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Distribution Strategies Analysis Using AHP and TOPSIS: A Distribution Company Case's Study in Special Region of Yogyakarta, Indonesia

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Abstract: The selection of distribution strategy is important for the company in order for the product to be delivered to the customer in time and according to the required quality and quantity. This research aims to analyze and determine the company's distribution strategy using the AHP and TOPSIS methods. The results of the calculations with AHP indicate that the distributor reliability is seen from the history and experience (0268), effective fund management (0159), and the financial structure of the distributor (0147) are three criteria with the weight of interest highest. The geographical strategy is a strategy that has the highest value so it is recommended to be the main strategy of the company in distributing products to customers.

Keywords: AHP, Distribution Strategy, TOPSIS

Introduction

The development of the industry is increasing both in national and international level. The 4.0 industrial era demands the company to be more competitive in every aspect. This industrial revolution certainly not only gives a threat to any company, but also provides many opportunities that can be utilized to run the business wheels of the company. To name a few, big data, IoT (internet of things), and blockchain are some examples of the 4.0 industrial revolution that can help companies to determine business strategy to be more effective and efficient.

The 4.0 industrial era has not only changes the mindset of business actors, but also consumers. The shift in consumer mindset is shown by the behaviour of consumers who are much smarter and selective in choosing a product. Some consumer considerations include: value, quality, and price of the product. This suggests that prices are not only the main reason for consumers to buy products. Consumers

sometimes do not hesitate to pay more for the quality and value of the products they expected.

This phenomenon requires companies to expand the market and be active in increasing their market share. In this case, customer loyalty becomes one of the key determinants of the company's success. Customer loyalty can be earned and maintained when the company is committed and consistently provide quality products and value as desired by customers, but still at the appropriate price. It is certainly not an easy task. The company must be able to define new strategic policies in order to face this increasingly fierce market competition.

It also applies to bottled water companies. Increased consumption of bottled water and the growth of population in Indonesian make it a staple need that the demand is always increasing, causing the bottled drinking water business to be even more lucrative. Companies that are engaged in the business of bottled water to expand its market network of products.

One of the bottled water company that has had a large market and brand known to the community is X, with A



as the distributed flagship product. The marketing of A products to all the country led to the distribution networks structure to be complex. Therefore, a distribution channel is required that focuses on the product distribution process until the end user.

X already has several distribution channels spread throughout cities in Indonesia to better reach consumers, one of which is CV. Z, located in the Special Region of Yogyakarta. Distributor CV. Z markets A products in the Yogyakarta and surrounding areas, such as Klaten, Wonogiri, and Purworejo. In addition to A products, CV. Z also distributes other X products. As one of the distribution channels of large capacity companies, CV. Z requires a strategic distribution strategy and appropriate organization to manage its distribution channel.

The determination of the distribution strategy is done by using the analytic hierarchy process (AHP) method and the technique for others reference by similarity to ideal solution (TOPSIS). AHP method is useful to assist the process of weighting each of the existing criteria while TOPSIS is used as a tool in solving multiple criteria problems in practical alternatives [1].

TOPSIS is a method that uses input models adaptation of other methods. The AHP method is selected to provide the input value required by TOPSIS as the initial capital for subsequent calculations. The use of the TOPSIS method by calculating the proximity value and preference value and comparing to the weight gained from the AHP method process can result in a more objective value [2].

Integration of these two methods is widely used in resolving cases of practical decision making, including decision making in determining the organization's distribution strategy in CV. Z. AHP will be used for the weighted to all sub-criteria and criteria used in determine the distribution strategy of CV. Z. While TOPSIS is used to obtain the ranking of alternative distribution strategies. The selection of TOPSIS due to the criteria used are benefit and there are also cost so that TOPSIS will be very in getting results that are close to the ideal.

This research was implemented in CV. Z located in special region of Yogyakarta in May to June 2016. The data collection techniques used in this study include: questionnaires, interviews, and observations. The contents of the questionnaire used first have been validated by the head of depo and supervision. The validity used in this study is including in the category of face validity. Face validity is a process of subjective assessment or evaluation of a questionnaire appearance in terms of readability, feasibility, and consistency of format and style, as well as the clarity of the language used. In general, this validity process is performed by experts in their field [3].

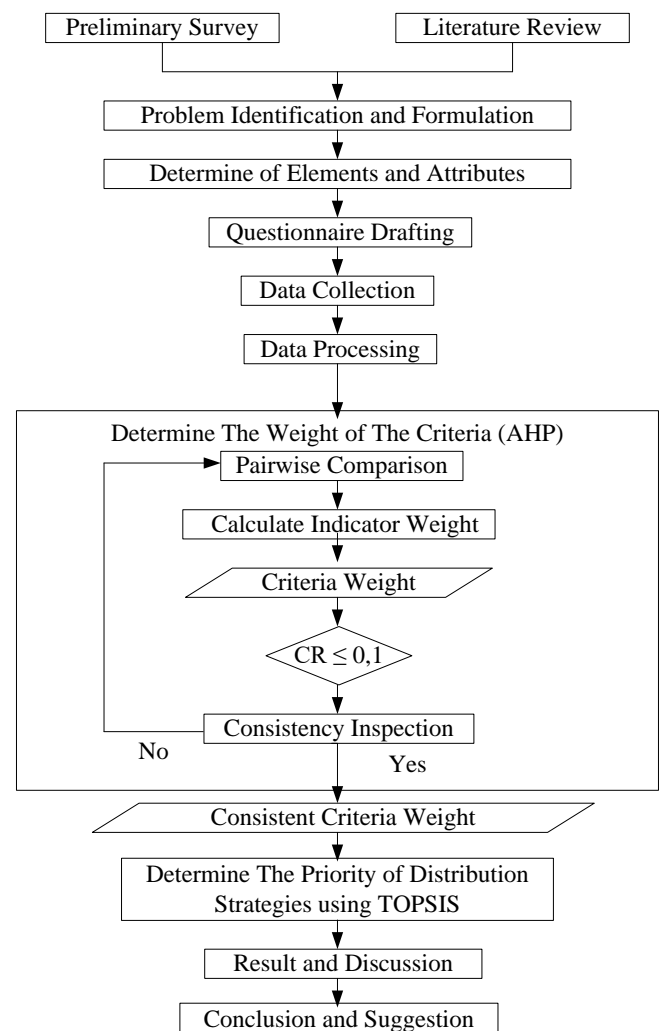


Figure.1. Research Design

Method / Metode

The samples in this study were selected using the purposive sampling method. According to Etikan, the purposive sampling technique is a sampling technique in which elements of the population are chosen based on the criteria of the researcher. The selected sample is a head section consisting of a depo head and supervision. The data processing methods used are AHP and TOPSIS [4]. A detailed overview of the stages of research conducted can be seen in Figure 1.

As for the strategy in the management of distribution channels adapted from Paksoy, et al. (2012) as can be seen on Figure 2. In the initial stage, a focus group discussion was conducted with respondents who are the experts to determine what strategy can be adapted and used as criteria

and sub-criteria in the hierarchy of strategy determination in distribution channel management.

In the determination of alternative strategies to distribute products X, CV. Z has several criteria adapted from Paksoy [5]. These criteria are processed using the AHP method to obtain the weight of each criterion. The first step is to create a matrix of individual opinions from each respondent. After all data is consistent with the requisite value of inconsistency ≤ 0.1 then it is followed by making a matrix of combined opinions using the geometric averages. The weight gained from calculations with AHP method using expert choice 11 can be seen in Figure 3. Here is a detailed explanation for each criteria used in determining the distribution strategy of CV.

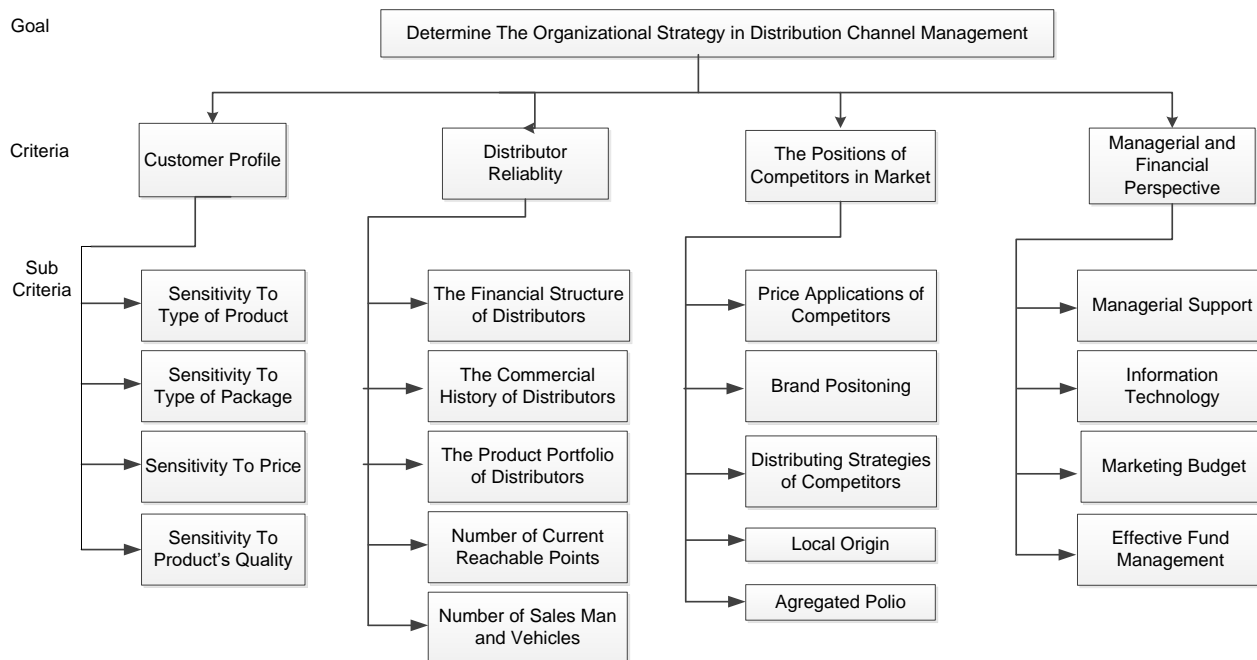


Figure 2 Hierarchy structure strategy determination in corporate distribution channel management [5]

Results And Discussion

A. Customer Profil

A.1. Sensitivity to Type of Product

Response plays a fairly big role in shaping consumer behaviour. Respon over product types will have a positive or even negative effect on purchasing process of the product by

consumers. A positive response to a particular product type will allow the consumer to make a purchase of the product, otherwise the negative response will prevent the consumer

from making the purchase. The response can certainly be influenced by external and internal consumer factors. There are six stages of consumers in response to the product, namely:

awareness, knowledge, liking, preference, conviction, and purchase [6].

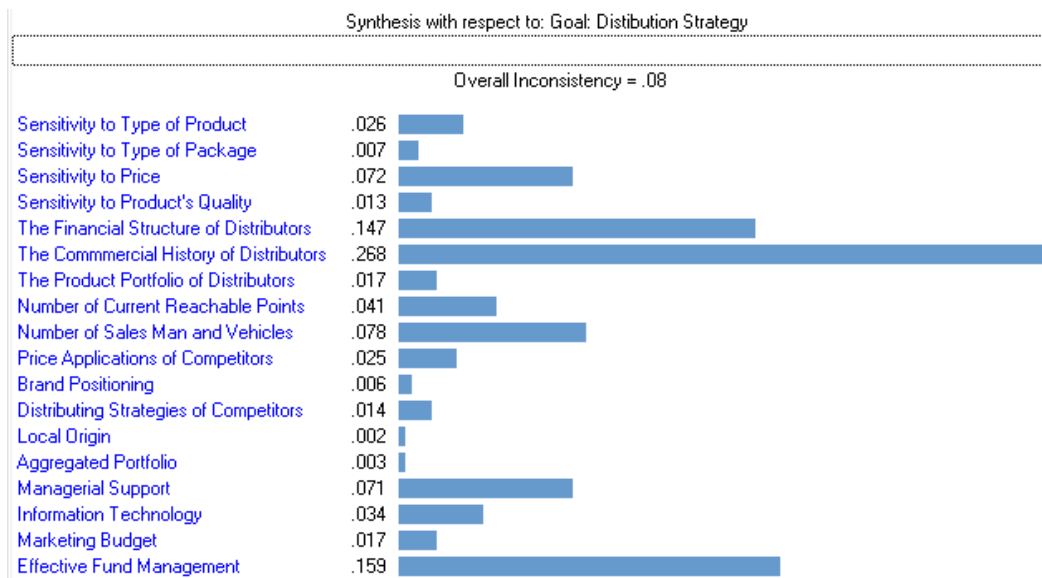


Figure 3. The results of the weighted sub-criterion of distribution with AHP

Source: Primary data processed, 2020

Sensitivity to product type is one of sensitivity of consumer response that occurs due to change in stimuli caused by the type of product. Sensitivity of consumer response is the level of sensitivity or change in consumer awareness of the presence of a product (in this case a new product type) that affects its behavior in meeting its needs as a result of the expansion of beverage product types. The type of product in the CV. Z is bottled water with brands: A, B, C, and D. Profile of consumers who have sensitivity to the type of bottled water product is one of the criteria considered in determining the distribution strategy that will be applied by CV. Z. This sub-criterion has a weight of 0.026. This sub-criterion is sufficiently considered in determining the distribution strategy because some consumers are currently quite sensitive to the type of product, especially bottled water.

A.2 Sensitivity to Type of Package

Sensitivity to packaging has a significant level of interest rate of 0.007. Nowadays, consumers are increasingly aware in protecting the environment thus the packaging

used is one consideration in buying a product. In addition, packaging becomes a consideration because when the consumer hears the word packaging, the thing that may cross their minds is packaging that protects the product, keeps the product safe and hygienic, and makes the product more attractive. Some consumers are concerned if the packaging used is difficult to open or should use a tool to open, the packaging is fragile and easy to tear so the contents fall apart when opened, packaging that is difficult to be closed back and packaging that have too many layers.

According to Mohebbi [7], packaging plays an important role as a means of communication in marketing activities and distribution management and logistics. In general, the influence of packaging functions on consumer decisions on product purchases is the ability to protect products, the ability to maintain product freshness, ease to carry or move, ease of storage, ease of opening, information related to nutrition, eco-friendly, fashionable packaging design and so forth.

A.3 Sensitivity to Price

Prices play an important role in increasing product purchases, as well as bottled drinking water products. Some consumers will pay attention to price as an important factor in a product, while others emphasize the factor of value, brand, quality, and product fame compared to the price. The complexity of the consumer's profile to the price becomes one of the necessary sub-criteria because it can affect the purchasing power of consumers.

CV. Z provides an important assessment of the customer's sensitivity sub-criteria to the price, with a value of 0.072. Consumers based on the price factor in general consist of two kinds by CV. Z, namely upper-middle class consumer who emphasize more on the value factor, brand, quality, and fame of the product, while lower - middle class consumer who focuses on the price attribute of the product. X products commonly consumed by consumers from various circles cause pricing to be one of the most important sub-criteria for determining distribution strategies.

A. 4 Sensitivity to Product's Quality

The increasing maturity of consumer minds in considering the quality of a product chosen to require the company to always improve their products. Product quality is an important thing to be cultivated by every company to satisfy the needs and desires of consumers. Through good quality products are expected to have high competitiveness.

The level of customer satisfaction relies heavily on product quality. High quality levels will result in high customer satisfaction. Keeping the satisfaction of consumers will increase the sustainability of the relationship with the costumers and continue to build new consumers. Therefore, consumer profiles that have sensitivity to quality are quite important in considering what strategies will be used in distributing products. The weighting of the "quality sensitive consumer profile" sub-criteria is 0.013.

B. Distributor Reliability

B.1 The financial Structure of Distributors

The policy on the structure of capital involves trade off between risk and return rate. Addition of debt will increase not only the risk of the company but also enlarges the expected return rate. The higher the risk from raising

debt tends to lower the stock price, but increasing the rate of return expected to increase the price of the stock. The optimal of capital structure is the capital structure that optimizes the balance between risk and return thereby maximizing the stock price [8].

The sub-criterion of the financial structure of distributors has a weighted interest of 0.147. The problem of capital structure is a big problem because both the capital structure will have a direct effect on the financial position of the company. The criterion is very important because if the company has an unwell financial structure and has very large debts, it will give a heavy burden to the company.

B.2 The Commercial History of Distributor

Distribution activities are considered to be quite reliable and competent if the distribution channel already has experience in distributing a product. Experience also affects the quality of distributors. In experienced distributors are more likely to make mistakes than experienced distributors.

The company's years of experience in handling marketing areas in the Yogyakarta and surrounding areas in distributing bottled drinking water products shows the competent capacity of distributors. The work experience of distribution channels has been seen as an important factor in predicting markets and overcoming problems in the distribution process, especially in terms of the quality of their distribution. Therefore, history and experience can be used as a reference in determining the distribution strategy.

In the case of CV. Z, the history and experience of distribution are the sub-criteria with the highest value and are very influential in determining the distribution strategy with a value of 0.268. This is because the company distributes X products which incidentally has a wide range of market segmentation. The complexity of these market segments results in higher opportunities for problems that arise in terms of product distribution. With history and experience in the distribution of X products, it is hoped that the company has high capability in resolving these problems without reducing the quality of distribution.

B.3 The Product Portfolio of Distributor (DP)

Reliability is the success level in the performance of a system to be able to provide better results in a period and in certain operating conditions. The product portfolio of the distributor is important enough to be able to describe the reliability of the distributor. The sub-criterion "distributor product portfolio" has an importance weight of 0.018. The distributor's product portfolio includes the product portfolio that is sought and distributed. The product portfolio of the company is to have different products to distribute consisting of A, B, C, and D.

B.4 Number of Current Reachable Points

The sub-criterion number of current reachable points has a weighted interest rate of 0.041 in determining the distribution strategy undertaken by the company. The target market that has been shared by the company is one of sub-criteria that supports the reliability in distributing products. The market shared achieved by the company is an actual market that is realized with the market that can be fulfilled by the overall demand of consumers in a particular region. In reality, the market is not only served by one company only. Many of the company's competitors are trying to seize to be able to meet market demand. This suggests that the company has many rivals in distributing the product. The company's rivals are distributors with different products and distributors who cooperate with local companies. The company has market coverage of Yogyakarta and surrounding areas. Therefore, with the ability of the company in fulfilling the demand of consumers is a good strategy as well as to defeat the its competitors. In other words, the company needs to take the market.

B.5 Number of Sales Man and Vehicles

The number of sales man and vehicles in a distribution channel is an important criterion in fulfilling the market demand. Distribution activities are required in order for a product to be in the customer's custody, where the product is consumed by consumers in diverse and broad geographical segmentation. Distribution channels must establish appropriate and effective strategies to achieve marketing objectives to retailers and to the areas of marketing targets.

The number of sales man and vehicles sub-criteria has an attribute value of 0.078 which means that the sub-criteria have a high level of importance in determining the

company's distribution strategy. X products that have various types of complex market segmentation require an adequate amount of workers and means of transportation in the distribution process to meet the market demand for products.

C. The Positions of Competitors in Market

C.1 Price Applications of Competitors

Pricing is one of the most important functions in marketing. The price is variable in exchange so that the price determination is one of the deciding factor against the product demand. The price difference between brands of bottled water on the market is not so obvious because each of the brands implements a going rate pricing strategy, that is, setting the same price or a certain percentage in the below or above the competitor's price. However, the price determines the competition between the brands of bottled drinking water. A which is one of the products distributed by the company is a brand of bottled drinking water that sets the highest prices among other local brands. Therefore, the price set by competitors becomes an important criterion for knowing the position of competitors in the market. If the company knows its competitor position in the market it will be easier for them to determine the distribution strategy to be used. This is because for some consumers the lower price (cheaper) is important but for some consumers others may be a price problem is not very important when compared with the quality of the products purchased by the consumers. The price set by competitors has an importance weight of 0.025.

C.2 Brand positioning

According to Keller [9], brand positioning is company's activity to design offers and images that provide a different value in the minds of consumers. A good brand positioning will make consumers know the meaning and uniqueness of the brand so that consumers can differentiate the product brand with other products and have reason to choose those brands. The actual approach of a brand position on the market depends on how to communicate the benefits and attributes of the product to the consumer or the user. Consequently, the product brand position seeks to create differences from competitors. Many products are now implementing brand positioning as a product marketing strategy. For example, some bottled water products create

and market their products as a functional product or beverage hence it will boost the interest of consumers in consuming the product.

The brand positioning of competitor in market sub-criteria has a weighted interest rate of 0.006. The product brand owned by the company, X, is very strong with excellent quality so that the demand for the product can be maintained. In other words, brand positioning by the company's competitors in distributing products is not very influential in the company's own distribution strategy. Products that are distributed by companies have brands that are already deeply embedded in the minds of consumers and are successful in creating focus in the minds of consumers as well as strong reasons why consumers should buy products.

C.3 Distributing Strategies of Competitors

To be able to exist in the market, a company should have the ability to determine the strategy and position of its competitors' products. Companies that have a strategy focus on product distribution, the company will maintain its product position in the market in general through control of its distributors [5]. Some values such as geographical position, population, and market demand will have an impact on distribution channels. In this regard, maintaining effective product value and distribution strategy has a close relationship with the marketing power of competitors that rely on product distribution [10].

Distributing strategies of competitors is a sub-criterion that is not very influential. This may be because the company's products already have a market segmentation that tends to be loyal to the product. Such loyalty is a consequence of the company's efforts in maintaining the quality of products in delivering superior products compared to competitor products. As for the weight of interest for sub-criteria the distribution strategy set by competitors is 0.014.

C.4 Local Origin

In its efforts to serve customer groups, the distributor is not alone. The effort of a distributor to build an efficient marketing system in order to serve the drinking water market is rivaled by other distributors. The marketing systems and strategies set by the distributor are influenced

by the competitors. The distributor needs to identify and monitor all the actions and movements of all these competitors in the marketplace, including the origin of the competitor whether the competitors come from local area. In certain regions, local competitors can dominate the market because consumers prefer to consume products originating from local producers. However, in other areas also the origin of competitors is not very important because consumers do not pay attention to where the product they consume originated.

In the case of bottled drinking water, local competitors are sufficiently considered in determining which strategy the distributor will use to distribute their products. This is because sometimes bottled mineral water products from local competitors are well known by consumers in the area and also usually the price of bottled water in the packaging set by local competitors is relatively cheap compared with bottled water whose brand is known at the national level, especially those who have been advertised in the mass, print, and social media. The competitor sub-criterion that comes from the local area has a weight of 0.002 when considering determining the strategy for bottling water distribution.

C.5 Aggregated Portfolio

A portfolio is a combination of various instruments or investment assets structured to achieve the investor's investment objectives. In addition, the combination of various investment instruments also determines the high risk and potential profitability that the portfolio has gained. The sub-criteria of aggregated Portfolio have a weighted interest rate of 0.003. The overall portfolio owned by company competitors such as property, shares, income and money are less influential in determining the company's distribution strategy.

D. Managerial and Financial Perspective

D.1 Managerial Support

A strong distribution channel structure requires managerial support and a stable and appropriate decision-making strategy by the manager [5]. This includes all distribution activities and financial arrangements within the organization. A company is able to survive and continuously

exist if it has loyal customers and good management support (Rahmawati, 2011). In determining the distribution strategy by CV. Z, a sub-criterion of support managers has a weighted interest of 0.071 which indicates that this subcriterion has an important value.

D.2 Information Technology

It is undeniable that one of the main cause of the 4.0 industri era that is all parties suspected is due to the rapid development of information technology. The implementation of the e-commerce, virtual offices, electronic data interchange, big data, intranets, etc. has transcendsthe physical boundaries between countries. The merger of telecommunications with computer technology has resulted in a revolution of information systems. Information or data that in ancient times had to take days to process before being sent to oversea today can be done in seconds.

In managerial and financial perspectives, information technology becomes very important, with a weight of 0.034. This is because with good information technology, companies will be easier to operate. The market can change in a very fast time. So, the existence of information technology will make it easier for information flow from distributors to consumers and from consumers to distributors. In addition, information will also be very quickly obtained and more accurate. Therefore, the correct management of information technology in the company becomes very important. The success of distributors in managing information systems and information technology does not depend on the amount of dedicated investment funds, but lies in the efficacy of the strategies chosen and implemented by the company's management.

D.3 Marketing Budget

The extent of marketing activities has implications for the magnitude of marketing costs. Marketing costs sometimes cover half the price of the product. Therefore, marketing costs require proper planning and control to increase the efficiency and effectiveness of marketing activities.

The positioning sub-criteria of competitors in the market has a weighting of 0.017. In distributing products, companies do not do very active marketing. Marketing is

done through mass media in the form of advertising, social media and so on. However, in its distribution, companies need costs that support these marketing activities such as transportation costs in distributing their products.

D.4 Effective Fund Management

The weight of the sub-criteria effective fund management has an important value of 0.159 for determining the distribution strategy by the company. In terms of competitive, budgeting and financial management must be done effectively [5]. In the distribution process, the funds spent must be in accordance with their interests so that there is no waste of funds and even losses to the distribution channel and can increase the income earned. Building an effective financial system that traces the flexibility of financial policies and controls the use of balanced resources in a company causes effective use of the value chain in the market.

Corporate Distribution Strategy

After obtaining the weight of each sub-criterion, the next step is to perform data processing using the TOPSIS method using microsoft office excel 2007 assistance. To combine the judgment values of the two respondents, the arithmetic average is used. Then proceed with making a standardized decision matrix. After that, standardized weighted decision matrices are also made. At this stage, the input in the form of sub-criteria weights from AHP is used. Furthermore, it can be seen the value of max (ideal solution) and min value (negative ideal solution) which is then carried out separation from ideal solution (S_{ii}^*) and separation from negative ideal solution (S_{ii}'). The calculation continues with finding a relative value for the ideal solution that can be seen in Table 1. Based on calculations with AHP and TOPSIS, it can be seen the best sequence of strategies that can be applied include: distribution strategy based on geography, based on products, based on consumers, and finally hybrid strategy (combination of distribution strategies).

Table 1. The result of relative to ideal solution using TOPSIS

Alternative	Product-based	Geographic-Based	Customer-Based	Hybrid-Based
Si*	0.025718	0.021106	0.023883	0.031604
Si'	0.022698	0.026368	0.020283	0.007569
Si*+Si'	0.048416	0.047474	0.044166	0.039173
Si'/(Si*+Si')	0.468814	0.555416	0.45925	0.19322

Source: Primary data processed, 2020

Description: Ranking of corporate Distribution Strategy: 1. Geographic Based Strategy; 2. Product Based Strategy; 3. Customer Based Strategy; 4. Hybrid Based Strategy

A. Geographic Based Strategy

Generally, the market of a product is heterogeneous with a large number of consumers and has a variety of needs, desires, buying capabilities, and behaviors and demands on purchases. With this basis, it is very difficult for a company to serve the entire market with different consumers. Therefore, this distribution strategy analysis becomes very important so companies can focus on one strategy that can minimize costs and increase company profits and can expand the market by increasing the number of consumers. The calculation results show that the first strategy that is most ideal to be implemented is a geographical strategy.

This geo-based strategy has the highest value of 0.55. The company would be better off using this strategy compared to the other three distribution strategies. This is because consumers are a wholesaler, star outlet, and retailer so the company does not directly distribute products to the end consumers. The company will focus more on distributing its products to wholesaler, star outlets, and retailers located in urban areas. Most wholesaler, star outlets, retailer and end consumer for X products are in urban area so it would be better for companies to focus on distributing their products in urban areas. Although in reality, X products such as A are also found in rural areas. The product is distributed by retailers who take the product from the company. The company's current role is only to distribute its products to wholesaler, star outlet, and retailer so that the geografic based strategy is considered very appropriate to be applied.

B. Product Based Strategy

In conducting product distribution, a strategy that corresponds to the type of product is distributed. The strategy with the second highest value of 0.46 that can be applied is a product based strategy. Based on Paksoy [5], the company that can implement this strategy is a company that has many types or types of products. This is according to the profile of the company that distributes several types of products namely bottled water under the brand of A, B, C, and D. Each brand of the product consists of various kinds of packaging, for example A consists of a gallon package, plastic bottles 600 ml, plastic bottles 1500 ml, and there is also a cup packaging. Consumers have different needs for A products. A with a cup packaging is usually served to guests while the consumers who are traveling will be more suitable with plastic bottle packaging products. Different for household needs, it will be better suited to the gallon packaging product. With the various types of packaging will be able to meet the needs of consumers.

Products are everything that manufacturers offer to consumers to meet the needs of consumers and are able to provide satisfaction to its users consisting of a set of real attributes, in which it is covered with color, price, packaging, the prestige of retailers and services of factories and retailers [12]. Companies can distribute their products based on their product type. For example, approaching the feast day then the company will be more to distribute its products that are branded A and B. This is because by the month of fasting the demand for this product rises quite high compared to the usual days. Especially for the A brand that has been very popular among the people.

C. Customer Based Strategy

This distribution strategy is a management structure that depends on the type of consumer, such as sellers and retailers that can differentiate consumers based on their type [5]. These types of consumers can be distinguished based on factors of demographic or based on more abstract factors of psychographic. Demographic factors consist of age, gender, race, marital status, and income. Psychographic factors consist of social issues, attitudes, career, political institutions, profesion, and views on life [13]. Consumer-based strategies are reflected through concepts and metrics

that direct distribution management, including customer satisfaction metrics, market orientation, consumer value, consumer lifetime value, and more [14].

The calculation results show that a consumer-based strategy has ranked third among other strategies. This is because the company has consumers with a wide scope of consumers. Therefore, application of distribution strategy based on consumers is less appropriate than the geographical and product-based strategy. In addition, products with brands that are well known have a fairly large market share. One of the reasons why this product has enough customers is because the company is committed to maintaining quality and improving its service. Consumer demand has also increased with the growing need for clean water as a beverage. Sales of products on increasing retailers lead to increasing supply needs by distributor channel. Some of these factors reinforce the reason that consumer-based strategies are not a top priority for corporate distribution channels compared to geographic and product-based strategies.

D. Hybrid Based Strategy

According to Paksoy [5], there are several companies that combine distribution strategies based on geographic, product, and consumer. Companies that have a lot of products will need distribution strategy based on products, when demand and consumers are different then it takes distribution strategy based on geographic and consumer. A combination of these strategies can help the company to achieve its goals. However, in this company, hybrid strategy is a fourth-order alternative that has a value of 0.19. This is because when compared to the other three strategies, this strategy is considered not better based on product type considerations, consumer characteristics, consumer demand, and other factors. If there is a combination of distribution strategy, then of course the required cost will be higher when what is more appropriate to be applied by the company is a geographic based strategy.

Conclusions

The company is an official distributor that distributes X products. In determining the distribution strategy, several criteria are considered, namely consumer profile, distributor reliability, competitor's position in the market, and

management and financial perspectives. Based on calculations with AHP, the weight of each criterion is known. The three criteria with the highest importance weight are distributor reliability seen from history and experience (0.268), effective management of fund management (0.159), and distributor financial structure (0.147). While based on the calculations with the TOPSIS method, the highest-ranking of strategies is obtained based on geographic, product-based, consumer-based, and combination strategy (hybrid based strategy).

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