Kilisuci International Conference on Economic & Business

Vol. 3 Year 2025

Supply Chain Analysis, Innovative Technology, Distribution, and Consumer Perception in Supporting the Sustainability of Hydroponic Vegetable Business

Anisa Rahmawati

Universitas Nusantara PGRI Kediri,Jl.Kh.Ahmad Dahlan No.76,Mojoroto, Kediri City, East Java. Postal Code 64114, Indonesia

anisarahmawati886@gmail.com

Article Information

Submission date: January 3, 2025
Revised date : February 14, 2025
Accepted date : March 22, 2025

Abstract

Research purposes*: Analyzing the supply chain, Innovative technology, distribution and consumer perception.*

Design/Method/Approach*: Study Qualitative Descriptive forunderstanding Supply chain analysis, among others farmers, distributors, and consumers. Data analysis was carried out with data reduction on the results of the interviews conducted on selected informants.*

Research Findings*: The results of this study indicate that to support the sustainability of the hydroponic vegetable business, it is necessaryGood and correct process, Diverse distribution network, Customer satisfaction and consumer perception.*

Theoretical contribution / Originality*:Adding theory about the importance of supply chains for sustainability hydroponic vegetable business.*

Practitioner/Policy Implications*:The results of this study can adapted by similar hydroponic businesses.*

Research limitations*: Time constraints that make the results that are get less than optimal so that this research is not perfect.*

Keywords*: Supply Chain, Hydroponic Vegetable Products, Business Continuity.*

1. Introduction

According to the Central Statistics Agency (2022), the need for vegetables in Indonesia is estimated to reach 12 million tons per year, while local vegetable production has not been able to meet this figure. With this gap, currently there has been developing a hydroponic farming model. Hydroponics, as one of the modern farming methods, offers a solution to increase vegetable production with better resource efficiency. This system not only reduces land use but also minimizes water use by up to 90% compared to conventional methods (Sari & Budiman, 2021).

Currently, many hydroponic businesses have developed. One of the hydroponic businesses that already has a fairly wide market is the hydroponic business in Menang Village, Pagu, Kediri Regency. Menang Village has quite good water resource potential and support from the local government in developing modern agriculture. However, challenges in implementing hydroponics in this area include lack of technical knowledge and access to a wider market. On the other hand, the success of the hydroponic vegetable business also depends on collaboration between farmers, distributors, and consumers.

The Menang Village Hydroponic Business also has great potential in developing hydroponic farming, especially with the high demand for organic and healthy vegetables. Hydroponics produces vegetables with better quality because the environment is more controlled, and free from dangerous chemical pesticides. This makes hydroponic

products superior and in demand by consumers who care about health. However, the success of hydroponic farming in this village does not only depend on cultivation techniques, but also on how the entire supply chain is managed effectively and efficiently.

According to Rachmawati (2022), effective supply chain management can help overcome these obstacles by increasing product accessibility to consumers. Supply chain analysis is important to understand how each stage of production, distribution, and marketing contributes to the success of a hydroponic vegetable business. In the context of hydroponic farming, the supply chain includes various components, such as procurement of raw materials (seeds, nutrients, equipment), production processes in the hydroponic system, and distribution of hydroponic vegetable products to the market or consumers.

Optimizing the supply chain is crucial in maintaining operational efficiency, product quality, and competitive selling prices in the market. An efficient supply chain not only increases product competitiveness but also ensures the sustainability of agricultural businesses.

According to research by Prasetyo et al. (2021), supply chain optimization can increase farmer profitability by up to 25%. Although previous studies have identified the great potential of hydroponic farming in meeting national food needs and increasing farmers' income, in-depth studies of the supply chain of hydroponic vegetable products, especially at the village level such as Menang Village, are still relatively limited. Previous studies tend to focus more on the technical aspects of hydroponic cultivation or general economic analysis. Therefore, this study aims to analyze the supply chain of hydroponic vegetable products in Menang Village. It is hoped that the results of this study can provide relevant recommendations for the development of a sustainable hydroponic vegetable business in the area.

Statement of Problem

The problem statement in this study is twofold, namely that it lies in the planting process where there is interference from pests and diseases that attack plants and the second is that there is price competition between hydroponic vegetables and conventional vegetables on the market.

Research Objectives

The aim of this research is toAnalyzeSupply Chain Analysis, Innovative Technology, Distribution, and Consumer Perception in Supporting the Sustainability of Hydroponic Vegetable Business. Starting from the beginning of the planting production process, growth process, maintenance to post-harvest, to the distribution process until the challenges faced and the resolution of the problems faced.

2. Method

The research method used in this study is a qualitative method. The selection of this method is based on the research objective which focuses on deeply understanding the processes, relationships, and dynamics in the hydroponic vegetable supply chain, as well as how innovative technology, distribution, and consumer perceptions affect the sustainability of hydroponic businesses at the local level. The qualitative method was chosen because it allows researchers to explore contextual insights, including personal experiences, perceptions, and social interactions between actors in the supply chain

system, starting from farmers, collectors, distributors, to consumers.

This method can include in-depth interviews and focused discussions. The research method used has two important components, namely a case study in Menang Village, Pagu, Kediri Regency as the research location. This approach allows for an in-depth analysis of the practices and challenges faced in the hydroponic vegetable supply chain in Menang Village, Pagu, Kediri Regency. The second focus is Participatory Observation: Involving researchers in the daily activities of hydroponic farmers to understand the production and distribution processes directly.

This approach is considered most appropriate to capture the complexity of social relations and non-structural processes that cannot be explained only with quantitative or statistical data. In addition, with qualitative methods, researchers can openly explore various factors that influence the cultivation practices, distribution, and market acceptance of hydroponic vegetable products, including obstacles and potential innovations that arise from the real experiences of the actors.

This research was conducted in Menang Village, precisely on Jl. Kendali sodo Rt 01, Rw 03, Menang Village, Pagu District, Kediri Regency, East Java. Environmental factors that are still clean, natural, and unpolluted air make the growth and development of hydroponic vegetables even better.

The informant who was taken was quite experienced in her field, able to provide information effectively and accurately, she was Dian Puji Lestari, the best graduate of Muhammadiyah University of Malang majoring in Agricultural Agribusiness, this 27 year old woman has been involved in the field of hydroponics since she was in college,

In this study, it is important to determine the criteria for selecting informants so that the information obtained is relevant and accurate, as can be seen from the experience of informants who have direct skills in the production, distribution, or marketing of hydroponic vegetables.

Initial Identification can be done by identifying potential informants through initial surveys, field visits, or recommendations from local communities. Then using selective analysis to assess the qualifications and relevance of potential informants. Furthermore, conducting short interviews with potential informants to evaluate their ability to provide relevant information.

Through the Informant Consent process, researchers can ensure that all informants give their consent to participate in the research and understand the purpose of the research. Another thing that needs to be considered is maintaining confidentiality of personal information and data obtained from informants to maintain each other's good name.

Data collection techniques are carried out by conducting interviews with producers or actors of hydroponic vegetable production, then continued with a location survey and also a documentation process. The first stage carried out is interviews: Conducting interviews with supply chain actors, including farmers, processors, distributors, and consumers.

2.1 Data analysis techniques

Qualitative Analysis: Using thematic analysis techniques to identify patterns and themes from interview and observation data. These results can be used to understand the factors that influence supply chain sustainability.

1. Purpose of Qualitative Analysis

Qualitative analysis aims to understand the dynamics and interactions in the

hydroponic vegetable product supply chain, as well as the factors that influence business sustainability. Data collected from interviews, observations, and discussions with supply chain actors will be analyzed to identify relevant patterns, themes, and relationships.

2. Data collection
   Qualitative data can be obtained through:
   1) In-depth Interviews: Engaging hydroponic farmers, distributors, retailers, and consumers to explore their experiences and perspectives.
   2) Participatory Observation: Observing the production, distribution, and marketing processes of hydroponic vegetables in the field.
   3) Focused Discussion: Holding discussions with business actors to discuss challenges and solutions in the supply chain.

3. Thematic analysis techniques

In this study, the data analysis technique used is thematic analysis, one of the qualitative methods approaches to identify, analyze, and report patterns or themes in data. Thematic analysis was chosen because of its ability to capture the complexity of meaning from qualitative data obtained through interviews, observations, and documentation. This technique helps researchers to understand how experiences, views, and interactions between actors in the supply chain shape the dynamics of the hydroponic vegetable business at the local level.

The thematic analysis process in this study began with the transcription of data from interviews and field observation notes. After that, the researcher repeatedly read the entire transcript to understand the data content comprehensively. The next step is to carry out the coding process, namely labeling important parts of the text related to the focus of the study, such as topics on distribution, logistical constraints, technology adoption, relationships between actors, and consumer perceptions of hydroponic products.

RESULT AND DISCUSSION

RESULT

Business overview

1. Results of interviews with hydroponic vegetable farmers

Q: What are the initial steps in building a hydroponic vegetable business?

A: The first step in building my hydroponic business started from my hobby and love for plants, then seeing the market opportunity in my area, no one had built a hydroponic business, then I started building a greenhouse with a capital of 3 million, then a mini greenhouse was built on the roof of the house with a total planting hole of 280 liters, with 14 PVC pipes, then I planted pak choy mustard greens and lettuce.

Hydroponic plants are plants that are cultivated without using soil, but with water media or nutrient solutions. Hydroponics is also known as soilless culture or cultivation of plants without soil. So hydroponics means cultivation of plants that utilize water and without using soil as a medium. By meeting the nutritional needs (nutrients) each plant can grow well even without using soil media.

Hydroponic farming has been recognized as one of the innovative solutions to

overcome various challenges in the traditional agricultural sector. One of the main challenges in conventional farming is the limited fertile land, especially in urbanized areas. Hydroponics is a solution because it does not require a large area of land and can be done in limited areas, even in urban areas. In addition, hydroponic farming uses water more efficiently than traditional farming methods, making it suitable for areas with limited water resources.

Menang Village in Kediri Regency has great potential in developing hydroponic farming, especially with the increasing market demand for organic and healthy vegetables. Hydroponics produces vegetables with better quality because the environment is more controlled, and free from dangerous chemical pesticides. This makes hydroponic products superior and in demand by consumers who care about health. However, the success of hydroponic farming in this village does not only depend on cultivation techniques, but also on how the entire supply chain is managed effectively and efficiently.

Starting from his love for plants, this hydroponic farmer tried the opportunities that existed at that time, creating a new business among people who were not familiar with the term did not discourage him. Seeing a fairly large market opportunity to develop a hydroponic vegetable business, because there was no business competition there, he started by building a green house with a capital of 3 million rupiah, then a mini green house was built on the roof of the house with a total planting hole of 280 liters, with 14 PVC pipes, the plants that were first planted were pak choy mustard greens and lettuce.

Initial overview of the business supply chain

Q: How is the hydroponic vegetable production process?

A: The hydroponic vegetable production process begins with sowing seeds using rockwool media, then waiting until the seeds grow until they produce true leaves before being transplanted into the hydroponic installation, then daily maintenance is done by adding nutrients up to the limit. **plant needs, checking PPM and pH of water**then until harvest time then it can be harvested

Q: What is the distribution and marketing mechanism for hydroponic vegetables?

A: The distribution and marketing mechanism was initially offered directly to neighbors, friends and relatives, then over time I started posting on Facebook and Instagram then started joining the KOHIKARI group (Kediri city hydroponic community) then I started posting the harvest results there and started getting buyers. Furthermore, from the FB posts and joining the KOHIKARI group, I started partnering with fellow hydroponic vegetable suppliers and restaurant and catering business actors. With the selling price of lettuce sold at IDR 20,000 / kg to suppliers, and IDR 30,000 / kg if sold to users, celery sold at IDR 20,000 / kg to suppliers and IDR 25,000 / kg to users, mint leaves sold at IDR 50,000 / kg, Brazilian spinach sold at IDR 15,000 / kg to suppliers and IDR 30,000 / kg to users. 20,000/kg to the user, the price difference occurs because the supplier has become a regular customer, takes a lot of goods, and will resell them to retailers, so I can give a cheaper price with careful calculations.

Q: What challenges are faced in fulfilling the hydroponic vegetable supply chain?

A: The challenges faced in the hydroponic vegetable supply chain are mainly pests and diseases that attack the plants themselves, ranging from Thrips, apids, butterflies (caterpillars) and whiteflies and whiteflies as well as diseases originating from bacteria, namely stem rot and root rot, as well as diseases from fungal attacks, namely

leaf spot disease on celery. The second challenge is usually in the dry season because of full sunlight, hydroponic vegetables grow well but compete with conventional vegetables from the market so that price competition occurs. So it is recommended that business actors have their own market/have business partners who are ready to accommodate the harvest.

Q: What solutions can be applied to these challenging problems?

A: 1. Utilization of Technology in Supply Chain Management Technology such as yellow traps, namely the use of used plastic bottles that are given yellow coloring and coated with adhesive glue so that they attract insects or pests to approach the object, so that they can reduce the number of pest populations in the greenhouse area of the hydroponic installation.

2. Building Partnerships with Suppliers and Distributors To overcome the limitations of raw materials, hydroponic farmers can establish partnerships with local or national suppliers who can provide production needs consistently. In addition, building a strong distribution network with large distributors or retailers can also help expand market access for hydroponic products. As well as maintaining the quality of the products being marketed.

Q: What is the initial consumer perception of the existence of hydroponic vegetable products?

A: Consumer perception of hydroponic vegetables was initially looked down on because it was thought to have never existed before, but after tasting the harvest, consumers were satisfied, because hydroponic products are cleaner and the freshness of the vegetables is more durable, stored in the refrigerator can last up to 1 week or more, unlike conventional vegetables which are damaged in just 2 days, although the price may be different, but for consumers who prioritize quality, they tend to choose hydroponic vegetables, because they have low pesticide residue. **chemistry**, the vegetables are fresher because they are harvested when there are buyers, and they have a longer shelf life.

Q: How do you collaborate with local consumers in the surrounding area?

A: My local customers are the owners of catering businesses around Pagu sub-district. They initially found out through my posts on FB, then continued until now. For non-regular customers, they usually find out by word of mouth that I have hydroponic plants.

Q: Does the technology used in the plant production process meet hydroponic vegetable cultivation standards and how does the system work?

A: NFT hydroponic technology is an efficient and innovative hydroponic method for growing plants using nutrient solutions. Although it has some drawbacks, its advantages in nutrient efficiency and rapid plant growth make it a popular choice among hydroponic farmers. With proper management, the NFT system can produce optimal yields.

Q: How can agricultural technology and practices be improved so that businesses can grow?

A; By conducting various analyses related to plant growth and market share, usually in the rainy season, interest in hydroponic lettuce is higher than usual, this is because stocks in conventional markets are low/even non-existent, as is the case with other vegetables.

Q: What do the sources think is a more effective marketing strategy?

A: A more effective marketing strategy is to join agricultural and hydroponic groups on FB or local culinary groups in the local area so that the harvest can be marketed there. In addition, it can also be posted via FB, Ig, wa, Twitter, etc. And also have a small prototype/hydroponic installation that can be seen by many people so that people know

that here they provide hydroponic vegetables.

Q: How does the collaboration mechanism work between farmers and supermarket vegetable distributors?

A: The collaboration mechanism between hydroponic farmers and distributors is usually to follow the distributor's schedule in supplying vegetables to supermarkets, usually in 1 week they can harvest 2-3 times depending on the distributor's request, for the payment transaction process via transfer media once a month.

Q: How many aspects need to be considered in the hydroponic vegetable production process? A: 1. Seed aspect

Hydroponic plant planting has several aspects of seed art used, the seeds used are good seeds and are commonly used by hydroponic farmers so that they produce good quality vegetables and sell well in the market, because some farmers use different seeds such as for example lettuce using caitira lettuce seeds, sometimes also sementel seeds from or Bejo seed, Bejo seed type seeds have many products. there are also those who use products from Rz junction. Those are some examples of lettuce and on average it depends on the farmer, also reviewed from the market share needed if those who usually like the characteristics of lily bell lettuce will definitely look for Rz junction, usually catering entrepreneurs like curly, wide lettuce and leaves with good green color, so if from catering catering usually ask for something like caitira or lily bell or simentel.

1) Irrigation system/NFT aspects

aspects of the irrigation system or NFT so the irrigation system that we use uses the NFT system where this system has a way of installing the installation there is a slope of height from the top end of the paralon to the bottom so that the water flow can flow quickly, the advantage of this NFT system is that it can supply more oxygen to the roots because the water flow is faster compared to the DFT system which tends to stagnate, then the disadvantage of this NFT system is when the power goes out, because if the power goes out the water cannot flow and the feared impact for this condition is that it will damage the roots.

2) Care aspects (providing ab mix nutrition)

Maintenance aspects The provision of AB mix nutrients must be checked every day whether the water concentration reaches the minimum standard limit used, for example when using AB nutrients from the review farm, we only use a concentration of around a maximum of 900 ppm, if using nutrients from other brands, we can use up to 1200 ppm.

This nutrient check can be done every day, for example if it is more than 900 ppm, water can be added. If the ppm figure still shows 900 ppm and there is still a lot of water, no more water needs to be added.

3) Prevention of pests and diseases

for prevention of pests and diseases, the efforts made are installing yellow traps, yellow traps are a type of pest trap made from used plastic bottles painted yellow and then given rat glue, the aim is so that the pests can stick to the yellow trap so as not to interfere with plant growth. in addition, so that treatment if there are pests and diseases can use smaller herbal or chemical pesticides with low doses so as to produce lower residues and in the notes 20 days before harvest time it should not be sprayed again,

4) Treatment aspects during harvest

Treatment during harvestnamely tidying up the roots, so the roots of the plants to be harvested are not lost, they are only tidied up and cut with scissors so that the vegetables are still fresh, they can even stay fresh for a week in the refrigerator, in conditions where the plants are durable, hydroponic vegetable customers choose hydroponic vegetables primarily, because the vegetables remain fresh and do not wilt easily, do not rot easily like conventional vegetables that are usually sold in the market because they are harvested when there is an order so that their freshness is maintained.

2. Results of interviews with hydroponic vegetable consumers

Q: Where did you first find out about the hydroponic vegetable products and locations?
A: I first learned about this hydroponic vegetable product from a neighbor. In addition, there was also a friend of mine who had bought it and recommended it directly because the quality was good. After that, I was interested in trying it and visiting the cultivation location directly in Menang Village.

Q: Have you subscribed to this hydroponic vegetable producer?
A: Yes, I have been a regular customer. Usually I order vegetables once a week, sometimes almost every day, depending on the catering order I get that day, especially for daily kitchen needs. In addition to being fresher, I also feel safer because these hydroponic vegetables do not use chemical pesticides.

Q: How is the service provided?
A: The service is very good. The seller is friendly and responsive, quick to respond to messages, and always provides clear information on vegetable availability. In addition, the packaging is also neat and clean, so I feel comfortable every time I order an order.

Q: Do you find the purchasing transaction process easy to do?
A: It's very easy. Usually I order via WhatsApp, and just transfer to the account provided. If I'm around the location, I can also pick it up directly. The process is flexible and hassle-free.

Q: Are consumers satisfied with the products they receive?
A: Yes, I am very satisfied. The vegetables are fresh, clean, and last longer in the refrigerator than vegetables from the market. They are also crispier and not bitter.

Q: What is the quality of the product?
A: The quality is very good. The vegetables look bright green, do not wilt, and there is no dirt because they are planted without soil. In addition, the size is also uniform and does not rot easily. Overall, I feel the quality is very satisfying and worth continuing to buy. I also recommend fellow catering business friends to buy from this place, because it is easy and very helpful.

Based on the results of the interviews conducted, the findings can be summarized as shown in the following image:

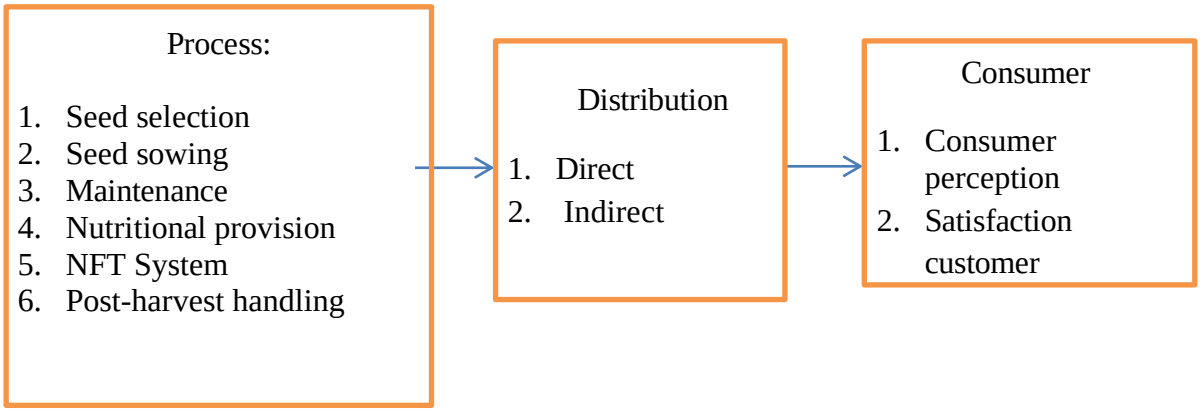

Figure 1.1 Supply Chain Flow.

Based on Figure 1.1, important findings related to the hydroponic channel supply chain are:

1. The correct and proper planting process

   A good and correct planting process is the main foundation in the hydroponic vegetable supply chain. This stage includes selecting quality seeds, preparing the right planting media, regulating nutrient solutions, and controlling the growing environment such as temperature, humidity, and light. Each step in this process has a significant impact on plant growth, harvest quality, and production efficiency.
2. Diverse distribution network

   The distribution network of hydroponic vegetables is very diverse and is influenced by a number of factors, such as the scale of production, the location of farmers, and market demand. Starting from small-scale farmers who sell their products directly to consumers to large companies that distribute their products to various supermarkets and restaurants. This variation in the distribution network creates both challenges and opportunities.
3. Consumer perception and customer satisfaction

   Based on the research results, it can be concluded that consumer perception and customer satisfaction levels towards hydroponic vegetable products in Menang Village are positive. Consumers generally view hydroponic products as more hygienic, safe, and high-quality vegetables compared to conventional products. This has a direct impact on the high level of customer satisfaction, especially in terms of freshness, cleanliness, and speed of service.

However, challenges still exist in terms of price and product availability that are not yet fully consistent. Therefore, to strengthen the sustainability of the hydroponic vegetable business, a more intensive consumer education strategy is needed as well as increased efficiency in the supply chain, so that positive perceptions and customer satisfaction can continue to be maintained and improved.

DISCUSSION

1. The correct and proper planting process

The results of this study show that a good and correct planting process is the main foundation in the hydroponic vegetable supply chain. This stage includes selecting quality seeds, preparing the right planting media, regulating nutrient solutions, and controlling the growing environment, such as temperature, humidity, and light. Each step in this process has a significant influence on plant growth, harvest quality, and production efficiency.

This research's results align with previous research HYDROPONIC CULTIVATION OF PAKCOY PLANTS (Brassica rapa L.) USING THE NUTRIENT FILMS TECHNIQUE (NFT) SYSTEM "Hydroponics is a plant cultivation system using liquid media or without soil in the planting process. Hydroponics also has several advantages including not depending on the climate, continuous harvest results, and more practical plant care. One of the hydroponic techniques that can be used is the nutrient film technique which is a closed hydroponic system where the nutrients will flow continuously or in a certain period of time regularly. And the plants used are pak choy plants (Brassica rapa L.) which are one type of leafy vegetables that are widely cultivated with this hydroponic system. In this planting process, it is better to use nutrients from AB Mix nutrients. The parameters to be measured in this observation are plant height and number of leaves in each netpot, this is seen in one week after planting (1 MST). The results of observations of plant height parameters can be seen in the data in the graph. increase in plant height, the tallest plant up to 24 cm in netpot 9, and the largest number of leaves up to 15 leaves. Some plants experience weak stems, thin, and yellowing leaves, this disorder is experienced due to lack of nutrients, lack of sunlight and pH."

2. Diverse distribution network

The results of this study indicate that the distribution network of hydroponic vegetables is very diverse and is influenced by a number of factors, such as production scale, farmer location, and market demand. Starting from small-scale farmers who sell their products directly to consumers to large companies that distribute their products to various supermarkets and restaurants. The variation in this distribution network creates both challenges and opportunities.

The results of this study are in line with previous research entitled Sartika FARM Hydroponics Digital Marketing Optimization Using Social Messaging and Google My Business.

This research was conducted by the PKM grant team of Nusantara University PGRI Kediri on Sartika Farm, a PKK mothers' work group in Singonegaran Village, Kediri City.Previously, marketing of hydroponic vegetables at Sartika Farm was still conventional and limited to local communities. Through digital marketing strategy training using social media and Google My Business, product distribution has become wider and known to a wider community. This shows that digitalization of distribution channels can increase market reach for local hydroponic entrepreneurs.

3. Consumer perception and customer satisfaction

1. Consumer perception

The results of the study showed that the results of the study showed that consumer perceptions of hydroponic vegetables in Menang Village and its surroundings tended to

be positive, especially in terms of cleanliness, quality, and product safety. Consumers considered that hydroponic vegetables had advantages because they were free from chemical pesticides, fresher, and looked more hygienic than conventional vegetables. In addition, several consumers also mentioned that neat packaging and product origin information also increased their trust.

However, some consumers still feel hesitant due to a lack of knowledge about the hydroponic cultivation process and the assumption that hydroponic vegetables are relatively more expensive.

This shows that consumer education and proper promotion are still needed to strengthen market acceptance of hydroponic products more widely. Good consumer perception is one of the important factors in supporting the sustainability of the hydroponic business, especially in terms of customer loyalty and expanding market reach.

The results of this study are in line with the findings of previous research on consumer perceptions of hydroponic vegetables contained in the research journal "The Influence of Marketing Mix and Consumer Perception on Hydroponic Vegetable Purchasing Decisions (Case Study of the Griya Botani Hydroponic Garden). Scientific Journal of Village and Agricultural Development, 9(4), 322–332." The content of which is The demand for hydroponic vegetables is not only limited to individual consumers, but also restaurants, supermarkets, and other institutions.

By exploring the factors behind consumer purchasing decisions and implementing a comprehensive marketing mix that includes seven important elements: the products and prices offered, the locations used, the promotions carried out, the people used, and the processes and facilities, companies can increase their opportunities to achieve their business goals (Kotler & Armstrong, 2018).

The promotion carried out is still relatively lacking and this company does not even have product distributors such as supermarkets, resellers, etc. Where the distribution of hydroponic vegetables is carried out directly to end consumers who live in the location where the Griya Botani Hydroponic Garden farming business operates.

So sales have decreased or stagnated because they only serve the local community.

Sales fluctuate due to intense competition between similar products, resulting in changes in market orientation. Modern competition no longer focuses on products alone, but rather on the overall experience offered to consumers, including price, promotion, location/distribution, people/participation, infrastructure/physical facilities, processes, and consumer perceptions (Sunarti, 2022).

The results of previous research findings on GEN Z CONSUMERS' PERCEPTION OF PRODUCT QUALITY PRICES AND DISCOUNT PROGRAMS ON SHOPEE AND TOKOPEDIA (Clara Permata Shinta). The results of the study show that Gen Z teenagers prioritize product quality and discount programs over price. They tend to choose products that have positive reviews and attractive discounts. The novelty of this study lies in the focus on Gen Z in rural areas, which has not been widely studied before, as well as the emphasis on the combined influence of price, product quality, Anddiscounts on their purchasing decisions.

2. **customer satisfaction**

the results of this study showThe results of the study showed that the level of customer satisfaction with hydroponic vegetable products was quite high, especially in terms of freshness, taste, and visual quality of the product. Customers were satisfied because the vegetables they received had a longer shelf life, were free from soil and dirt, and were cleaner than conventional vegetables. In addition, several customers also appreciated the ease of access in ordering and the speed of delivery provided by hydroponic business actors.

However, there are some notes from customers regarding prices that are still considered relatively high and product availability that is not always consistent. This shows that although customers are generally satisfied, there is still room for improvement, especially in terms of supply stability and pricing strategy. Maintaining customer satisfaction is an important element in building long-term loyalty and supporting the sustainability of the hydroponic vegetable business at the local level.

The results of this study are in line with previous research EMPLOYEE PERFORMANCE VALUATION WITH THE SERVQUAL APPROACH TO IMPROVE CUSTOMER SATISFACTION AT O'SEAFOOD KEDIRI The results of the study indicate a gap between customer expectations and perceptions of employee performance, especially in terms of responsiveness, reliability, and service assurance. In addition, interviews with employees also revealed several challenges faced in providing satisfactory service. Based on these findings, several improvement steps are suggested, including employee training, improving internal communication, and improving operational processes. The implementation of these steps is expected to improve employee performance and in turn increase customer satisfaction at O'Seafood Kediri (Dio Ardiansyah, 2024).

According to this view, if compared to the case study being studied at this time, consumer perception of hydroponic vegetables was initially underestimated, because the surrounding community was still not familiar with the term hydroponic vegetables, after the community began to feel the results of the harvest, it turned out that consumers were satisfied, because this hydroponic product is cleaner and the freshness of the vegetables is more durable, can be stored in the refrigerator can last up to 1 week, even more, in contrast to conventional vegetables which can only last a maximum of 2 days at room temperature, although the price given may be different from conventional vegetables, consumers still prioritize quality and tend to choose hydroponic vegetables, because low chemical pesticide residues, vegetables can be fresher because they are harvested when consumers need or buy, and the shelf life can be longer.

Conclusion

Overall, the supply chain process carried out in the hydroponic business in Menang village has been in accordance with the standards, namely a good and correct process, and a varied distribution network. With this supply chain, it has an impact on good consumer perception. The results of this study provide a theoretical contribution, namely regarding the importance of supply chain analysis in business operations and practical contributions.

research and suggestions for previous research, namely based on the analysis of previous research, it can be concluded that there are still many opportunities to dig deeper

into the hydroponic vegetable supply chain. Consumer perceptions, case studies, and collaboration with practitioners are essential to produce relevant and applicable findings. Thus, future research can make a greater contribution to improving the efficiency, sustainability, and competitiveness of the hydroponic vegetable industry.

References

[1] Central Bureau of Statistics. (2022). Agricultural Statistics.

[2] Sari, R., & Budiman, A. (2021). "Effectiveness of Hydroponic Systems in Increasing Agricultural Yields". Journal of Modern Agriculture, 15(2), 45-58.

[3] Rachmawati, D. (2022). "Sustainable Agricultural Supply Chain Analysis". Journal of Agroeconomics, 10(1), 12-25.

[4] Prasetyo, A., Hadi, S., & Utami, N. (2021). "Optimization of Hydroponic Vegetable Supply Chain". Journal of Agricultural Economics, 8(3), 34-50.

[5] Putri, AE, Winarno, ST, & Laily, DW (2024). "The Influence of Marketing Mix and Consumer Perception on Hydroponic Vegetable Purchasing Decisions (Case Study of the Griya Botani Hydroponic Garden)". Scientific Journal of Village and Agricultural Development, 9(4), 322–332.https://doi.org/10.37149/jimdp.v9i4.1332

[6] Agribis, Vol. 10, No. 2, Year 2024 "partnership study on the development of hydroponic vegetable commodities to increase business profitability in Kendari City" Agribis: Agribusiness Journal, Faculty of Agriculture, Tulungagung University,https://doi.org/10.36563/agribis.v10i2.989

[7] Natasya Aulia Rahman, Muhammad Zainal Umar, Rizka Meisy Evis Putri, & Resti Fevria. (2023). HYDROPONIC CULTIVATION OF PAKCOY PLANTS (Brassica rapa L.) USING THE NUTRIENT FILMS TECHNIQUE (NFT) SYSTEM. Proceedings of the National Biology Seminar, 2(2), 743–750.https://doi.org/10.24036/prosemnasbio/vol2/503

[8] https://www.researchgate.net/publication/365063671_Optimasi_Pemasaran_Digital_Sarti_ka_FARM_Hydroponics_Menggunakan_Social_Messaging_dan_Google_My_Business

[9] Shinta, CP., & Hakimah, EN . (2024). GENERAL Z CONSUMERS' PERCEPTION OF PRODUCT QUALITY PRICE AND DISCOUNT PROGRAMS ON SHOPEE AND TOKOPEDIA (CASE STUDY OF VILLAGE YOUTH GAYAM GURAH KEDIRI). Proceedings of the National Symposium on Management and Business, 3, 894–901. Retrieved from https://proceeding.unpkediri.ac.id/index.php/simanis/article/view/4780

[10] PERFORMANCE EVALUATIONEMPLOYEES WITH SERVQUAL APPROACH TO IMPROVE CUSTOMER SATISFACTION IN O'SEAFOOD KEDIRI. Proceedings of the National Symposium on Management and Business, 3, 1302–1310. Retrieved from https://proceeding.unpkediri.ac.id/index.php/simanis/article/view/4692