Increasing The Competitive Advantage of Pt. XYZ Through Product Differentiation for Hvac Chiller (HRS) Systems

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ABSTRACT

This document examines the product differentiation strategy implemented by PT. XYZ to strengthen its competitive advantage in the HVAC industry, with a specific focus on chiller systems integrated with Heat Recovery Systems (HRS). In an increasingly competitive market, companies must understand customer needs and design products that offer distinct advantages over competitors. This research employs a quantitative methodology to investigate critical variables influencing customer attraction, retention, and overall satisfaction. The findings indicate that a robust product differentiation strategy, coupled with continuous service improvements, plays a pivotal role in enhancing customer loyalty. This, in turn, leads to significant increases in sales volume and contributes to long-term business success. The study also highlights the importance of adapting to evolving market trends, such as sustainability and energy efficiency, which customers in the HVAC industry increasingly value. By incorporating these elements into product offerings, PT. XYZ can position itself as a leader in innovation and customer satisfaction. Additionally, this research provides valuable theoretical insights and practical recommendations for other businesses in the refrigeration industry. It aims to guide them in formulating effective marketing strategies that foster customer loyalty and create a sustainable competitive advantage, particularly in the context of advanced technological features like HRS, which offer significant energy savings and environmental benefits.

INTRODUCTION

Every company, whether engaged in products or services, has the main goal of staying afloat and thriving in a competitive market. The rapid growth of business can be seen from the increasing number of companies offering similar products, which triggers competition in the fight for market share and consumers (Cooper & Vlaskovits, 2013; McGrath, 2013). In this condition, it is very important for every company to understand well the market to be targeted, as well as how the products or services they offer can meet the needs and desires of customers (Weinstein, 2013).

The company's main goals can be achieved through continuous efforts to maintain and increase profits, which in turn supports business continuity and growth. One of the strategies that can be done to increase profits is to find and foster good relationships with customers, as well as dominate the existing market (Bakar et al., 2015; Bolton & Tarasi, 2017; Margherita & Heikkilä, 2021). This effort is inseparable from the important role of the marketing department which has the task of formulating and implementing the right strategy so that the company can take advantage of the opportunities that exist in the market (Peng et al., 2021). Thus, the

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company's position in the market can be maintained and even improved (Tampi, 2015; Zhao et al., 2020).

One of the sectors that is growing rapidly is the refrigeration industry, including HVAC (heating, ventilation and Air Conditioning) products, especially air conditioners or air conditioners (AC) (Chua et al., 2013; Dong et al., 2021; Hundy, 2016). This product is in great demand, especially by the Indonesian people, especially in the upper middle class who live in big cities (Goetzler et al., 2016). Along with this increasing need, many air conditioning brands, both local and international, are competing with each other to offer the advantages of their respective products, ranging from features, technology, to price.

Based on the results of a survey conducted by Kurious from the Katadata Insight Center (KIC), the majority of Indonesian consumers prefer air conditioners with brands from South Korea and Japan. In the survey, LG took the top position with 34.3% of respondents claiming to use the product, followed by Sharp (Japan) with 26.2%, and Samsung (South Korea) and Panasonic (Japan) with 21.9% of respondents each. This shows that the competition for air conditioning brands in Indonesia is very fierce, with the majority of consumers choosing brands based on the ease of access and availability of products in the market.

The survey also showed that 73.1% of respondents chose AC brands because they have used some products from the brand, while another 69.8% stated that they chose the brand because they are easy to find in electronic shopping malls. This shows the importance of convenience and ease of access factors in the decision to purchase air conditioners in the Indonesian market.

Strategy is a very important element in the business world, as strategy is the way that companies use to achieve pre-set goals. According to Swastha (2011), strategy is a series of grand designs that describe how a company should operate to achieve its goals. In this case, strategy is not only about planning long-term goals, but also about determining the operational steps that need to be taken to achieve them. In a corporate context, the strategy should encompass all operational aspects, from marketing to human resource and financial management.

According to Kotler and Armstrong (2016), marketing is a managerial social process that involves individuals and groups to get what they need and want, through the creation and exchange of products and values with other parties. The main goal of marketing is to understand the needs and wants of consumers so that the product or service offered can meet their expectations and sell on its own. Therefore, marketers are required to be able to understand the fundamental problems in their field, provide a clear and targeted picture of what the company is doing, and strategize to achieve the set goals. In the HVAC industry, which involves heating, ventilation, and air cooling, understanding consumer needs is essential to create products that are relevant and can meet customer expectations.

HVAC (Heating, Ventilation, and Air Conditioning) is a system used to regulate and control the temperature, humidity, and air quality in a room or building. HVAC systems are essential for creating a comfortable and healthy indoor environment for their occupants. In this industry, the products offered must be able to meet high quality standards in order to provide comfort for its users, be it in the residential, office, or other industrial sectors.

Marketing strategy has a very important role to achieve business success. Without a clear strategy, companies will struggle to survive in a highly competitive market. Marketing should be able to provide a clear picture of the steps to be taken to introduce the product to consumers and ensure the company's position in the market. The right marketing strategy will allow the company to take advantage of existing opportunities, maintain existing products, and introduce new products to the market.

To achieve marketing goals, companies need to utilize various methods and strategies, including product promotion. Promotion can be done through various media, such as magazines, newspapers, TV, radio, the internet, and even participating in relevant industry exhibitions or events. In the short term, the purpose of promotion is to attract the attention of consumers to the new product launched, while in the long term it aims to maintain the sustainability of existing products in order to remain relevant and exist in the market.

Product differentiation is one of the main strategies that companies use to create a unique product or service that provides added value compared to competitors (Delpech et al., 2018). According to Porter (1980), differentiation aims to increase customer loyalty by offering something different, both in terms of features, quality, design, and user experience. Product differentiation is an effective way for companies to achieve a competitive advantage because by creating unique added value for customers, companies can build loyalty, increase selling prices, and avoid direct price competition.

However, product differentiation strategies require continuous innovation and a deep understanding of market needs. This is important because customer needs and preferences are always changing, and companies must be ready to adapt to those changes. Companies that are successful in implementing product differentiation can avoid price wars and increase the attractiveness of their products in the market. As time goes on, customers will prefer to pay premium prices for products that offer more value or unique features.

Refrigeration systems, such as HVAC, are essential in human life, both in the industrial and household sectors. This system not only serves to create comfort for humans, but also to maintain the temperature of equipment operating in industries or installations. In many cases, HVAC systems are used to condition the air of the room to keep it comfortable for humans and ensure that the operation of industrial equipment goes smoothly.

The refrigeration industry in Indonesia continues to grow in line with increasing needs in various sectors, such as manufacturing, hospitality, healthcare, and commercial industries. Some of the major players in the industry, such as Daikin, Panasonic, Mitsubishi, Trane, and York, generally offer standard products that are mass-produced. This mass production approach allows for production cost efficiency, but often comes at the expense of flexibility in meeting the specific needs of customers.

However, the current market shows a shift in consumer preferences. Customers now prefer solutions that not only meet their basic needs, but also provide added value according to their specific needs. Companies like PT XYZ have a great opportunity to leverage their competitive advantage through a product differentiation strategy based on customer needs. With factory facilities equipped with production machinery and an in-house engineering team,

PT XYZ is able to design a special HVAC system, especially for chiller types that are tailored to customer needs.

Another advantage of a product differentiation strategy is the potential for a larger profit margin. Standard products generally have a profit margin of 10-20%, while custom products designed to meet the specific needs of customers can generate margins above 20%. This provides a strong incentive for companies to focus on this market segment and deliver products that not only meet basic needs, but also provide more specific and more valuable solutions.

From the table above, it can be seen that PT XYZ's sales rate from 2021 to 2023 shows varying fluctuations every month, with increases and decreases recorded. Companies will need to consider more targeted marketing strategies to maximize sales volume and reduce the uncertainty that arises from high sales variability. Based on the background of the problems presented above, the author is interested in conducting a study titled "Product Differentiation Strategy Based on Customer Needs in HVAC Systems, Especially Chillers with Heat Recovery System (HRS) and Air Handling Units, to Increase Sales Volume and Competitiveness of the Refrigeration Industry."

This research identifies problems that need to be overcome by PT. XYZ, among which is the volatile sales rate, where sales experienced a significant decline in 2022, indicates instability that requires further analysis in order for companies to design more effective strategic measures to increase sales. In addition, the implementation of the company's marketing strategy has not been maximized in achieving the desired sales targets, which can be caused by a lack of understanding of market and customer needs and a lack of proper differentiation in the products offered.

This research aims to analyze and formulate solutions related to the problems identified in PT. XYZ, focusing on maximizing marketing strategies to increase product sales volume. Some of the problem formulations that will be discussed are the development of product differentiation strategies based on consumer needs to create added value that differentiates products from competitors, as well as the effective implementation of product differentiation strategies based on customer needs in the refrigeration industry, especially in HVAC products.

The benefit of this research is to identify and analyze sales strategies based on product differentiation that can be applied by PT. XYZ to increase competitiveness in the refrigeration industry. Specifically, this study aims to find out the marketing strategies implemented by companies in increasing sales volume and how effective these strategies are in achieving the desired sales target. In addition, this study also aims to understand the specific needs of customers in the industrial sector related to refrigeration systems, examine the effectiveness of product differentiation as a strategy to attract new customers and retain existing customers, and formulate strategic steps in optimizing competitive advantage through product differentiation.

It is hoped that the results of this study can provide theoretical benefits by contributing to the literature on product differentiation strategies in the context of the refrigeration industry, as well as becoming a reference for further studies related to marketing strategies and the development of competitive advantages. Practically, this research can provide guidance for PT. XYZ in developing more effective sales strategies and optimizing product differentiation, as well as inspiring other companies in the refrigeration industry and marketing practitioners on

the importance of understanding customer needs in product development and marketing strategies.

METHOD

Research methods provide a systematic approach to collecting data for specific purposes. This study employed a quantitative method, which tests theories by measuring relationships between variables using statistically analyzable numerical data (Creswell, 2010:5). The author applied descriptive and verifiable approaches.

Descriptive research describes collected data as it is, without generalizations (Sugiyono). In this study, the author described the sales decline of Air Handling Unit (AHU) products at PT. XYZ amid intense competition, outlining steps the company took to compete in Indonesia's AHU market.

Verifiable research tests hypotheses and theories to confirm their validity (Sugiyono, 2016:39).

RESULT AND DISCUSSION

Competition Occurs Between HVAC Companies

Competition conditions in the heat, ventilation, and air conditioning industries are increasing along with the increasing weather conditions in Indonesia (heat), making Indonesia a very attractive market for HVAC production companies both from domestic and foreign companies. Based on data from Kurious Top Brands in Indonesia in 2023, data is obtained in Figure 5.1. below is where the largest air conditioning market is controlled by LG.
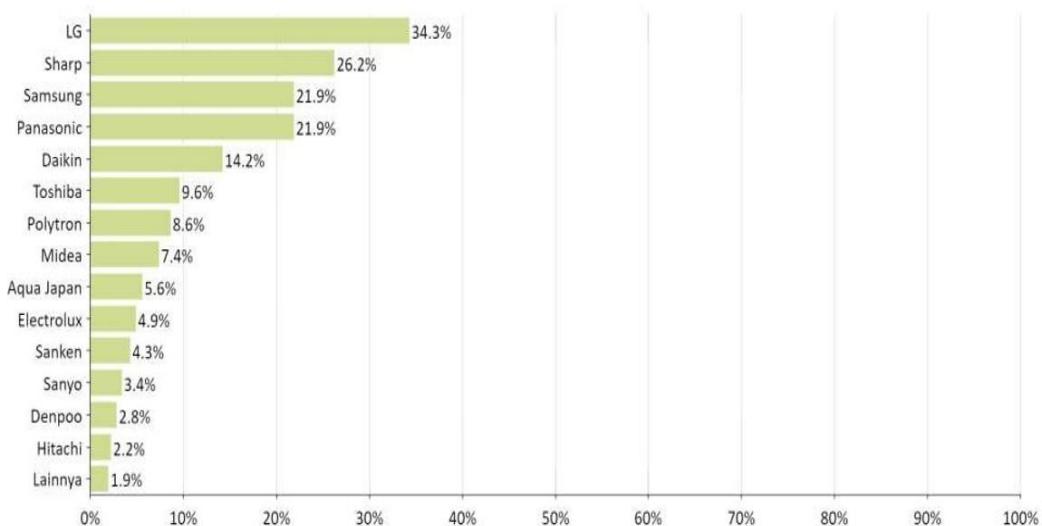
Figure 1. Air Conditioning Consumption Data in Indonesia 2023 (Kurious, 2023)

Based on the data above, PT. XYZ has a great opportunity to be able to increase its market share, by making several efforts to improve product quality and other things related to product differentiation that suits consumer desires. The emergence of new manufacturers and

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brands will make the competitive map even more increasing, so the recommendations from the results of this study will be very helpful to increase the HVAC market share.

One of the parameters of competitiveness in the HVAC industry is production capacity. The facilities owned by PT. XYZ is very likely to be able to serve the largest market share in Indonesia, especially in the Big Island, such as Java and Sumatra where the HVAC needs for these two islands are the largest. One of the development areas chosen by HVAC manufacturers is the area on the island of Java because it has the largest population in Indonesia and the largest number of industries in Indonesia, so the largest consumption on the island of Java is very attractive to HVAC players in Indonesia, with a consumption of around 3.7 million units in 2024.

| Year | Asumption | | | | |
| | Domestic Consump. Growth | Domestic Consumption | Domestic Consumption | Domestic Consumption | Domestic Consumption |
	6%	9%	12%	15%	17%
2011	47.999	47.999	47.999	47.999	47.999
2012	50.879	52.319	53.759	55.199	56.159
2013	53.932	57.028	60.210	63.479	65.706
2014	57.168	62.160	67.435	73.000	76.876
2015	60.598	67.755	75.527	83.951	89.945
2016	64.233	73.852	84.591	96.543	105.235
2017	68.087	80.499	94.742	111.025	123.125
2018	72.173	87.744	106.110	127.678	144.057
2019	76.503	95.641	118.844	146.830	168.546
2020	81.093	104.249	133.105	168.855	197.199
2021	85.959	113.631	149.078	194.183	230.723
2022	91.116	123.858	166.967	223.310	269.946
2023	96.583	135.005	187.003	256.807	315.837
2024	102.378	147.156	209.443	295.328	369.529
2025	108.521	160.400	234.577	339.627	432.349

Figure 2. Table Projected growth of air conditioning consumption in Indonesia
(Source: the author's work)

From the data above, it shows that the need for intensive efforts for PT. XYZ to be able to develop create product differentiation that suits the desires of consumers so that it can seize the existing market share as in the table above.

Table 2. Sales Data of PT. XYZ over the past 3 years

| Month | Year | | |
	2021	2022	2023
January	128	448	228
February	144	136	468
March	256	360	192
April	208	672	128
May	208	384	384
June	96	416	200
July	184	360	168
August	264	308	88

Month	Year		
	2021	**2022**	**2023**
September	200	436	248
October	224	440	120
November	160	328	248
December	240	328	260
Total	4.333	6.638	4.755

(Source: Results by the author)
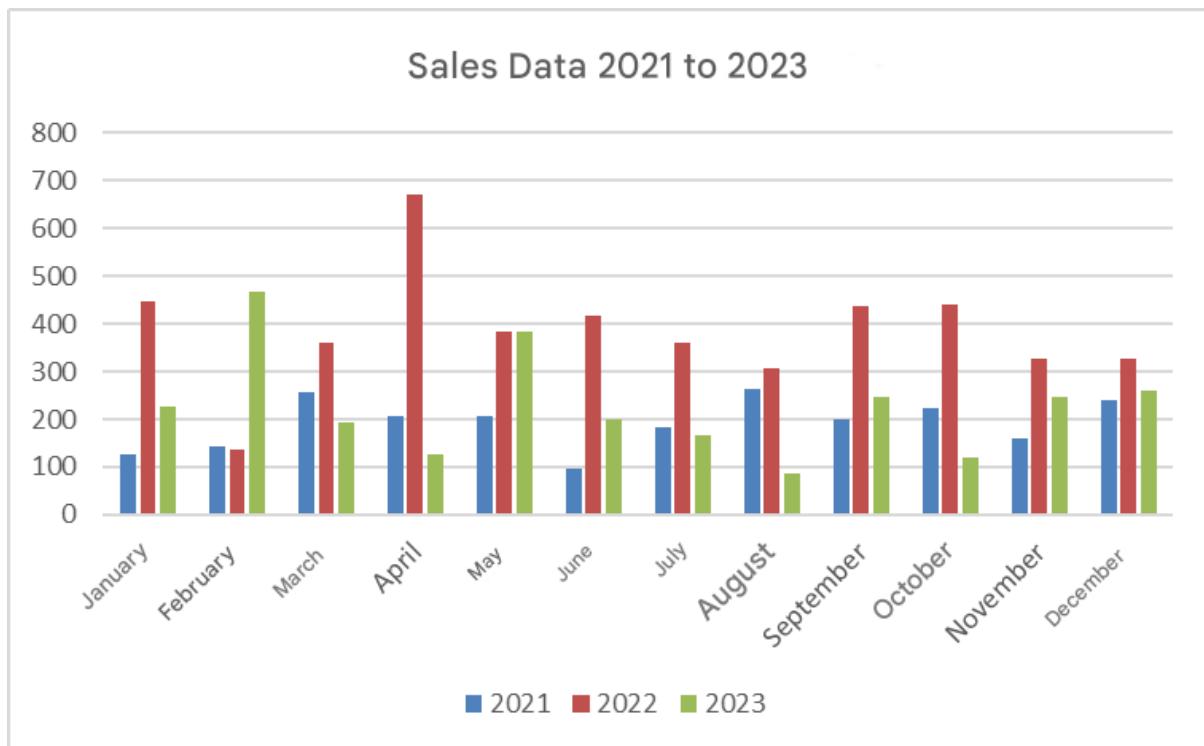
Figure 3. Sales Data of PT. XYZ over the past 3 years
(Source: Results by the author)

Analisa Variable Important to Customer

From the results of data processing, respondents' answers to variables important to customers were obtained that the Company has been sufficiently responsive to every consumer desire for several variables sub important to customers. The order of proirity is obtained as follows:

Tabel 2. Priority of Important to Customer

Attribution	Priority of Important to Customer	
	Total	Average
Q2 *Electrical test result*	132	4.40
S1 *Commissioning*	131	4.37
S4 *Technical service*	130	4.33
U2 *Reliability*	123	4.10
S2 *Help desk service*	123	4.10
S5 *Response time*	123	4.10

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Attribution	Priority of Important to Customer	
	Total	Average
I2 *Quick response reputation*	123	4.10
R2 *Sales product knowledge*	122	4.07
S3 *Technical training*	121	4.03
A2 *Delivery time*	121	4.03
P1 *Speed of Quotation*	120	4.00
P3 *Price performance*	119	3.97
R1 *Relationship with customer*	118	3.93
P2 *Value*	116	3.87
A1 *Remote warehouse & stock readiness*	112	3.73
I1 *Brand image*	110	3.67
F2 *Coloring*	100	3.33
F1 *Packaging*	98	3.27
U1 *Performance*	98	3.27
Q1 *Visual of HVAC*	95	3.17

The results of the test on the electrical installation of HVAC products show the greatest value, this indicates that the results of the electrical test are the main concern of consumers so that the company needs to provide maximum results for the electrical factor of HVAC products. The next biggest concern of consumers is in commissioning, product quality will be said to be good if during the initial testing after installation (commissioning) there are no obstacles, and the HVAC product is operating properly. The next variable that is the main concern of consumers is technical service, this variable shows that the concession really expects technical service if there is a problem with the HVAC purchased. The company PT. XYZ must have a technical team that is able to move quickly (responsive) and can provide service or technical repairs in the event of a problem with HVAC.
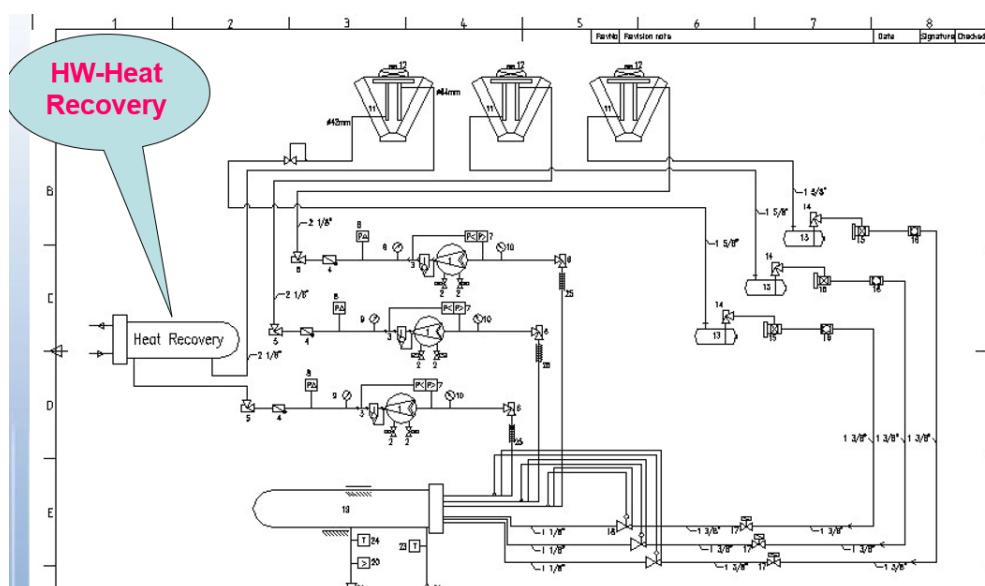
Figure 3. Schematic System with Heat recovery system

Vhw (max) =TRx18.1 gal/hr
         =TRx68.6 Liter/hr *)
*) University of Florida, Ronald E Jarnagin

Air Cooled Chiller R22
Hot Water 27C --> 55 C
Example:
TR --> 41,16 m3/hr is equal to 275 Guests shower/h

Priority of Improvement Action

It is not possible to make an improvement at the same time given the limitations of capabilities, resources, financial capital and other reasons; therefore it is necessary to prioritize which actions should be done first and which should be postponed.

Table 3. Improvement Priorities

No.	Priority of Improvement Action	Value		No.	Priority of Improvement Action	Value
1	Improve Customer Relationship	255.1				
2	Internal process control	241.6				
3	Finish good stock determination	210.2		11	Review design	101.0
4	Improve help desk &	183.1		12	Standardize commissioning tools	86.1
5	Control vacuum drying	180.8		13	Improve drafter speed of	84.7
6	Improve Final Inspection	156.8		14	Welder Skill-up	74.5
7	Technical presentation Skill-up	145.4		15	Powder coat quality	69.9
8	Problem identification of	143.3		16	Price benchmarking	63.4
9	Testing team skill-up	117.4		17	Improve packaging material	56.2
				18	Packaging system standards	41.5
10	**Web-site update (Learing**	**114.1**		19	**Additional powder coat facility**	**10.0**

For a repair project where many things must be done, of course, it is necessary to make a limit on the priority of actions so that the improvements to be made are more focused on the goals to be achieved. From the pareto analysis, an overview of the priority of improvement actions is obtained.

Figure 4. Pareto Analysis for Improvement Priorities

From the Pareto diagram above, corrective actions can be prioritized based on their potential impact on system improvements. By focusing on the top 80% of areas for improvement, we can allocate resources to actions that will yield the greatest results. Table 5.4 and figure 5.4 outline the first 11 priorities for immediate repair and attention. These priorities range from enhancing customer relationships to improving the design review process, all of which aim to increase operational efficiency and customer satisfaction.

The first priority is improving customer relationships. Building stronger, more loyal customer connections is essential, and this can be achieved through increased visit schedules, frequent phone calls, and organizing special events such as exhibitions or customer gatherings. The second priority focuses on internal process control, ensuring the operational team maintains consistency and continues to improve product quality. Additionally, proper stock determination of finished goods is vital for addressing unexpected customer demands, and an effective help desk, coupled with proactive communication, will further ensure customer satisfaction and service accessibility.

The final set of priorities addresses several critical operational aspects. Vacuum drying control, final inspection improvements, and enhanced technical presentation skills for sales teams are all essential to improving product quality and customer experience. Further, the commissioning activity process, testing team skills, and website updates with relevant technical learning materials are all crucial to building a positive reputation and fostering long-term brand loyalty. Finally, ongoing design reviews ensure HVAC products remain innovative and meet customer expectations by adapting to new technologies and customer feedback.

Preparation of Alternative Decisions

In the discussion of the QFD above, it has been known that the customer needs of the 20 attributes of market competition for HVAC products through a questionnaire from 30 respondents, as well as the priority contribution value of the value of customer interests for product attributes as explained in table 5.4. The proposed priority steps for what improvements

must be carried out as a technical response to customer needs will be the agenda of PT. XYZ in the future.

At this stage, the author will continue the priority of attribute contribution values from table 4.14 which is the result of data processing using the QFD method, followed by AHP data processing through pair-wise comparison to find the most appropriate alternative strategy.

QFD output on Pareto curve figure 5.4. used as input in the processing of AHP data. We selected 14 out of 20 attributes for an alternative matrix of strategy choices based on Pareto analysis 80% of the impact occurred on the 14 priority attributes. Here is a pair-wise comparison matrix for the first priority criteria,

Tabel 5. Pair-wise Comparison Matrix (Commissioning)

Commissioning	Cost Leader	Different	Focus
Cost Leadership	1.000	0.143	5.000
Differentiation		1.000	9.000
Focus			1.000

1) Eigenvalue and Weight

Calculate the eigenvector by completing the pair-wise comparison matrix above by the reciprocal value of the matrix to the right of the diagonal (number 1), the eigenvector of the matrix above as follows:

Table 6. Own vector

Commissioning	Cost Leader	Different	Focus
Cost Leadership	1.000	0.143	**5.000**
Differentiation	7.000	1.000	**9.000**
Focus	**0.200**	**0.111**	**1.000**

Now we add each column, then divide each cell by the result of the sum of the columns, this new matrix is called the normalized eigen vector.

Tabel 7. Normalized Eigen Vector

	Sum	8.200	1.254	15.000
Cost Leadership		0.122	0.114	**0.333**
Differentiation		0.854	0.797	**0.600**
Focus		**0.024**	**0.089**	**0.067**

The weight value is the average of the sum of each row in the normalized eigenvector; here is the alternative weight of the Commissioning attribute.

Table 8. Weights of Attributes

	Sum	8.200	1.254	15.000	Weight
Cost Leadership		0.122	0.114	0.333	0.19
Differentiation		0.854	0.797	0.600	0.75
Focus		0.024	0.089	0.067	0.06

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To prove that the matrix is consistent, the sum of the weights must be equal to 1. This for the value of the strategy weights for the alternatives 0.75, 0.19 and 0.06 respectively

In the same way as the steps above, the author did it on the other 13 attributes. In the following table, the author presents the results of the final calculation of the pair-wise comparison matrix for alternative strategies from 14 attributes that are priorities according to the Pareto diagram in figure 4.1. The author only made a pair-wise comparison analysis for 14 research attributes referring to the Pareto concept by prioritizing attributes that have an 80% impact on contributions.

Table 9. Alternative Matrix of Strategies on Priority Attributes

S1 *Commissioning*

Commissioning	Cost Leader	Different	Focus	
Cost Leadership	1.000	0.143	5.000	
Differentiation	7.000	1.000	9.000	
Focus	0.200	0.111	1.000	
Sum	8.200	1.254	15.000	Weight
Cost Leadership	0.122	0.114	0.333	0.19
Differentiation	0.854	0.797	0.600	0.75
Focus	0.024	0.089	0.067	0.06
Calculation control	1	1	1	1

I1 *Brand Image*

Brand Image	Cost Leader	Different	Focus	
Cost Leadership	1.000	0.111	3.000	
Differentiation	9.000	1.000	5.000	
Focus	0.333	0.200	1.000	
Sum	10.333	1.311	9.000	Weight
Cost Leadership	0.097	0.085	0.333	0.17
Differentiation	0.871	0.763	0.556	0.73
Focus	0.032	0.153	0.111	0.10
Calculation control	1	1		1

I2 *Quick Response Reputation*

Quick Response Reputation	Cost Leader	Different	Focus	
Cost Leadership	1.000	0.111	5.000	
Differentiation	9.000	1.000	7.000	
Focus	0.200	0.143	1.000	
Sum	10.200	1.254	13.000	Weight
Cost Leadership	0.098	0.089	0.385	0.19
Differentiation	0.882	0.797	0.538	0.74
Focus	0.020	0.114	0.077	0.07
Calculation control	1	1	1	1

Q2 *Electrical Test Result*

Electrical Test Result	Cost Leader	Different	Focus	
Cost Leadership	1.000	0.111	0.143	
Differentiation	9.000	1.000	9.000	
Focus	7.000	0.111	1.000	
Sum	17.000	1.222	10.143	Weight
Cost Leadership	0.059	0.091	0.014	0.05
Differentiation	0.529	0.818	0.887	0.74
Focus	0.412	0.091	0.099	0.20
Calculation control	1	1	1	1

P3 *Price Performance*

Price Performance	Cost	Different	Focus	
Cost Leadership	1.000	7.000	9.000	
Differentiation	0.143	1.000	5.000	
Focus	0.111	0.200	1.000	
Sum	1.254	8.200	15.000	Weight
Cost Leadership	0.797	0.854	0.600	0.75
Differentiation	0.114	0.122	0.333	0.19
Focus	0.089	0.024	0.067	0.06
Calculation control	1	1	1	1

R1 *Relationship with Customer*

Relationship with	Cost	Different	Focus	
Cost Leadership	1.000	1.000	5.000	
Differentiation	1.000	1.000	7.000	
Focus	0.200	0.143	1.000	
Sum	2.200	2.143	13.000	Weight
Cost Leadership	0.455	0.467	0.385	0.44
Differentiation	0.455	0.467	0.538	0.49
Focus	0.091	0.067	0.077	0.08
Calculation control	1	1	1	1

S4 *Technical Services*

Technical Service	Cost	Different	Focus	
Cost Leadership	1.000	0.143	7.000	
Differentiation	7.000	1.000	9.000	
Focus	0.143	0.111	1.000	
Sum	8.143	1.254	17.000	Weight
Cost Leadership	0.123	0.114	0.412	0.22
Differentiation	0.860	0.797	0.529	0.73
Focus	0.018	0.089	0.059	0.05
Calculation control	1	1		1

S3 *Technical Training*

Technical Training	Cost	Different	Focus	
Cost Leadership	1.000	0.111	0.333	
Differentiation	9.000	1.000	0.143	
Focus	3.000	7.000	1.000	
Sum	13.000	8.111	1.476	Weight
Cost Leadership	0.077	0.014	0.226	0.11
Differentiation	0.692	0.123	0.097	0.30
Focus	0.231	0.863	0.677	0.59
Calculation control			1	1

S5 *Response Time*

Response Time	Cost	Different	Focus	
Cost Leadership	1.000	0.200	0.333	
Differentiation	5.000	1.000	5.000	
Focus	3.000	0.200	1.000	
Sum	9.000	1.400	6.333	Weight
Cost Leadership	0.111	0.143	0.053	0.10

S2 *Help Desk Service*

Help Desk Service	Cost	Different	Focus	
Cost Leadership	1.000	0.143	3.000	
Differentiation	7.000	1.000	5.000	
Focus	0.333	0.200	1.000	
Sum	8.333	1.343	9.000	Weight
Cost Leadership	0.120	0.106	0.333	0.19

Differentiation	0.556	0.714	0.789	0.69		Differentiation	0.840	0.745	0.556	0.71
Focus	0.333	0.143	0.158	0.21		Focus	0.040	0.149	0.111	0.10
Calculation control		1	1	1		Calculation control	1	1	1	1

Q1 *Visual HVAC*						U1 *Function Performance*				
Visual HVAC	Cost	Different	Focus			Function Performance	Cost	Different	Focus	
Cost Leadership	1.000	0.111	5.000			Cost Leadership	1.000	0.200	3.000	
Differentiation	9.000	1.000	9.000			Differentiation	5.000	1.000	7.000	
Focus	0.200	0.111	1.000			Focus	0.333	0.143	1.000	
Sum	10.200	1.222	15.000	Weight		Sum	6.333	1.343	11.000	Weight
Cost Leadership	0.098	0.091	0.333	0.17		Cost Leadership	0.158	0.149	0.273	0.19
Differentiation	0.882	0.818	0.600	0.77		Differentiation	0.789	0.745	0.636	0.72
Focus	0.020	0.091	0.067	0.06		Focus	0.053	0.106	0.091	0.08
Calculation control	1	1	1	1		Calculation control	1	1	1	1

R2 *Sales Product Knowledge*						A2 *Delivery Time*				
Sales Product Knowledge	Cost Leader	Different	Focus			Delivery Time	Cost	Different	Focus	
Cost Leadership	1.000	0.200	1.000			Cost Leadership	1.000	7.000	9.000	
Differentiation	5.000	1.000	7.000			Differentiation	0.143	1.000	3.000	
Focus	1.000	0.143	1.000			Focus	0.111	0.333	1.000	
Sum	7.000	1.343	9.000	Weight		Sum	1.254	8.333	13.000	Weight
Cost Leadership	0.143	0.149	0.111	0.13		Cost Leadership	0.797	0.840	0.692	0.78
Differentiation	0.714	0.745	0.778	0.75		Differentiation	0.114	0.120	0.231	0.15
Focus	0.143	0.106	0.111	0.12		Focus	0.089	0.040	0.077	0.07
Calculation control	1	1	1	1		Calculation control	1	1	1	1

The data in the table above is a summary of the results of the AHP analysis to find alternative strategies for each priority attribute. Furthermore, the author tabulates the data in an excel table and sums the total value of each alternative strategy so as to produce a sequence of strategies as alternative management choices to determine which strategies will be used in facing the competition of the HVAC product market in Indonesia (Park, 2020).

Management Decision Making

The following is the final part of data processing, as explained in the previous sub-chapter. Paying attention to the table above, then all the weight values are added up and compared among the three alternative competition strategies recommended by Porter. The following table shows the final results of the processing for the selection of alternative strategies:

Table 10. Weighted Values for Priority Attributes

Alternative Strategies	Value of Weight for Priority Attributes														
	S1	I1	I2	Q2	P3	R1	S4	S3	S5	S2	Q1	U1	R2	A2	Sum
Cost Leadership	0.19	0.17	0.19	0.05	0.75	0.44	0.22	0.11	0.10	0.19	0.17	0.19	0.13	0.78	3.68
Differentiation	0.75	0.73	0.74	0.74	0.19	0.49	0.73	0.30	0.69	0.71	0.77	0.72	0.75	0.15	8.46
Focus	0.06	0.10	0.07	0.20	0.06	0.08	0.05	0.59	0.21	0.10	0.06	0.08	0.12	0.07	1.85

Increasing The Competitive Advantage of PT. XYZ Through Product Differentiation For HVAC Chiller (HRS) Systems

Of the three alternative competition strategies, namely Cost Leadership, Differentiation, and Focus on certain market segments. Now it's time for us to determine which strategy is the most appropriate to execute. From the table, it can be seen that the alternative value of the Differentiation strategy is far above the value of other alternatives with a total weight of 8.46, followed by the alternative Cost Leadership strategy with a total weight of 3.68, and finally the Focus strategy with a total weight of 1.85.

CONCLUSION

This study used Quality Function Deployment (QFD) and Analytic Hierarchy Process (AHP) to identify key consumer attributes for HVAC products and recommend strategies for PT. XYZ. QFD revealed 20 attributes, prioritizing electrical test results, commissioning, technical service, reliability, and help desk—suggesting product differentiation via tailored features and services, supported by quality enhancements like final inspections, process controls, and team training. AHP confirmed differentiation as the top strategy (highest weight over cost leadership and focus), emphasizing technical excellence, customer relationships, brand image, and rapid response to boost sales and competitiveness. For future research, explore longitudinal impacts of these strategies on sales data or extend QFD/AHP to other refrigeration subsectors like non-chiller HVAC units.

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