

Greenhouse-Based Premium Horticulture Business Plan Design in Java: Business Model Canvas Approach

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ABSTRACT

Embracing technologies and sustainable practices can lead to a competitive edge in horticulture. One of them is the use of greenhouses for premium horticultural cultivation. A business model is essential to highlight the competitiveness and sustainability of businesses. This study aimed to design a Business Model Canvas (BMC) of greenhouse-based premium horticulture business planning. The study starts from June–December 2024. It was conducted in six provinces on Java Island. There are thirty informants. The data used is primary and secondary data. Primary data was collected through questionnaires, in-depth interviews, observations, and focus group discussions. Secondary data is obtained from various sources of literature and company documentation. Data was analysed according to nine block of BMC. The BMC consists of nine blocks that explain the key elements of the business, which are: customer segments, value proportions, channels, customer relationships, revenue stream, key resources, key activities, key partnerships, and cost structure. The research results present the BMC elements that need to be noticed and carried out by greenhouse premium horticulture entrepreneurs in Java to make their business run well. It also can be a reference for investors who want to invest their capital in a premium horticulture business based on a greenhouse.

Keywords: *Business Model Canvas, Bussiness Planning, Melon, Premium Horticulture.*

BACKGROUND

Horticulture is one of the subsectors that supports the national economy because it has great economic value and is a source of income for small, medium, and large-scale farmers. Horticulture has advantages, including immense selling value, diversity of types, land availability, and rapid development of cultivation technology (Nurhayati, 2020). Several methods exist in agricultural cultivation, including hydroponic systems and greenhouses. Some premium horticultural commodities require a modern cultivation system to ensure an optimal growing environment to obtain the expected quality. The use of greenhouses in the plant cultivation process is one of the efforts to provide a more optimal environment for plant growth.

Horticultural commodities cultivated in greenhouses by the hydroponic system are a type of horticulture with a high selling value or are included in the category of premium fruits and vegetables to cover the operational costs of hydroponic horticulture cultivation in greenhouses. Several previous research (Harniati et al., 2023; Kamyod & Yooyatiwong, 2022a; Wiseansart, 2023) revealed that premium melon cultivation in smart greenhouses can yield higher financial returns per production cycle, even involves higher costs and greater management complexity. On the other hand, premium vegetable cultivation, particularly in semi-smart greenhouses, offers a more balanced approach with lower costs and higher economic viability, making it a more sustainable option for small to medium-sized farms. This may have contributed to the growth of the premium melon business in greenhouses in recent years, compared to the premium leafy vegetable business. With the recent growth of premium horticulture businesses in greenhouses, it is necessary to prepare a business model to guide a beginner entrepreneur in this potential business.

The demand for hydroponic produce, including melons, has risen due to consumer preferences for higher quality and taste. Melon is well-known for its high vitamin and antioxidant content, which attracts health-conscious consumers (Crosby et al., 2015). It is a popular premium fruit with a good market share. In recent years, consumer preference for superior quality, nutritional benefits, and flavour has significantly driven the demand for premium hydroponic melons over regular ones cultivated in open fields. This trend is driven by the willingness of consumers to pay higher prices for high-quality products. Hydroponic systems can consistently meet these expectations, supporting the growth trend in demand for high-quality products (Brentlinger, 2007; Crosby et al., 2015; Syah et al., 2024). Hydroponic melons are often perceived as superior in sweetness and quality compared to conventionally grown melons (Syah et al., 2024). Consumer preferences for attributes such as taste, freshness, ripeness, and sweetness heavily influence the market demand for melon.

It is necessary to meet the demand of the premium market, which demands superior quality products. Greenhouses will create controlled conditions, producing high-quality vegetables and fruits with better nutritional value, taste, and appearance than open-field cultivation (Kamyod & Yooyatiwong, 2022b). Although initial costs for infrastructure and greenhouse technology investments may be high, the long-term benefits, such as reduced labour costs, the use of fewer pesticides, and increased crop yields, can offset the costs (Kamyod & Yooyatiwong, 2022b; Zhu et al., 2023).

Apart from the economic potential of melons in particular, the market for premium horticulture is not as vast as horticultural commodities in general. Generally, premium horticulture is sold only in modern markets, hotels, restaurants, and supermarkets. Its limitation is a challenge in penetrating the market share that is still limited. This problem requires a solution in business planning to create the right business concept for the hydroponic fruit and vegetable business (Nazil et al., 2017).

Premium melon is experiencing rapid business growth today. This fact is supported by the fact that several greenhouses have begun to be built for the hydroponic cultivation of premium melons on the island of Java in recent years. The public increasingly demands premium melons, although they are still demographically segmented in big cities.

Business models are essential to highlight the competitiveness and sustainability of bio-based solutions. This tool helps primary producers capitalise on opportunities in the bioeconomy by analysing value chains and adjusting the focus to cover market or business readiness levels (Hatvani et al., 2022). Embracing new technologies and sustainable practices can lead to a competitive edge in horticulture. For instance, pineapple farmers in Nigeria have gained a competitive advantage by adopting technology and differentiation strategies. Utilising new technology and sustainable practices can provide a competitive advantage in horticulture. For example, pineapple farmers in Nigeria have managed to gain a competitive advantage and the implementation of differentiation strategies

(Oladapo et al., 2023). By adopting an expanded Business Model Canvas that includes sustainability and ecosystem aspects, companies can have a more comprehensive framework for analysing and developing business strategies (Hatvani et al., 2022; PEK et al., 2017). Implementing the differentiation strategies used by pineapple farmers in Nigeria can help them gain a competitive advantage in the premium horticultural market (Oladapo et al., 2023).

Horticultural premium commodity businesses that offer potential high profits, such as premium melon business will undoubtedly attract business actors to participate in the premium melon business. Entrepreneurs not engaged in agriculture are starting to see this business opportunity. This condition can be seen in new greenhouses in several regions, such as D.I. Yogyakarta, Central Java, and East Java. However, this business is capital- and technology-intensive, so planning a mature business model for the premium melon in a greenhouse is necessary.

Developing a robust business model design is essential to recognise the value and advantages of competitors in the premium horticulture business. Understanding the importance of business models, overcoming innovation barriers, and implementing differentiation strategies allow firms to navigate the competitive landscape better and develop effective growth strategies. By leveraging these insights, businesses in the premium horticulture sector can identify competitive strengths and devise strategies to improve their market position. Business Model Canvas is a helpful tool for identifying and leveraging competitive advantages. By mapping out business models, companies can better understand their value propositions and those of competitors, which will make it easier to plan and grow strategically more effectively. Combining traditional strategic analysis with BMC can also improve its usefulness in a competitive environment (Diderich, 2020; Markovic & Furjan, 2021; Pratiwi & Chumaidiyah, 2021; Silva et al., 2020). Business Model Canvas describes the business model of a company or organisation in creating, conveying, and capturing values and supporting the formation of new strategic options through nine essential elements (Osterwalder dan Pigneur, 2015).

In developing a greenhouse-based business, designing a business model is essential. Without a business model, greenhouse-based business owners will have difficulty understanding who the entities in their ecosystem are. It is not easy to identify the value and advantages of competitors, making it challenging to plan a strategy to grow in the future. Business owners will also find it challenging to understand the primary value and additional value that can be potentially provided by a greenhouse-based premium melon business and have difficulty identifying marketing channels under the characteristics of the melon produced. Previous research has focused more on preparing a business model BMC for businesses that have been running and are carried out only on one specific business unit, so it cannot comprehensively represent or describe the business conditions of premium melons. Based on the background described, this study was formulated to design nine components of Business Model Canvas for greenhouse-based premium melon business planning on Java Island. With this business model, prospective greenhouse-based premium horticulture ~~melon~~ entrepreneurs can more easily recognise the services, interactions, and resources involved. As for investors, this business model map will be helpful when investing.

RESEARCH METHODS

This study uses a descriptive research method with a qualitative approach. Implementation of research time starts from July – December 2024. The research was carried out on the island of Java, covering six provinces: D.I. Yogyakarta, Central Java, East Java, West Java, DKI Jakarta, and Banten. The research location was determined purposively according to the research objectives. The sample was selected based on convenience sampling techniques, under consideration of respondents willing

to be interviewed and easy be accessed. The sample consists of horticulture premium producers in greenhouses, marketers, and stakeholders. Research informants include greenhouse-based premium melon business actors, premium horticulture off-takers and the Provincial Agriculture Office of D.I. Yogyakarta. There were thirty informants in this study. The informants comprised twenty-one premium melon producers, eight marketers of premium horticultural products (resellers and retailers), and one stakeholder. Primary and secondary data were collected for this study. Primary data was collected through questionnaires, in-depth interviews, observations, and focus group discussions. Secondary data is obtained from various sources of literature and company documentation. The collected data was given triangulated techniques and sources before being analysed through data reduction, categorisation stages, and conclusion. The data is processed according to the nine components of the Business Model Canvas (BMC), developed by Osterwalder and Pigneur (2010). The nine elements of the BMC shown in the Figure 1, can be explained as follow 1) customer segments, to describe the targeted customer segmentation 2) value propositions, to describe what value will be offered to customers 3) channels, to describe the company’s way of reaching its customers to convey the value proposition offered 4) customer relationship, to describe the company’s way of communicating with customers specifically 5) revenue streams, to describe the revenue flow that the company receives for the products sold and also the payment system carried out by customers 6) key resources, to describe the most important resources in running the company so that the business model can be carried out properly 7) key activities to explain what important activities must be done by the company so that the business model can run 8) key partnership, to describe other parties who cooperate with the company to achieve the company’s goals, and 9) cost structure to describe all costs incurred to run the business model.

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
	Key Resources		Channels	
Cost Structure		Revenue Streams		

Figure 1. Business Model Camvas
Source: Osterwalder & Pigneur (2015)

The research approach using BMC has been applied to various studies for business planning in the agricultural sector. The BMC is a valuable tool for designing and optimising horticulture businesses (Atuahene-Gima & Amuzu, 2019; Donner et al., 2020; Vlachopoulou et al., 2021).

RESULT AND DISCUSSION

Informants of Green House-Based Horticulture Premium Business

The data was collected from thirty key informants: twenty-one premium melon producers, eight premium melon marketers (off-takers and retailers), and one stakeholder. The premium melon business producers, marketers, and stakeholders are spread across Java Island. From twenty-one greenhouse-based horticulture producers, all cultivate premium melons. Of the twenty-one producers, only four cultivate other premium horticulture commodities, such as cherry tomatoes, lettuce, kale, spinach, and pak coy, but the main one is still melon. Premium melons are dominantly cultivated because they have the highest economic value and are the easiest to market compared to other commodities. Leaf vegetable plants such as lettuce, spinach, pakcoy, and kale have a short shelf freshness, so they must be quickly marketed. With a market share that has begun to be saturated and considering the freshness of products, new greenhouse-based horticulture business actors do not prefer to choose cultivated leaf vegetables.

Table 1. Distribution of Informant Locations by Province

No	Business Location	Amount
1	Central Java	
	a. Semarang Regency	2
	b. Purworejo Regency	1
	c. Sragen Regency	1
2	West Java	
	a. Sukabumi City	1
	b. Karawang Regency	1
	c. Bogor Regency	2
3	D.I. Yogyakarta	
	a. Sleman Regency	12
	b. Yogyakarta City	4
4	DKI Jakarta	
	a. East Jakarta	1
5	East Java	
	a. Malang Regency	1
	b. Tulung Agung Regency	1
	c. Magetan Regency	1
	d. Kediri City	1
6	Banten	
	a. Tangerang City	1
Total		30

Source: Research Primary Data, 2024.

Designing Business Model Canvas of Greenhouse-Based Premium Horticulture

The Business Model Canvas is a business model of a logical picture of how an organisation creates, delivers, and captures value (Osterwalder et al. 2015). The canvas divides a business model into nine main components, then separate further into the right (creative) and left (logic) components. Using nine components in the BMC, the condition of premium horticultural businesses in Java was designed. The design was carried out to make it easier to see how the premium horticultural business runs. Based on information obtained from practitioners of cultivating premium melons in a Greenhouse-Based Premium Horticulture Business Plan Design in Java: Business Model Canvas Approach (Yekti et al., 2026)

greenhouse and stakeholders, a premium melon business plan in the form of a business model canvas can be designed, as shown in Figure 2.

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
<ol style="list-style-type: none"> Off-taker of premium horticulture product Modern market Production input distributor 	<ol style="list-style-type: none"> Cultivation of melons Marketing Open farm tourism Premium horticultural cultivation training services in a greenhouse for the community (short/long training) Skill and knowledge transfer internship 	<ol style="list-style-type: none"> Less pesticide for melons Free pesticide for leafy vegetables Product uniformity in size, freshness, sweetness Exclusive physical appearance Unique experience Experiential Learning in Modern Farming 	<ol style="list-style-type: none"> Personal Assistance For suppliers Self-Service for open farm visitors 	<ol style="list-style-type: none"> Fruit supplier for the modern market Visitors of open farm Individual customers
	Key Resources <ol style="list-style-type: none"> Greenhouse physical facilities 400m²/unit Knowledge and expertise in the cultivation of melons hydroponic Financial Hydroponics and automation technology Trained/skilled human resource 		Channels <ol style="list-style-type: none"> Direct marketing Indirect marketing Social media: Instagram, tik tok, Facebook, WhatsApp Website 	
Cost Structure		Revenue Streams		
<ol style="list-style-type: none"> Investment costs for greenhouse construction and hydroponic installations Operational costs per planting season 		<ol style="list-style-type: none"> Premium melon & leafy vegetable sales Picking your own agri-tourism Training in melon premium cultivation 		

Figure 2. Design of Premium Melon Business Model Canvas in Java Island

Source: Research Primary Data, 2024

1. Consumer Segment

The customer segment aims to identify and know potential customer segments from horticultural hydroponic cultivation using greenhouses. This identification is done to find potential customers who will buy or accommodate the crop. Customer segmentation in the Business Model Canvas is about who is being served and how to segment customers based on their needs and behaviours. Three main customer segments are planned to be marketing targets, namely:

a. Premium fruit supplier for the modern market

Premium horticulture product suppliers, especially in big cities, are targeting modern markets and premium fruit shops in Java. This supplier wants high-quality products with consistent quantities. The growth of big cities significantly boosts the demand for premium horticultural products through urbanisation, changing consumer preferences, economic factors, and technological advancements (Batt, 2023). Health and nutrition awareness, indulgence in quality, transparency, sustainability, convenience, higher incomes, and technological innovations drive the demand for premium horticultural products in the capital or big cities. These factors collectively shape consumer preferences and willingness to pay for premium products (Batt, 2019; Wang et al., 2019). The results of this study revealed Jakarta area still dominates the largest market segment of premium melons. This large market is shown by the flow of premium melon products cultivated in D.I. Yogyakarta, Banten, West Java, Central Java, and East Java, many of which are sent to Jakarta. Modern markets and premium fruit shops often demand high-quality standards, given that the reputation of their businesses depends on the products they sell to consumers. This collaboration with premium melon suppliers is strategic because it can guarantee sustainable product distribution.

On the other hand, long-term cooperation with premium fruit suppliers allows greenhouses to get a stable income stream, which is very important in agriculture-based businesses. Referring to the Market Segmentation theory from Kotler and Keller (2016), market segments can be grouped based on business demographics (large or small producers/suppliers), geography (provincial location), and psychographics (preference for premium products). By understanding the characteristics of each segment, greenhouse business actors can adjust their products to the specific needs of each target segment.

b. Loyal individual customer

Premium melon producers and suppliers can attract and create loyal end consumers. Communication and service are important in creating loyal consumers for premium melon products. Information about product excellence, variety origins, exclusive cultivation methods, and unique values in premium horticultural products helps build consumer trust and appreciation. Focusing on eco-friendly practices and obtaining organic certification can significantly increase consumer loyalty. Consumers tend to be more loyal to eco-friendly brands than conventional brands, as evidenced in the case of eggs with eco-labels that show a 3% higher loyalty rate (Danko & Nifatova, 2022).

Carrying excellent services, such as personalised services (e.g., special packaging for gifts), after-sales service, and quick response to complaints, provide a positive experience to consumers, potentially increasing loyalty in the long run. In line with research, Kotliarov (2013) states that increasing direct interaction between producers and consumers through e-commerce, vending machines, and direct purchases can strengthen relationships and increase loyalty. With proper communication and excellent service, premium melon producers and off-takers can reach and retain loyal customers. These consumers will not only be loyal to buying the product but will also be happy to recommend the product to others. Some premium horticultural producers state they have loyal customers.

c. Visitors of the open farm (Picking your own agri-tourism)

This segment is individuals or groups who come to the greenhouse to enjoy the experience of picking fruit directly. Agri-tourism's open farm activities offer fresh produce and a fun and educational experience. This educational tour targets consumers interested in modern agriculture and sustainable plant cultivation. Edutourism has recently become a trend due to the increasing interest in more personalised and nature-based experiences (Roberts & Hall, 2004). This experience educates visitors and facilitates direct interaction with the products they consume, increasing customer satisfaction.

2. Value Proposition

The value proposition is a key element in Business Model Canvas that explains why customers should choose the company's products or services over competitors. The value proposition also plays a role in knowing what a premium horticultural business should have to influence consumers to choose the products produced. Based on data from greenhouse-based business actors, there are several main aspects of the value proposition developed to run a greenhouse-based premium horticulture business.

a. Less Pesticide.

Most smart greenhouse-based hydroponic business actors are working on exclusive/premium hydroponic melon commodities as the primary commodity rather than leafy vegetable commodities. Currently, widely cultivated melons are Inthanon, Sweet Nett, Sweet Hami, Fujisawa, and Hamigua. Hydroponic premium melons are often the top choice of the modern market because they offer superior quality that appeals to middle-to-upper-class consumers,

following the theory of Value Proposition Design by Osterwalder et al. (2014), where the selected product must be able to meet the unique needs and preferences of customers. The value built from premium melons in greenhouses is less pesticide spray, while the leafy vegetables are pesticide-free. This concept is one of the selling points of premium leafy vegetables and melons cultivated in greenhouses compared to open fields. Cultivation in the open field requires more intense pest control, so pesticide application is often carried out excessively. Premium agricultural products, especially pesticide-free ones, are more in demand by high-end consumers for health and environmental reasons. Their willingness to pay higher prices for these products reflects a broader trend toward sustainable, health-conscious consumption (Nohara, 2024; Seck & Racine Thiam, 2022; Wendt & Weinrich, 2024; Zheng et al., 2022).

b. Product uniformity

Premium melons are uniform in terms of size, freshness, and standardised sweetness. This is in line with (Lavarestagh et al., 2024) research that stated the visual characteristics of agricultural products, including shape, colour, size, and uniformity, are the consumers evaluated the first attributes. These attributes significantly influence their initial purchase decisions. Consumers in the premium segment are willing to pay higher prices for products with superior quality attributes. It includes intrinsic qualities like flavour and texture and extrinsic qualities like appearance and uniformity (Zhou et al., 2021). Consumers of hydroponic premium leafy vegetables generally want products that are uniform in freshness and visual appeal. They tend to choose fresh vegetables that have leaves without holes, are fresh, and have light colours. A high level of visual uniformity will positively impact consumer acceptance (Yasmin et al., 2017). Meanwhile, melon consumers expect premium melons to maintain high firmness as a key indicator of freshness (Jang et al., 2024). Melon consumers prefer a sweetness level of 12° Brix or higher (Lu et al., 2015). Melons that maintain their firmness over time are more likely to be perceived as fresh and high-quality (Jang et al., 2024).

c. Exclusive physical display

Premium fruits are always marketed with an attractive and memorable appearance that is exclusive, reflecting an exclusive product and making it look more luxurious. Attractive and luxurious premium fruit packaging plays an important role in increasing the attractiveness of the product in the market. Research by Nik Wan et al. (2023) stated that using high-quality packaging materials can increase the perception of product value in the eyes of consumers.

d. Unique experience with agri-tourism tours.

The premium horticultural business in the greenhouse allows consumers to buy fresh products directly from the garden, get a unique experience by picking the desired fruits and vegetables, and learn to know modern agriculture through technology smart farming. The experience of picking fresh produce in the greenhouse is unique and enjoyable for tourists and supports a healthy and active lifestyle (Aldous, 2017). This tourism activity model allows visitors to interact with nature, positively impacting their physical and mental well-being (Perkins & Brown, 2012). Educational tourism packages can also be bundled with cultivation training, adding educational value for visitors. According to Pine and Gilmore (1998), in the concept of the Experience Economy, companies that can create unforgettable experiences will have more value than those that only sell products. Edutourism not only provides entertainment but also education for consumers who are interested in the sustainable aspects of modern agriculture.

e. Experience Learning in Modern Farming

The greenhouse-based premium horticulture business is an opportunity for students and students in the context of field practice and entrepreneurial practice. It adds value for students as part of applicable learning while improving conventional and digital cultivation or marketing

skills. This collaboration is based on the concept of experiential learning by Jhon Dewy, and David A. Kolb, where applying the learning-by-doing method is essential to help students develop practical skills and competencies (Knobloch & Smith, 2024). Research related to the development of the premium melon business conducted by Spain and Widodo (2013) stated that the dominant competencies to achieve competitive advantage in sustainable melon are innovation, the technical ability of cultivation, and greenhouse use.

3. Channel

The distribution channel in BMC describes how a company's products or services get into the hands of customers. In business activities, distribution can be interpreted as moving goods or services from producers to consumers (Manullang, 2016). Companies use distribution channels to communicate with consumer segments to fulfill their value proposition. Based on the mapping of greenhouse business actors, all business actors use websites and social media to convey information and promote products like WhatsApp, Instagram, Facebook, and TikTok. Social media allows existing and new customers to get accurate information about the availability of premium horticultural products. All business actors apply two sales channel systems: direct and indirect. In addition to direct sales channels to end users, greenhouse business actors also market to off-takers, direct supermarkets around big cities, and premium fruit shops. The distribution channel planning for the premium melon business in the greenhouse is arranged as follows:

- a. **Offline Channels.** Direct communication with premium fruit suppliers is the primary channel for marketing melon products. This communication involves a personal approach, where the greenhouse manager can arrange a cooperation agreement directly with the off-taker who will buy many crops. Some off-takers also have the opportunity to make purchases with a sell-out system, but on the condition that they notify a few days before harvest and send visuals/samples of the products to be harvested. Based on Kotler and Keller's theory of direct marketing (2016), this channel is very effective for the B2B (business-to-business) business segment, where personalisation and direct negotiation are important factors in building strong relationships.
- b. **Online Channels:** marketing is carried out through social media platforms such as Instagram, Facebook, and TikTok to attract agrotourism visitors and end consumers. Social media could be an example of a digital marketing strategy that allows greenhouses to reach a wider audience at a lower cost. According to research by Chaffey and Ellis-Chadwick (2019), using social media as a marketing channel can increase brand awareness and consumer engagement, especially in interactive agri-tourism businesses. Marketing through marketplaces/e-commerce is not an option for many greenhouse managers because the availability of products (predominantly premium fruits) cannot be provided continuously.

4. Customer Relationship

Customer Relationship is a relationship that can be established with customers. Through a good relationship with customers, the company can know the desires of consumers so that they can make predictions of market demand. The company can also find out what complaints customers feel so that they can be input for improvements in the future. Fostering trust and commitment through relationship marketing strategies can improve sales performance and customer loyalty (Dagger & Danaher, 2014; Samaha & Palmatier, 2015). Trust and commitment are the main foundations of a strong relationship between customers and the company, which is crucial in retaining premium melon customers. The planned customer relationships on the greenhouse-based premium horticulture business model are divided into two types according to their customer segments:

- a. Personal Assistance for Suppliers: This relationship involves a more intensive approach in which the greenhouse management interacts directly with the supplier. Intensive and personalised communication allows the greenhouse to ensure that every cooperation agreement related to price, distribution, and quantity goes according to plan. According to Grönroos (2000), this personal relationship is important in B2B business because it builds trust and long-term commitment between the two parties.
- b. Self-Service for agro-tourism visitors: Visitors can directly pick the desired fruit without any intervention from the greenhouse. Self-service agro-tourism allows visitors to have a more personalised and interactive experience. This self-service concept also aligns with the modern trend where consumers prefer control over their experience. Prahalad and Ramaswamy (2004), in the Co-Creation theory, explain that customers allowed to participate in the buying process will have a higher level of engagement and greater satisfaction.

5. Revenue Stream

Revenue flow is a crucial aspect of the financial sustainability of a business. Based on the information that has been collected in this study, the source of income is designed as the results of the mapping as follows:

- a. Sales of premium melon cultivation through off-takers, both in the form of distributors and retailers. The selling price and terms given by each off-taker generally vary. Tong (2022) explained that the level of economic development and the presence of modern retail infrastructure in large cities can influence prices. Some off-takers located near the capital city give higher purchase prices. From the survey results, it is known that the price range based on the location of the premium melon off-taker is as follows:
 - 1) D.I. Yogyakarta Region provides a price of Rp.20,000 to Rp.25,000/kg for grade A.
 - 2) Central Java Region provides a price of Rp.16,000 to Rp.25,000/kg for grade A
 - 3) East Java Region provides a price of Rp.17,000 to Rp.20,000/kg for grade A
 - 4) Off-takers with large capacities are in the West Java and DKI regions. Jakarta (only accepts products in the form of premium hydroponic melons), prices between Rp.18,000 – Rp. 25,000/kg
 - 5) For off-takers with small-medium capacity in the West Java and DKI Jakarta regions (only accepting products in premium hydroponic melons), buy products at prices that arrive at the company's warehouse between Rp.20,000-28,000/kg.

The purchase price offered by off-takers varies based on the company's location. This is under a differential pricing strategy that allows companies to adjust prices based on specific geographical locations or market conditions (Nagle & Hogan, 2006). Based on this pattern, it is recommended that premium melon greenhouse producers should be sold to off-takers around the capital (Jakarta) because they can provide better selling prices due to many premium melon consumers in big cities.

- b. Open farm agri-tourism.

Agri-tourism also provides significant income streams for greenhouse producers. Entrance tickets for garden picking and cultivation training are a stable source of income, especially during the holiday season or when the demand for educational tourism increases. Agri-tourism has proven to be a business with great potential, as it offers consumers entertainment and education (Roberts & Hall, 2004). The selling price of melons during open farm activities is also higher, around Rp.30,000/kg – Rp.45,000/kg compared to if sold to off-takers. In open farm agri-tourism activities, there are usually also introduction and plant training packages. In line with Nelson and Pade (2007) findings, educational activities and tours on farms, such as those involving aquaponics and hydroponics, play an important role

in increasing product recognition and profitability. These activities can attract tourists, school groups, and the public, who are willing to pay more to get the learning experience and products they learn.

c. **Training/Course.**

Human resource knowledge and skills can be packaged into a training service/course. Premium horticultural cultivation courses/training/workshops in greenhouses can be packaged in short durations, in the form of an introduction to hydroponic cultivation in greenhouses (1-3 days) or long-term (1 planting season cycle).

d. **Consulting/technical assistance for hydroponic cultivation in greenhouses**

Some business actors in the greenhouse-based hydroponic business for about 5 years generally have experience in various cultivation techniques with hydroponic systems and greenhouse automation technology. Armed with their experience and knowledge, some greenhouse actors offer consulting and mentoring services to novice business actors.

e. **Production Input Sales**

Business actors not yet established or experienced generally lack experience in formulating nutrients. It becomes a business opportunity for greenhouse business actors who are experienced and have knowledge in nutrition to provide nutritional formulations for beginner greenhouse entrepreneurs.

6. Key Resources

Key resource describes the important assets needed in a business to function correctly. Every business model needs key resources to create and offer added value, reach the market, establish good customer relationships, and earn income. The primary resources in the design of this greenhouse-based premium horticulture business process include:

- a. **Physical facilities:** Greenhouse is the central infrastructure supporting melon premium production. Modern technology is needed so that greenhouses can be operated with high efficiency. Greenhouse melon cultivation offers a competitive advantage through improved yields, quality, and profitability while supporting sustainable and environmentally friendly practices (Brezeanu et al., 2020; Cavalcanti et al., 2015; Kamyod & Yooyatiwong, 2022b; Sato, 2023; Zhu et al., 2023). Based on the obsessiveness of several melon greenhouses, it is known that the greenhouse models built are generally separated from one unit to another. However, it was also found that one greenhouse cub was partitioned into several rooms, separated from each other so that it could still be planted with different types or with the same variety but with different planting ages. Suggestions from greenhouse cultivation practitioners the optimal area for one greenhouse unit ranges from 400m² to 500m², with an automated system only in the irrigation and nutrition systems.
- b. **Cultivation knowledge and expertise:** Technical knowledge related to the cultivation of premium melons and vegetables in greenhouses is an important intellectual asset. According to Nonaka and Takeuchi (1995), knowledge possessed by an organisation can be one of the competitive advantages that is difficult for competitors to imitate. The knowledge that needs to be possessed is the cultivation process in the greenhouse.
- c. **Financial resources:** The initial capital used to build a greenhouse and carry out operational activities is obtained from various sources, including capital and loans. Some greenhouse businesses established, on average, start with their capital but with a limited area. Furthermore, the revenue stream from product sales and tourism will be used to maintain operational continuity. Furthermore, it will use the turnover of business results in the greenhouse.

- d. **Trained/skilled human resources:** Running a greenhouse-based business requires trained and skilled human resources to optimise modern technology used in the management of the planting environment. Using sensors, automated irrigation systems, and applications to set up automation requires special skills to function efficiently. Trained employees can monitor and adjust greenhouse conditions, ensuring plants get optimal nutrients and an environment conducive to growth.
- e. **Hydroponic technology:** The technology used, such as the fertigation system in hydroponic melon cultivation, allows for more efficient use of water and nutrients. This hydroponic system provides more advantages in terms of operational cost savings, in line with the principles of sustainable agriculture, which focuses on resource efficiency (Kamyod & Yooyatiwong, 2022b)

7. Key Activity

Key activities describe the main activities that need to be carried out by a company to generate and provide a value proposition, reach consumer segments, maintain good relationships with customers, and obtain revenue income on a sustainable basis. The key activities of the horticulture business based on greenhouses are designed to consist of:

- a. **Production (Cultivation of melons with fertigation system and NFT system):** The explanation from the premium horticultural cultivation actors is in line with various previous studies that state that hydroponic NFTs appear to be more efficient than traditional fertigation methods in the use of energy, water, and nutrient management, and have a lower environmental impact. However, to reap these benefits, careful monitoring and maintenance are required. By integrating advanced technologies such as IoT and machine learning, the efficiency and effectiveness of NFT systems can be further improved (Agustian et al., 2022; Gillani et al., 2023; Ibarra et al., 2020; Lycoskoufis & Mavrogianopoulos, 2020; Patel et al., 2024; Sidibé et al., 2023)
- b. **Marketing:** Marketing is carried out with a dual approach, namely through online to attract agri-tourism visitors and offline premium fruit suppliers. These two activities are carried out simultaneously to maximise market penetration under the integrated marketing communication theory (IMC), which emphasises the importance of message coherence across various channels. Online branding is prioritised through cohesive visual identity (e.g., logos, colour schemes) and storytelling across social media platforms (Wu et al., 2022). For instance, Instagram campaigns featuring visitor experiences at the PYO agri-tourism site enhance brand recognition and emotional engagement (Galloway, 2020). These efforts align with IMC's principle of unified messaging to amplify market reach. Branding elements online have been implemented, such as the company's website, social media profiles (e.g., Instagram, Facebook), and targeted digital campaigns that consistently showcase the brand's identity (e.g., logo, slogans, visual themes). Companies also have used content strategies like user-generated content (e.g., visitor photos) and educational posts to reinforce brand values (e.g., sustainability, farm-to-table authenticity). They implemented metrics for success, such as brief mentions of engagement metrics (likes, shares) or conversion rates tied to branding efforts. Thus, companies can optimally increase brand value, consumer engagement, and market coverage. The integration of social media and continuous adaptation to technological developments are the keys to the success of IMC's strategy in the future (Galloway, 2020; Harizi & Trebicka, 2023; Oladele Jo, 2011; Wu et al., 2022).
- c. **Picking Your Own (PYO) agri-tourism:** There is a growing interest in people interested in educational tourism as an educational and fun means of recreation recently. PYO agri-tourism

not only offers an interactive and educational experience but also provides health benefits through outdoor activities and the consumption of fresh produce. By taking advantage of this trend, the PYO agri-tourism business can become an alternative tourism option that attracts various market segments and significantly increases the company's revenue. It is also stated by Nelso & Pade (2007) that PYO agri-tourism provides additional income for farmers by attracting tourists who pay to pick their produce. This diversification helps stabilise farmers' incomes and is especially beneficial during the low season for conventional farming activities. In addition, PYO agri-tourism allows farmers to reach new consumer segments, increasing product recognition and demand. Its added value benefits unique agricultural companies such as aquaponics and hydroponics.

- d. **Course/training services:** After the team that manages the greenhouse already has enough experience cultivating premium horticulture with a greenhouse-based hydroponic system, the course/training becomes the target of the next activity. The training will be packaged for short-term and long-term duration. The agricultural sector is now transforming thanks to the integration of modern technology, which creates various business opportunities in training services. With the increasing adoption of digital technologies in agriculture, training is needed for personnel to be able to use these technologies effectively, including specialised software, advanced equipment, and innovative agricultural practices (Kozina, 2021; Shumakova et al., 2022)
- e. **Field Practice/Internship:** Internship activities are intended for students and students. This activity is aimed at supporting the birth of the young generation in the field of modern agriculture.

8. Key Partnerships

Key partnerships describe the relationship between the supplier network and partners that make the business model work well. Collaboration with partners such as off-takers (buyers) and input distributors can be highly beneficial in addressing challenges in the melon premium market. Effective collaboration between distributors and suppliers can lead to better communication and information sharing, which enhances supply chain efficiency. A study by Akiri et al. (2024) explained that working with off-takers can provide better access to high-quality niche markets. This is particularly important for smallholder farmers struggling with market entry barriers. Agricultural input distributors can offer knowledge and resources related to advanced agronomic practices, including genomics techniques and nanotechnology applications, which can improve the sensory and consumer acceptance qualities of melons (Brandão et al., 2022; Nagashima et al., 2022)

The types of cooperative relationships can be in the form of strategic alliances between companies rather than competitors, strategic partnerships between competitors, partnerships to open new businesses, and relationships between suppliers and buyers to ensure the availability of reliable production materials. The primary partnership of the greenhouse business is designed to be able to involve:

- a. **Supplier premium fruit:** Cooperation with off-takers/suppliers allows premium melon producers to market their products more widely. It is a strategic alliance in which both parties support each other to achieve their business goals. Alliance able to improve market access and smooth operations (Pérez-Mesa et al., 2019)
- b. **Modern market:** Products sold through the modern market target consumers with middle-to upper-income levels. Thus, it becomes important to establish cooperation with the modern market. Research by Perdana (2017) reveals that increased demand for high-quality vegetables in Indonesia, such as carrots, results from the growth of modern retail markets.

c. Production input distribution

Building partnerships with hydroponic nutrient input providers is important to ensure the quality and consistency of production. This partnership allows access to the quality nutrients necessary for optimal plant growth and helps reduce production costs through bulk purchases and more competitive prices. Collaborative purchasing and marketing with supply chain partners give opportunity economic benefits such as acquiring inputs at lower costs, increasing distribution efficiencies, and combining selling activities (Stegelin, 2015)

9. Cost Structure

The cost structure of greenhouses is classified as cost-driven, where cost efficiency is the top priority in business management. Every aspect of operations, from infrastructure development to marketing, is designed to optimise the use of resources and minimise waste. The lean **startup** principle introduced by Ries (2011) is relevant for greenhouse businesses because companies strive to reduce costs while maintaining high product quality.

Referring to one of the premium horticultural hydroponic business actors, which has a greenhouse physical development business line, it is known that the cost to build a greenhouse unit with galvanised iron material, the building area is $19.2\text{m} \times 21\text{m} = 403.2\text{m}^2$, an investment of Rp. 392,516,000 is required. This cost includes a greenhouse building for hydroponic melon cultivation with a fertigation system, a seed nursery room, a reservoir veranda, and a media sink. The greenhouse unit is designed for a population of 1,260 melon plants. The greenhouse structure is targeted to have an economic life of 10 years. Operational costs for a population of 1,260 melon plant pits per planting season reached Rp.29,419,715.

CONCLUSION AND SUGGESTION

Using nine components of Business Model Canvas, a greenhouse-based premium horticulture business plan can be designed each element as following: 1) The demand for premium horticultural products is a segmented market, such as off-takers of premium fruits, visitors of agri-tourism, and individual customers 2) value proposition that can be create are less pesticide for premium fruits, product uniformity (in size, sweetness, freshness) according to consumer wishes, exclusive physical appearance, unique experience, modern farming experiential learning 3) channels: done through direct marketing, indirect marketing, social media (Instagram, TikTok, Facebook, WhatsApp) and website 4)Customer Relationship: Personal assistance for suppliers and self-service for agri-tourism visitors is a kind of customer relationship that should be developed 5) revenue streams are obtained from sales of premium fruits (melons), agri-tourism tickets, and hydroponic melon cultivation courses/training services 6) Key Resources are physical facilities of the greenhouse 400m^2 - 500m^2 /unit, knowledge, and expertise in the cultivation of premium melons, finance, hydroponic system technology and automation, and skilled human resources are key resources that need to be owned 7) the key activities planned are premium melon cultivation, marketing, picking your own agri-tourism, melon cultivation training services (short/long training), and skill and knowledge transfer internships 8) key partnerships should be build with the premium fruit off-takers, modern market and production input distributors, and 9) cost structure consists of investment costs for greenhouse construction, hydroponic installations, and operational costs per planting season. The BMC elements that have been stated are important elements that need to be noticed and carried out by premium horticulture greenhouse startups in Java if they want their business to run well. This BMC can also be a reference for investors who want to invest their capital in a premium horticulture business based on a greenhouse.

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