

THE DESCRIPTIVE ANALYSIS OF LOCATION DETERMINATION FACTORS IN PROBIOTIC DRINK FACTORY

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Abstract

The main objective of an organization is to satisfy and delight customers with its product and services. Therefore, it becomes essential for an organization to have a strategy formulated around its manufacturing unit. A manufacturing unit is where all inputs, such as raw materials, equipment, and skilled labor, come together and manufacture products for customers. One of the most critical factors determining the success of the manufacturing unit is the location. Factory location determination is a business-critical strategic decision. Several factors determine the factory's location: competition, cost, and corresponding associated effects. The factory location is a scientific process utilizing various techniques. This study aims to analyze the factors for choosing the location of PT. XYZ, a probiotic drink factory in Indonesia, to give some knowledge and managerial contribution to operational management studies. This study uses a descriptive qualitative method. The data collection method is collecting primary and secondary data such as the company's website, public research, and observation about factory location selection. The results of the analysis in this study show that the factors considered in choosing factory location are: 1) availability and location of resources and raw materials, (2) distance to target markets, (3) ease of distribution, (4) availability of labor, and (5) expansion opportunities.

Keywords: *factory location; manufacturing; operational management.*

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Abstrak

Tujuan utama suatu organisasi adalah untuk memuaskan dan menyenangkan pelanggan dengan produk dan layanannya. Oleh karena itu, bagi suatu organisasi, penting untuk memiliki strategi yang dirumuskan di unit produksinya. Unit

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manufaktur adalah tempat di mana semua input seperti bahan mentah, peralatan, dan tenaga kerja terampil berkumpul dan memproduksi produk untuk pelanggan. Salah satu faktor terpenting yang menentukan keberhasilan unit manufaktur adalah lokasi. Penentuan lokasi pabrik merupakan keputusan strategis yang penting bagi bisnis. Ada beberapa faktor yang menentukan lokasi pabrik di antaranya persaingan, biaya, dan efek terkait yang terkait. Lokasi pabrik adalah proses ilmiah yang menggunakan berbagai teknik. Penelitian ini bertujuan untuk menganalisis faktor-faktor pemilihan lokasi PT. XYZ, sebuah pabrik minuman probiotik di Indonesia, untuk memberikan sumbangsih pengetahuan dan manajerial pada kajian manajemen operasional. Penelitian ini menggunakan metode kualitatif deskriptif. Metode pengumpulan data yang digunakan adalah pengumpulan data primer dan sekunder berupa website perusahaan, penelitian masyarakat, dan observasi pemilihan lokasi pabrik. Hasil analisis dalam penelitian ini bahwa faktor-faktor yang dipertimbangkan dalam pemilihan lokasi pabrik adalah: 1) ketersediaan dan lokasi sumber daya dan bahan baku, (2) jarak ke pasar sasaran, (3) kemudahan distribusi, (4) ketersediaan tenaga kerja, dan (5) kesempatan untuk ekspansi.

Kata kunci: lokasi pabrik; manufaktur; manajemen operasi.

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INTRODUCTION

Location determination is one of the company's operational activities. Determining the factory's location is to minimize costs to achieve effective and efficient operations. Choosing of factory location is not easy because it must consider several factors. These factors, in practice, will certainly differ according to the type of business and the products produced (Maulana, 2018).

Factors that influence the choice of factory location include availability and location of resources and raw materials, distance to target markets, ease of distribution, availability of labor, opportunities for expansion, availability of electricity and water, and others. The decisions for the business location affect the effectiveness and efficiency of an operational activity or business operation management. Operation management can be translated word by word. Management is a way that can be used to achieve the goals of an organization or company both in terms of profitability (profit) and not (non-profit). At the same time, operations in business activities refer to making or producing a product that is done continuously and needs cost, time, and labor. So, operations management can be interpreted as activities carried out in an organization

or a company (business) that controls or regulates the manufacturing process of a product (goods, services, or a combination thereof) within a specific time, quantity, quality, and price (Mawadati et al., 2020; Kartika et al., 2017).

Location Determination Theoretical Framework

Management is a tool to achieve organizational goals for profit-oriented and non-profit organizations. In production companies, the thing that deserves attention is the operation/production activities; this is because these activities cost a lot of money and must continue to rotate. Therefore, good management is needed to handle the production process. Operational Management is a series of activities that generate value in the form of goods and services by converting inputs into outputs (Heizer, 2005). In addition, Herjanto (2007:2) stated that operational management is an activity related to manufacturing goods, services, and their combinations through transforming production resources into the desired output. Operational management is an activity within a company that aims to plan, organize, and control the production process that will produce products in the form of goods or services in a certain amount, time, quality, and price according to consumer demand, covering a wide range of activities related to various decisions, both short term and long-term decisions.

Factory Location

Business activities will not be separated from the purchase and procurement of labor. For production businesses, the focus for purchasing is raw materials and other supporting materials; for trading businesses, merchandise is the focus for purchasing. Making these purchases certainly requires costs to obtain them; the amount of these costs depend on the location of the source of materials/goods, so the location of the business affects costs significantly. For production companies, choosing a location with abundant raw materials and relatively low prices is a priority, considering that raw materials are fixed costs that continue to exist and rotate as long as the company operates (Riady & Aspiranti, 2019).

The location of each industry depends on the total cost of transportation and labor, where the sum of the two must be a minimum. A place where the minimum total cost of transportation and labor is synonymous with the maximum level of profit. Tjiptono (2002: 92) argues that business location is where the company operates or carries out activities to produce goods and services concerned with the economic aspect. Location selection is an essential factor that influences the success of a business. Choosing the right business location will determine the

success and failure of the business in the future. Usually, the management, in determining the location of the business, will look for locations with low operational costs and easy access to resources. Choosing the wrong location will result in high operating costs for the company. Furthermore, the company will not be able to compete and causes losses.

Factory Site Selection Factors

Given the importance of the factory's location for any business activity, choosing a factory location must be taken with full consideration. According to Herjanto (2007:127), in getting the right location of a company/factory, it is necessary to pay attention to factors related to the company's business activities. These factors are market location, location of sources of raw materials, availability of labor, availability of electricity, water, transportation facilities, public facilities, health services, security, and fire prevention, government regulations, community attitudes, building costs and land, parking area, sewer, and possible expansion. Several previous studies discussing the factors that determine the selection of factory locations are Zuliarni & Hidayat (2013) in the field of the food industry, Wamaliya & Wirawan (2014), which discusses determining the location factors for gold and silver production factories, and Rianda et al. (2020) who discussed determining the location of factories for beverage production companies in Malaysia. Meanwhile, another previous study stated that the main factors that determine the location of a factory/business are access to transportation services, public facilities, business capital, and traffic (Kartika et al., 2017; Maulana, 2018; Mawadati et al., 2020; Rafidanta & Lusiani, 2021). There are several methods for determining factory location, such as the gravity method (Mawadati et al., 2020; Rully & Aldenia, 2018; Schmidt et al., 2023), Analytical Hierarchal Process/AHP (Permatasari, 2020), factor rating (Rafidanta & Lusiani, 2021; Riady & Rafianti, 2019; Suryani & Hisjam, 2020). The novelty of this research is to use a comprehensive qualitative method in determining the factory's location.

Method

This research was located at PT XYZ, a producer of probiotic drinks in Indonesia. The main reason for choosing this company is because of the size of the company and the economic impact given to the factory area, where this company absorbed 6000 workers in 2022. According to Sugiyono (2005:1), qualitative research methods are used to examine

under natural conditions. Qualitative descriptive research seeks to dig up information that fits the description of conditions, objects, or social phenomena at the time of the research. This study uses a qualitative approach with descriptive analysis methods; this method is considered relevant and follows the research to be conducted to obtain a true understanding of the factors that influence the selection of PT. XYZ, as well as using this method, can reveal comprehensively how the process of selecting a business location is so that researchers believe that qualitative research methods are considered relevant.

Sources and data collection methods were obtained based on the results of observations, question, and answer sessions with PT. XYZ and from secondary data related to secondary data obtained from documents, archives, and other data and information related to the selection of factory locations. The stages of data analysis are:

1. Data reduction, collecting the information obtained and simplifying the information, choosing the main things, and focusing on the essential things, looking for themes or patterns from reports or data obtained in the field. Thus, the reduced data will provide a sharper picture of the results of the observations and make it easier for researchers to retrieve the data obtained if necessary.
2. Data display or presentation, presenting various information from the data that has been analyzed to provide an overall picture of certain parts of the research being conducted.
3. Drawing conclusions and verification are data analysis activities intended to find meaning and make conclusions from the data collected by looking for patterns, themes, relationships, similarities, things that often arise, and working hypotheses. At first, these conclusions were, of course, still very tentative, vague, and doubtful, but with increasing data and through verification that was carried out during the research, these conclusions became more in-depth and accurate.

RESULTS AND DISCUSSION

In starting a business, a business person will consider using a marketing mix strategy, namely the 4Ps: Product, Price, Place, and Promotion. Place (location) is one of the factors that can affect the level of efficiency and effectiveness of a business so that it is easily accessible and obtainable by consumers. Likewise, in determining the location of a factory business. PT. XYZ chose its business location by considering several factors related to the company's business activities. PT. XYZ also considers factors to determine the location of the product factory:

Market location

PT. XYZ is in a strategic area, which is in an industrial area that is close to many other factories. By reviewing using the same tool, the factory location of PT. XYZ is also close to several tourist areas, which can be the closest target market locations directly to consumers. The location of this factory is also still in urban area, so it is still easy for consumers to reach.

Material sources

The availability of raw materials close to the factory location is very profitable for the company because the costs incurred in procuring raw materials can be reduced due to lower transportation costs. The primary raw material in the manufacture of probiotic products is *Lactobacillus casei* Shirota Strai which is imported directly from the main company in Japan. The location of PT. XYZ in Ngoro is still in an area that is easy to reach because it is still in the same Asian region as Japan. In addition, the location of Ngoro, Mojokerto is close to industrial transportation locations such as airports and ports, Surabaya, and Sidoarjo. This, too, can reduce costs in distributing the main raw materials for making products.

Availability of labor

The most critical factor is the availability of human resources, both an educated and trained workforce. In determining the location of the business, the possibility of the availability of these workers must be considered. Based on data from the Indonesian Central Bureau of Statistics, the number of Indonesia's workforce in 2022 will reach 144.1 million people or equivalent to 69.06% of the total population reaching working age which amounts to 208.54 million people (BPS, 2022). According to the BPS definition, the working-age population is 15 years and over. PT XYZ employed 6,000 people in 2022, consisting of workers up to the management level. For experts, the people recruited are those who are competent in their fields, especially technology. Also, the governor of East Java at that time hoped that the presence of PT XYZ in Mojokerto would help absorb workers from East Java, especially unskilled workers. Meanwhile, skilled workers can be recruited from East Java and all parts of Indonesia.

Availability of electricity and water

For companies, the availability of electricity at prospective business locations is an absolute must; sometimes, some areas still need to be reached by PLN. Therefore, the availability of electricity is a factor that must be considered. The availability of electricity and easy access to water is a must in choosing a factory location. The availability of clean water is necessary for human life, including companies, especially companies that need water as a raw material for their products. Water used in industry is primarily for cleaning, heating, cooling, and making steam. Water sources come from surface water, including river water, groundwater, and seawater. As mentioned above, the location of this factory is strategic amid other industrial factories which are also near the river, to be precise, the Porong River, so that access to water for the factory is fulfilled through the river.

For the availability of electricity itself because the location is in East Java, PT. XYZ requires a lot of electricity because the production process system uses machines. The need for electricity is met through a power plant in East Java.

Ease of transportation access

Transportation facilities are a tool that carries out the transportation process, which brings possible volume or amounts of transportable passengers. PT. XYZ is in need of transport facilities in activity operations, good transport of materials, raw materials, and energy transportation work.

6. Transportation facilities. Transportation facilities are tools or transportation facilities available in the implementation of the transportation process; for example, in the case of land transportation, means of transportation such as buses, trucks, and others must be available according to the possible volume or number of passengers that can be transported. In addition, the facilities that will be used or passed by the transportation in carrying out its function are to transport goods or passengers from one place to another that has been determined for land transportation such as; roads, bridges, terminals, and others, must be adequately available, for smooth transportation, including for loading and unloading of goods or lowering and raising passenger.

Housing, education, shopping, and telecommunication facilities.

Housing, education, and shopping facilities should be considered in choosing the business location of PT. Considering the type of business, XYZ does not require these factors, but the housing factor is also considered in determining the company's location because PT. XYZ also has direct sellers who must deliver or offer products to each residential area, the company is close to residential areas or the Mojokerto village complex, and there are several park areas or residential areas near the company's location; this is to facilitate marketing activities carried out by the direct seller and telecommunications factors are also taken into consideration in determining the business location of PT. XYZ, because current conditions demand the speed of information flow supported by communication technology. Telecommunication networks cover Mojokerto City through 3G, 4G technology, or fiber optic (FO) networks, so it becomes a consideration for PT. XYZ in establishing his business.

Health, safety, and fire prevention services

Health services should be considered in choosing a business location; this is useful for creating work accident assistance that is fast and easy to reach. In Mojokerto City, adequate health services are available, there is 1 government hospital, and several clinics are scattered in every corner of the Mojokerto area. The distance to health care facilities is pretty close. Security services must also be considered, considering the company's assets are significant.

Transport facilities

Transportation facilities are transportation tools or facilities available in the implementation of the transportation process; for example, in the case of land transportation, means of transportation such as buses, trucks, sedans, and others must be available according to the possible volume or number of passengers that can be transported. In addition, the facilities that will be used or passed by the transportation in carrying out its function are to transport goods or passengers from one place to another that has been determined for land transportation such as; roads, bridges, terminals, and others, must be adequately available, in order to smooth transportation, including for loading and unloading goods or lowering and boarding passengers. Based on the information obtained from Google Maps, many transportation facilities in Mojokerto City support business establishments in Mojokerto. Many toll road accesses exist, and Mojokerto is the closest city to the port. PT. XYZ requires transportation facilities in its operations, transporting raw materials and workers.

Local government regulations

It is undeniable that the government has a role in the development of a business. This is because the government regulates maximum working hours, minimum wages, and minimum working age and includes taxes, all of which affect the company's operations. The regulations issued by the City Government are quite helpful in developing existing businesses in the City of Mojokerto, especially regarding business licensing; based on information obtained from city government data sources, entrepreneurs need less than 30 days to obtain a permit to establish a business. This will make it easier for prospective entrepreneurs to open a business in Mojoketo City. These factors are one of the factors considered by PT. XYZ in choosing the location of his business.

Community attitude

The willingness of the people in an area to accept all the positive and negative consequences of establishing a place of business in that area is a condition for whether or not a business can be established in that area. This is because residents around the factory location benefit from the existence of the factory; they will get the quality of clear water produced by PT. XYZ from the source of liquid waste disposal that has been processed in such a way that the standard is equivalent to the water quality standard that will be forwarded to the river. Absorption of its workforce is also prioritized for residents, especially women or mothers previously unemployed.

Sewer

Every production company will produce waste, either solid waste or liquid waste. The waste must be processed before it is safe to dispose of. Good waste management will ensure the comfort of the environment and the surrounding community. Therefore, adequate drainage is needed. The waste generated by PT. XYZ is a solid waste of solids, sludge, and slurry originating from processing residue. This waste can be categorized into two parts, namely solid waste that can be recycled, such as plastic, textiles, and metal scrap, and secondly, solid waste, which has no economic value, and liquid waste in the form of leftover washing machines or leftovers from washing materials and packaging. At PT XYZ, the handling of solid waste is carried out by recycling, where it is economically and environmentally feasible, such as the remaining waste from broken bottles crushed and mixed with other resins, which will be made into various plastic products, for example, chairs and tables. Solid waste that has no economic value can be handled in various ways, including landfilling in one place, reprocessing, then dumping it and burning it. Effluent – Any effluent goes into a holding tank at the water treatment facility. Water's acidity (pH) is adjusted to acid or alkaline to meet standards before being released into the sewage system. Based on the above, XYZ pays attention to the sewerage factor, considering that the amount of liquid and solid waste produced is quite a lot because one production process can produce more than 3 million bottles of probiotic

drink per day. These production levels will produce sufficient solid and liquid waste. Near the company is the Bengawan Solo River, which becomes a channel for disposing of liquid waste from the liquid waste disposal system, which has previously been regulated for its acidity level and has met the standards before being released into the river. So that the sewer factor needs to be considered in choosing the location of PT. XYZ.

CONCLUSION

Based on the results of this study, it can be concluded that the main factors that companies in determining factory locations consider are market location, material sources, availability of water, electricity, transportation access, access to public and health facilities, government policy, society feedback, and sewer facilities. This research is expected to provide scientific implications in operations management, especially regarding location determination and managerial implications for decision-makers determining factory locations which are crucial for business continuity. The limitation of this research is that the research method is limited to qualitative analysis; it will be more comprehensive if future research can combine qualitative and quantitative methods such as rating, gravity, and AHP methods for determining factory locations.

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