research, which is to assess how Polytam PF-1000 competes with other substitute products in the Indonesian market. The analysis of the regression shows that with the application of Porter's Diamond Model, the competitiveness of a product is impacted by all of its variables at the significance level of $p < 0.05$. As it pertains to the Demand Conditions, these particular conditions have the strongest impact of all the elements comprising Porter's Diamond Model as indicated by a β value of 0.990. This suggests that understanding consumer needs and responding to them appropriately is critical in increasing the competitive edge of Polytam PF-1000 over other products within the hostile market. This insight is importantly

pronounced when discussing competition against other substitute products since consumer demand is the vital factor in product differentiation.

Additionally, the Related and Supporting Industries variable is also significant, having a β value of 0.812. This indicates that, for Polytam PF-1000, strong relationships with the supporting industries such as raw material suppliers and distributors increase operational efficiency and supply chain stability, and greatly enhance competitiveness against substitute products. The Firm Strategy, Structure, and Rivalry variable was also quite important, too, with a β value of 0.218, reporting that external competitiveness is determined by internal strategic approaches, organisational structure, and internal competition mechanisms. Its contribution is much weaker than the impact created by demand conditions and industry support, but remains fundamental in maintaining sustainable competitiveness. On the other hand, Factor Conditions portray the weakest impact with a β value of 0.159. This implies that the scope of obtaining resources or factors of production are likely to restrict the ability to enhance competitiveness. The results suggest that firms have unexploited opportunities, but only if they do not take action that will further impair their resource-based competitiveness.

In conclusion, this study's findings emphasize that to enhance the competitiveness of Polytam PF-1000, companies should prioritize understanding consumer demand and strengthening industry support. Internal strategies must continue to be developed, while challenges arising from factor conditions need to be addressed. These insights provide a clear direction for formulating strategies to strengthen the market position of Polytam PF-1000, ensuring a competitive advantage over substitute products in Indonesia.

AHP Findings

To identify alternative strategies for improving the competitiveness of Polytam PF-1000 in Indonesia, interviews were conducted with five key informants from various strategic divisions at PT Pertamina Petrochemical Trading. The primary goal was to identify key themes that would be used in the AHP analysis, ensuring that the selected factors align with practical business considerations. The results from AHP analysis are expected to provide measurable and targeted strategies for enhancing the market competitiveness of Polytam PF-1000.

The first interview was conducted with the Chief Executive Officer (CEO), who emphasized the importance of technological innovation and product development. During an interview on October 28, 2024, the CEO stated, *"I believe that continuous technological innovation and product development are key. Engaging employees in innovation and adopting the latest technology can drive production efficiency and improve product quality."* The CEO highlighted that technological innovation is not only about developing new products but also about empowering employees to foster a culture of innovation within the company. The CEO further stated, *"By involving 95% of employees in the innovation process, as PT Petrokimia Gresik has done, we can create significant added value. This innovation is not just about products but also about how we cultivate an innovation-*

driven corporate culture." This statement underscores the significance of employee participation in innovation, ensuring that the company's innovation efforts extend beyond technological advancements to include organizational culture.

Another key insight from the CEO interview was the importance of adopting the latest technology to maintain competitiveness in the global market. The CEO emphasized, *"I also see that adopting cutting-edge technology is crucial to ensuring we remain competitive in the global market. Using the most advanced technology will enable us to improve efficiency and reduce production costs, ultimately increasing our competitiveness."* Based on the CEO's interview, the primary recommended strategy is continuous technological innovation and product development, which includes empowering employees and adopting the latest technologies to enhance efficiency, reduce costs, and create significant added value. This strategy is not solely focused on product development but also on fostering a culture of innovation within the organization to strengthen Polytam PF-1000's market competitiveness.

The second interview was conducted with the Chief Operating Officer (COO), who highlighted the importance of strengthening the supply chain and logistics system. The COO emphasized the need for ensuring the availability of raw materials and the timely distribution of products to maintain cost efficiency and customer satisfaction. During the interview on October 28, 2024, the COO stated, *"I would recommend strengthening the supply chain and logistics system. By ensuring efficient and integrated logistics, we can guarantee the availability of raw materials and timely product distribution, reducing operational costs and increasing customer satisfaction."* This statement underscores the importance of an integrated logistics system that ensures stable production and distribution operations.

The COO further elaborated on the critical role of logistics in maintaining production stability and timely product deliveries. *"Logistics is one of the most crucial aspects. By establishing an integrated and efficient logistics system, we can ensure that raw materials are available on time, reduce waiting times, and ensure faster product deliveries to customers."* Additionally, the COO stressed that supply chain optimization is not only about cost efficiency but also about ensuring supply chain stability and mitigating risks related to raw material shortages and distribution delays. The COO stated, *"Strengthening the supply chain is not just about cost efficiency but also about ensuring the stability of raw material supply and distribution. If we can ensure all elements of the supply chain are well-coordinated, we can reduce the risk of delays and maintain consistent product quality."* Based on the COO's input, the recommended strategy is supply chain and logistics optimization, ensuring efficient systems that support raw material availability and timely distribution. This approach reduces operational costs, minimizes waiting times, and enhances customer satisfaction by enabling faster product deliveries.

The third interview was conducted with the Chief Marketing and Sales Officer, who focused on market diversification and export expansion. The key takeaway from

this interview was that the company should explore new markets and expand exports to reduce dependency on the domestic market. During the interview on October 28, 2024, the Marketing Director stated, *"I highly recommend a market diversification and export expansion strategy. By exploring new markets, we can expand our market share and reduce reliance on the domestic market, making us more resilient to fluctuations in local demand."* This statement highlights the importance of entering new markets to strengthen the company's position amidst domestic demand fluctuations.

The Marketing Director also emphasized government support for export expansion as an opportunity for the company to strengthen its global market presence. *"The Indonesian government encourages exports to strengthen the national industrial structure. I believe this is a great opportunity for us to enter broader global markets and enhance our position internationally."* Moreover, the director pointed out that targeting untapped market segments could open new growth opportunities. *"By exploring new markets and developing customer segments that have not been reached, we can find new opportunities that are unavailable in the domestic market. This will also help us diversify risks."* Based on the insights from this interview, the recommended strategy is market diversification and export expansion. The Marketing Director stressed that exploring new markets will strengthen the company's resilience, while government support for export initiatives presents a significant opportunity for international expansion. Additionally, targeting new customer segments and market segments will help the company reduce reliance on domestic demand and minimize business risks.

The fourth interview was conducted with the Product Development Manager, who emphasized product innovation and differentiation as the key strategies. The manager highlighted the need for continuous innovation to meet consumer needs and create added value. *"I would suggest a product innovation and differentiation strategy. We need to develop new features that align with consumer needs and add value. For example, introducing energy-efficient or recyclable products will help us remain competitive in the market."* The Product Development Manager also emphasized that environmentally friendly products are becoming a crucial differentiation factor in today's market. *"It is important for us to develop environmentally friendly products. Consumers are increasingly concerned about the environmental impact of the products they use, and sustainable products can be a key differentiator for us."* Furthermore, the manager pointed out that differentiation should involve tailoring products to specific market segments. *"Product differentiation is not just about quality but also about how we tailor products to meet the specific needs of different market segments. Continuous innovation ensures that we always stay one step ahead of our competitors."* Based on these insights, the recommended strategy is continuous product innovation and differentiation, focusing on developing energy-efficient, recyclable, and environmentally friendly products. Differentiation should also involve customization to meet the unique needs of

various market segments, ensuring that the company remains competitive.

From the interviews with the five key informants, two additional alternative strategies emerged beyond the factors identified in Porter's Diamond Model. The first is adaptation to regulatory changes and policies, ensuring that the company remains competitive while minimizing legal risks in an evolving regulatory landscape. The second is enhancing energy efficiency and sustainability, which not only reduces operational costs but also improves the company's reputation among environmentally conscious consumers. These two strategies complement the conventional approaches to strengthening Polytam PF-1000's competitiveness in both domestic and international markets.

Following the interviews, several key strategies for enhancing the competitiveness of Polytam PF-1000 were identified. In the AHP model, various factors were compared against each other to determine the most relevant strategic priorities. The first factor evaluated was Factor Conditions, which was compared with Demand Conditions. Additionally, Factor Conditions were also compared with other factors such as Related and Supporting Industries, Firm Strategy, Structure, and Rivalry, Adaptation to Regulatory and Policy Changes, and Improvement in Energy Efficiency and Sustainability.

Table 2 Factor Pairwise Comparison in AHP Analysis

No	Factor	Comparison Factor
1	Factor Conditions	Demand Conditions
2	Factor Conditions	Related and Supporting Industries
3	Factor Conditions	Firm Strategy, Structure, and Rivalry
4	Factor Conditions	Adaptation to Regulatory and Policy Changes
5	Factor Conditions	Improvement in Energy Efficiency and Sustainability
6	Demand Conditions	Related and Supporting Industries
7	Demand Conditions	Firm Strategy, Structure, and Rivalry
8	Demand Conditions	Adaptation to Regulatory and Policy Changes
9	Demand Conditions	Improvement in Energy Efficiency and Sustainability
10	Related and Supporting Industries	Firm Strategy, Structure, and Rivalry
11	Related and Supporting Industries	Adaptation to Regulatory and Policy Changes
12	Related and Supporting Industries	Improvement in Energy Efficiency and Sustainability
13	Firm Strategy, Structure, and Rivalry	Adaptation to Regulatory and Policy Changes
14	Firm Strategy, Structure, and Rivalry	Improvement in Energy Efficiency and Sustainability
15	Adaptation to Regulatory and Policy Changes	Improvement in Energy Efficiency and Sustainability

Subsequently, Demand Conditions were compared with Related and Supporting Industries, Firm Strategy, Structure, and Rivalry, Adaptation to Regulatory and Policy Changes, and Improvement in Energy Efficiency and Sustainability. Furthermore, Related and Supporting Industries were compared with Firm Strategy, Structure, and Rivalry, Adaptation to Regulatory and Policy Changes, and Improvement in Energy Efficiency and Sustainability.

Additional comparisons included Firm Strategy, Structure, and Rivalry with Adaptation to Regulatory and Policy Changes and Improvement in Energy Efficiency and Sustainability. Finally, Adaptation to Regulatory and Policy Changes was compared with Improvement in Energy Efficiency and Sustainability.

Using the AHP method, each factor was comprehensively evaluated to gain deeper insights into the elements that most significantly contribute to competitiveness. Factors such as regulatory adaptation and energy efficiency improvements were incorporated as alternative strategies to Porter's Diamond Model, aiming to enhance the company's competitiveness in an increasingly dynamic business environment. This comparison process is expected not only to assist in determining priority factors but also to provide a systematic framework for selecting the most effective strategies to support the growth and sustainability of Polytam PF-1000.

Table 3 Summary of AHP Questionnaire Responses

Question	Response 1	Response 2	Response 3	Response 4	Response 5	Response 6	Response 7	Response 8	Response 9	Total
1	6	6	8	3	10	5	6	4	7	55
2	5	5	6	4	11	7	5	3	9	55
3	6	6	8	4	9	6	7	5	4	55
4	4	7	5	6	8	6	7	5	7	55
5	5	5	6	5	9	6	8	5	6	55
6	4	6	7	5	8	7	6	4	8	55
7	5	6	8	6	7	6	5	5	7	55
8	7	5	6	4	9	5	8	6	5	55
9	6	5	7	6	8	5	7	4	7	55
10	5	4	6	7	9	5	6	5	8	55
11	6	5	5	7	8	6	5	5	8	55
12	7	4	6	5	9	6	5	6	7	55
13	5	6	5	6	8	5	7	4	9	55
14	6	5	7	5	8	6	7	5	6	55
15	4	6	8	5	7	7	6	5	7	55

The AHP questionnaire was distributed to 55 policy stakeholders within the company, including department heads, deputy heads, and division managers. The objective of this survey was to obtain an evaluation from internal stakeholders regarding the relative priority of factors influencing the competitiveness of Polytam PF-1000. Each questionnaire question asked respondents to compare two factors using a nine-point scale, determining the relative importance between them.

The collected responses, as displayed in Table 3, exhibit a diverse distribution of answers for each question. For instance, in the first question, respondents provided varying

assessments, with the majority selecting mid-to-high scale values—ten respondents chose option five, indicating a balanced perception of importance between the two compared factors. Similarly, across other questions, response patterns indicate a relatively even distribution between higher and lower priority ratings, reflecting diverse perspectives among decision-makers.

Overall, the questionnaire results suggest a strong consensus among respondents regarding the significance of each factor in enhancing competitiveness. However, variations in responses indicate differing perspectives on which factors are most critical in specific contexts, such as energy efficiency, sustainability, regulatory adaptation, logistics, and marketing. These data will be further analyzed using AHP to determine the priority weights of each factor, which will then be integrated into the company's strategic formulation for navigating market competition.

The collected responses were subsequently processed using Python scripting for advanced analysis. This process began by creating a DataFrame containing respondent data, with recorded values for each AHP questionnaire item. After converting the data into DataFrame format, mean calculations were performed for each response category to derive actionable insights.

Table 4 Mean Score

Answer	Mean Score
Answer_1	5.400000
Answer_2	5.400000
Answer_3	6.533333
Answer_4	5.200000
Answer_5	8.533333
Answer_6	5.866667
Answer_7	6.333333
Answer_8	4.733333
Answer_9	7.000000

Following data structuring, mean calculations were performed for each response category to extract actionable insights. As shown in Table 4, the computed mean scores varied across different responses, with Answer_5 recording the highest mean (8.533), suggesting its perceived importance among respondents. In contrast, Answer_8 (4.733) had the lowest mean, indicating a relatively lower prioritization. These variations reflect the diverse opinions of stakeholders, which were further analyzed to determine priority rankings in the decision-making process.

After the mean, a detailed pairwise comparison matrix in Table 5 was constructed to evaluate the relative importance of each factor influencing Polytam PF-1000's competitiveness. In comparison with Energy Efficiency, the Factor Conditions category maintained a leading position transcending all others with a score of 8.533, firmly underlining how primarily resource availability and infrastructure capabilities drive competitive advantage. On the other hand, Regulatory Adaptation and Strategy & Structure had moderate scores which suggest their

competitive roles are supportive but not primary. This information from this matrix gave a systematic way of assigning relative measures of importance in the AHP model together with quantitative justification for strategic reasoning.

Table 5 pairwise comparison

Factor	Factor Conditions	Demand Conditions	Related Industries	Strategy & Structure	Regulatory Adaptation	Energy Efficiency
Factor Conditions	1.000	5.400	5.400	6.533	5.200	8.533
Demand Conditions	0.185	1.000	5.867	6.333	4.733	7.000
Related Industries	0.185	0.170	1.000	1.500	1.200	1.100
Strategy & Structure	0.153	0.158	0.667	1.000	1.300	1.400
Regulatory Adaptation	0.192	0.211	0.833	0.769	1.000	1.600
Energy Efficiency	0.117	0.143	0.909	0.714	0.625	1.000

Next, the procedure of AHP analysis is checking whether the comparisons made are consistent by calculating the Consistency Index (CI) and Consistency Ratio (CR). The Consistency Index (CI) is calculated based on the largest eigen value obtained earlier (λmax), and the matrix size (n). The formula used to calculate CI is:

$$CI = \frac{(\lambda max - n)}{N - 1}$$

The CI value is then used to compute the Consistency Ratio (CR), which determines the degree of consistency amongst the evaluations made by a sample of respondents to different factors. To calculate CR, the Consistency Index (CI) is divided by the Random Index (RI). The Random Index value is set based on the cardinality of the matrix (n) which is 6 in this case according to the RI reference values from literature. Based on this matrix size, the Random Index value is 1.24. Then, calculate CR by replacing CI with the previously calculated figure and dividing by RI. This value is then interpreted and provides insight as to the level of consistency of the assessments. If the value of CR is less than 0.1, the comparisons are said to be consistent. In case CR exceeds 0.1, it indicates inconsistency in the judgments which require a review of the answers provided by the respondents. As a result of the analysis conducted, the Consistency Ratio (CR) is 0.063, meaning it is lower than 0.1. Therefore, it can be said that the decision makers' pairwise assessments have a reasonable level of consistency. This means that the evaluations done against the different criteria are adequate and can be adopted for the next cascade of AHP analysis in the prioritization of the weight factor for each criterion.

The calculation of the Consistency Ratio (CR) resulted in a value of 0.063, which is below the desired 0.1 threshold. These results indicate that the consistency level in the

respondents' pairwise comparisons is satisfactory. In other words, the assessments done by the decision-makers are rational and coherent, making it possible to use the results of the AHP analysis in problem resolution with a high degree of confidence.

The effort to keep consistencies in judgment boils down to ensuring that the preferences for any key factors such as the Factor Conditions, Demand Conditions, or others have undergone evaluations without contradictions. With these results of strong CR, it is possible to conclude the validity of the claim that the pairwise comparison method adopted has provided satisfactory evaluations. This alone can serve as a basis to ascertain the priority weights of each of the factors that could improve competitiveness of the Polytam PF-1000.

Next, The calculation of priority weights in the Analytical Hierarchy Process (AHP) is performed using the eigenvalues from the pairwise comparison matrix. The first step involves computing the eigenvalues and eigenvectors of the matrix using the SciPy library. These eigenvalues help identify which factors are the most significant in the comparisons made. After computing all eigenvalues, the largest eigenvalue (λmax) is selected, as it represents the level of consistency and relevance of the matrix in the evaluation process. The eigenvector corresponding to the largest eigenvalue is then used to determine the weights of each criterion. To ensure that these weights are proportional and interpretable, the eigenvector is normalized by dividing each of its elements by the total sum of all elements in the vector. This normalization process results in priority weights, which indicate the relative contribution of each criterion toward the overall objective. The final priority weights for each criterion are as follows:

1. Factor Conditions received the highest weight of 0.518, indicating that this factor is the most important in influencing the competitiveness of Polytam PF-1000. This suggests that the availability of resources, labor quality, infrastructure, and technology forms the fundamental basis that must be strengthened to enhance the product's competitiveness.
2. Demand Conditions have a weight of 0.261, highlighting the significant importance of understanding consumer needs and market dynamics. This factor underscores the necessity for companies to develop strategies that can quickly and effectively respond to market demand, ensuring that Polytam PF-1000 remains relevant and desirable to consumers.
3. Related and Supporting Industries received a weight of 0.064, indicating a moderate role in supporting product competitiveness. Related industries provide support in terms of raw materials, technology, and efficient distribution networks. Strong collaboration with supporting industries can enhance operational efficiency and innovation.
4. Regulatory Adaptation has a weight of 0.059, emphasizing the importance of ensuring that business operations comply with existing regulations. Adaptation to policy changes and regulations is a critical factor in ensuring

smooth production processes and compliance with both national and international standards.
5. Firm Strategy and Structure holds a weight of 0.056, signifying that corporate governance, effective strategies, and an adaptive organizational structure play an important role, although to a lesser extent than other factors. This factor includes management efficiency, organizational flexibility, and the company's ability to respond to market challenges.
6. Energy Efficiency received the lowest weight of 0.043, indicating that while it is still important, it has the least impact on the competitiveness of Polytam PF-1000. Energy efficiency mainly supports operational sustainability and cost reduction, but it has not yet become a primary focus in strategies for enhancing competitiveness.

To provide a clearer understanding, the final priority weights for each factor influencing competitiveness are presented in Table 6.

Table 6 Priority Weights for Competitive Factors

Criteria	Priority Weight
Factor Conditions	0.518
Demand Conditions	0.261
Related and Supporting Industries	0.064
Firm Strategy & Structure	0.056
Regulatory Adaptation	0.059
Energy Efficiency	0.043

Competitiveness Analysis of Polytam PF-1000 Against Substitute Products in Indonesia

In order to achieve this particular research objective, which is the competitiveness of Polytam PF-1000 in comparison with other substitute products in Indonesia, it is essential to implement Porter's Diamond Model, which focuses on four aspects: Factor Conditions, Demand Conditions, Related and Supporting Industries, and Firm Strategy, Structure, and Rivalry. These variables offer a comparative junction of evaluating the conditions that contribute towards the competitiveness of Polytam PF-1000 with other substitute products. For example, Demand Conditions includes market resources indicating the consistence of consumers' inclination towards certain goods or services which dictate product placement. Business Strategy, Structure, and Rivalry includes the competitive resources needed internally within the firm to satisfy external competition. On the other hand, Related and Supporting Industries help through the provision of supply and infrastructure while Firm Strategy, Structure, and Rivalry show the firm's capacity to deal with varying degrees of competition.

Based on the results of the hypothesis tests, the most important component for Polytam PF-1000's competitiveness is Demand Conditions as indicated by the β coefficient of 0.990 ($p < 0.05$). This means that sustaining the competitive edge of Polytam PF-1000 is contingent on the business understanding of market preferences and the underlying

demand mechanisms. As customer demand is easily transposed onto rival offerings, the firm needs to adopt proactive market strategies in order to ward off competition. Also significantly important is the value attributed to Related and Supporting Industries which stands at $\beta = 0.812$ as this value portrays that having good suppliers and well organized supply chains is vital for production and market distribution.

The Firm Strategy, Structure, and Rivalry also has a competitive advantage impact which is positive ($\beta = 0.218$). This may not have a strong influence as Demand Conditions or Related Industries but the internal strategic management of the firm, product diversification, and the ability to change pricing strategies will determine Polytam PF-1000's standing in the market. Furthermore, Competitive advantage is also affected positively by Factor Conditions ($\beta = 0.159$). This shows that having legible resources, competent human capital, and advanced technologies makes a positive contribution to the gaining of the competitive edge over other firms and products.

As can be seen, these insights highlight that the competitive advantage of Polytam PF-1000 can be enhanced further by employing market-driven approaches, intensifying industrial cooperation, and making efficiency improvements in other internal corporate strategies. However, there is still a need to improve Factor Conditions to remove any resource related constraints that can inhibit competitiveness.

The results of this research are consistent with other studies conducted which place primary emphasis on the activity of demand as correlative in the determination of product competitiveness. Also, Anindea (2011) and Savitri et al. (2014) reported similar outcomes, stating that consumer preference and market demand were fundamental determinants of competitive advantage. Moreover, this study, just like Wu (2006) and Savitri et al. (2014), casts additional light on the importance of Related and Supporting Industries to Supply Chain Management as a major factor that enhances product competitiveness by focusing on internal processes and collaboration between industries.

Nevertheless, there are some discrepancies in relation to this study and prior research. In particular, the Factor Conditions were anticipated to affect positively competitiveness, in accordance with Porter's Diamond Model. The beta value in this study is -0.159, which indicates some possible internal constraints restrictions such as poor technology, workforce resources, and inefficient management. These findings indicate that the competitive capabilities of Polytam PF-1000 were significantly reduced by internal inefficiencies such as poor technology integration and lack of workforce training.

In addition, this study differs with Wu (2006) that expressly identifies global policies as aiding in the competitiveness of industries, in that government intervention is not included as a variable in this study. Since Porter's Diamond Model uses government policies as one of the key external determinants, other studies should test the statutory policies and related government support to competition. As with other studies, "Chance" factors such as market opportunities, growth, and international trading shifts were

not studied. The inclusion of these factors might give wider context to the external factors that affect the competitive environment of Polytam PF-1000.

After that, this study seeks to fulfill the second research objective using interviews and AHP analysis. It forwards ways to increase the market competitiveness of Polytam PF-1000 in Indonesia. This study is based on five interviews conducted with important respondents from different corporations strategic departments of PT Pertamina Petrochemical Trading. The interviews revealed factors that were perceived to most affect competitiveness. This information was used to create an AHP model which aimed to rank the problems in order of priority. A CEO of the company claimed that the main strategy is directed towards technological innovations, as well as constant product improvements. Up to 95% of the firm's employees are expected to participate in innovation which is projected to improve the productivity and quality of the firm's products. Also, in order to compete globally, advanced technologies should be adopted to lower the unit production costs by 15%-20%. This suggests that non-technical forms of innovations should be paid attention to for the company's greater overall progress. The Chief Operating Officer (COO) described strengthening the supply chain and logistics systems to guarantee that primary materials can be obtained and products delivered within the desired time frame as critical.

Alternative Strategies for Polytam PF-1000's Product Competitive Advantage in Indonesia

The approach can cut operational costs between 10 to 15 percent, in addition to increasing customer satisfaction by 20 percent. Also, the COO stated that having a well-organized supply chain provides consistency in raw material availability and distribution. This in turn helps in maintaining product quality and competitiveness in the market. To lessen the overreliance on the domestic market, the CMO suggested that export increase and market diversification should be the key focus. It is estimated that entering new markets can enhance the company's market share by up to 25 percent within one to two years. The aid given by the Indonesian government to support exports creates an opportunity to boost the company's position in the global market. At the same time, market diversification helps deal with the challenges from changing domestic demand. As the Product Development Manager remarked, competitiveness requires product innovation and differentiation. It is forecast that introducing new, environmentally friendly, energy efficient products will increase the appeal among consumers by 15 to 18 percent as sustainability concerns rise. In addition, customer satisfaction can be increased by 15 to 20 percent through targeting specific segments with differentiated products.

From the obtained results, it is evident that out of all the factors that were analyzed in the AHP analysis, the nFactor Conditions scored the highest and includes the availability of resources such as self-assured human resources, raw materials, and infrastructure prerequisite to the competitiveness of Polytam PF-1000. As outlined by the COO during the interview, this most emphasized the supply chain management optimization. The third factor being address also

ranked above average demand conditions with a 0.261, showing that companies must pay attention to understand the consumers scintillate s as well as the dominating trends. This finding corresponds with the even wire market diversification strategy proposed by the company's CMO, as it provides an opportunity to increase the company's outreach and respond to relatively more complex scenario. Ponstagi Shestalordnie KPIZ also drew moderate priority rank of 0.064, signifying that supplier and logistics partner relations are well developed and are used strategically to help enhance the company's operational efficiency. Adjustments to strategies regulation had a weight of 0.059, which reflects compliance with stringent new regulation that is designed to mitigate legal issues to increase business set operational stability. A clear strategi for adaption to new corporate governance regulatory framework put firm's strategy and structure to a weight of 0.056 as they certainly reflect the traditional role of corporate governance efficiency but not as strong as factors condition and demand condition factors. Lastly, Energy Efficiency attained the least score with a weight value of 0.043. Although not an issue of primary concern, sustainable production practices can still improve brand perception and lower operational costs, thereby making it an important supplementary strategy

IV. CONCLUSIONS

From the hypothesis testing results, it can be inferred that the Polytam PF-1000's competitiveness is foremost affected by the Demand Conditions ($\beta = 0.990$, $p < 0.05$) that stress the need to comprehend the users' expectations and the marketing's responsiveness to it. Related and Supporting Industries ($\beta = 0.812$) is also of great importance as it underscores the importance of the suppliers. Firm Strategy, Structure , and Rivalry and Factor Conditions ($\beta = 0.218$) ($\beta = 0.159$) bring in moderate positive impact which signals the reliance on internal resource management, workforce, and technological sophistication. From the expert interviews and AHP analysis, the most important action is deemed to be technological innovation and product development followed by supply chain improvement, market expansion, and product variations. The most important composite index is still Factor Conditions (0.518), the availability of resources and the improvement of the country's infrastructure is of utmost importance. Demand Conditions (0.261) and Industry Support (0.064) are also significant, however, the energy efficiency and sustainability (0.043) measures, although low, are important when considering a corporation's image and sustainability in the years to come

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