Research on World Agricultural Economy
https://journals.nasspublishing.com/index.php/rwae

ARTICLE

Strategic Priorities for Developing the Marketing of Pomelo Oranges (*Citrus maxima* Merr.): A Case Study in Magetan Regency, Indonesia

Kusnandar [1*] ***, Risma Dwi Pratiwi*** [2] ***, Kartika Yoga Prasetyani*** [2] ***, Asmadi*** [2] ***, Reismaya Wanamertan Nugroho*** [3]

[1] *Department of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta 57126, Indonesia*
[2] *Postgradute Program of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta 57126, Indonesia*
[3] *Department of Plantation Management, Politeknik LPP Yogyakarta, Yogyakarta 55222, Indonesia*

ABSTRACT

Magetan Regency is the main production center for pomelo in Indonesia with total production reaching 244,395 quintals per year. Despite the high output of pomelo oranges in Magetan Regency, they still need to improve their marketing process. The purpose of this research is to analyze the priority of choosing the best strategy to develop a marketing strategy for pomelo oranges in Magetan Regency. The analysis method uses the Analytic Network Process (ANP) with Super Decision Software. Data collection uses journal reference methods, observations, interviews, and questionnaires to people who are experts in the field of pomelo oranges to obtain data/information regarding criteria, sub-criteria, and alternative solutions that will be analyzed later. The experts are the Head of the Horticulture Division from the Food Crops, Horticulture, Plantation, and Food Security Department, Magetan Regency; pomelo orange farmers in Magetan Regency; and representatives of Field Agricultural Extension Officer Sukomoro District, Magetan Regency. The results of the analysis using the ANP method, lead to the right and best decision in terms of selecting a profitable marketing strategy for pomelo citrus farming in Magetan Regency, namely post-harvest quality improvement. These results can be used as the best alternative because they meet the criteria and

*CORRESPONDING AUTHOR:
Kusnandar, Department of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta 57126, Indonesia;
Email: kusnandar_fp@staff.uns.ac.id

ARTICLE INFO
Received: 6 October 2024 | Revised: 4 December 2024 | Accepted: 9 December 2024 | Published Online: 5 February 2025
DOI: https://doi.org/10.36956/rwae.v6i1.1370

CITATION
Kusnandar, Pratiwi, R.D., Prasetyani, K.Y., et al., 2025. Strategic Priorities for Developing the Marketing of Pomelo Oranges (*Citrus maxima* Merr.): A Case Study in Magetan Regency, Indonesia. Research on World Agricultural Economy. 6(1): 353–366.
DOI: https://doi.org/10.36956/rwae.v6i1.1370

sub-criteria above, namely managerial capabilities, customer linking capabilities, market innovation capabilities, human resources assets, and reputational assets.

Keywords: Pomelo Orange; Magetan Regency; Marketing Strategy; ANP

1. Introduction

Pomelo oranges (*Citrus maxima* Merr,) are plants that are often found in Southeast Asia, such as Cambodia, Indonesia, Laos, Malaysia, the Philippines, Thailand, and Vietnam, and are also spread in several other Asian regions, such as Bangladesh, India, and Japan [1]. Indonesia, as a reasonably large distribution area, has great potential for development. This plant has unique characteristics in terms of taste, size, and storage time [2]. In terms of shape, pomelo oranges are almost similar to grapefruits because they have the same large fruit size, but the flesh of the pomelo fruit is red. Therefore, people often call pomelo oranges red grapefruit. In terms of taste, pomelo oranges tend to have a dominant sweet taste compared to grapefruit, which tends to be more sour. The beneficial substances contained in pomelo oranges are quite diverse, such as vitamins A, B6, B12, C, lycopene, pectin, tryptophan, and other mineral content. According to Sharma and Singh [3], pomelo fruit has good health benefits, including preventing cancer, diabetes mellitus, being good for body balance, preventing pancreatic disorders, and being rich in antioxidants that can prevent free radicals. Its fiber content helps maintain gut health, while its vitamin C plays a role in fighting infection and inflammation. Grapefruit is rich in vitamin C, fiber, and antioxidants. It also contains enzymes that can help absorb nutrients and support healthy digestion. Pomelo fruit is known for its high vitamin C content and benefits for the body. According to research by Sheik, Vedhaiyan and Singaravel [4], pomelo leaves are efficacious for treating epilepsy, and the fruit has benefits as a diabetes medication [5], while the stems and roots can be used to treat microbes [6].

There are many types of pomelo oranges in Indonesia with different regional names. According to Kalsum et al. [1], pomelo that grows in Indonesia is divided into 2 cultivars: seed-bearing and seedless. Seed-bearing cultivars include Cikoneng, Adas Nambangan, Adas Duku, Jawa 2, Magetan, Srinyonya, Bali Putih, Muria Merah 2, Putih Asam, and Pangkep Putih. Seedless cultivars are found because they have less than 10 seeds, some of which are Bageng, Jawa 1, Bali Merah 2, Muria Merah 1, and Giri Matang. The two types of cultivars have different special characteristics, such as flowering characteristics, fruit emergence, harvest time, and fruit quality. Even though various varieties of pomelo have been discovered, it is currently not certain how many local pomelo cultivars and accessions exist and are cultivated in Indonesian society. One of the pomelo orange cultivation areas that has become a center is Magetan Regency [7]. As a cultivation center area, Magetan Regency can produce up to 244,395 quintals per year. This region develops 3 main cultivars, namely Magetan, Nambangan, and Sri Nyonya.

Notwithstanding the high production of pomelo oranges in Magetan Regency, farmers do not have information about the market, both prices and demand trends. In addition, farmers' knowledge about good pomelo fruit quality standards is still low. This is because the motivation for farmers to cultivate pomelo is not based on consumer preferences, but rather on the characteristics of the pomelo fruit which has a long storage life. Pomelo cultivated by farmers is only based on pomelo varieties that have strength in storage capacity and does not refer to consumer desires. According to Makkumrai, Huang and Xu [8],consumer desires for pomelo fruit that are prioritized are the freshness of the fruit, then other attributes such as taste, price, color, texture, aroma, and size. Information regarding consumer preferences has not been well socialized among farmers. The absence of a meeting point between consumer desires and the lack of knowledge to improve the quality of pomelo fruit from the farmers' side has caused this fruit not to be an alternative fruit among consumers. In fact, the potential for pomelo fruit at the world level is very large, considering that not all areas can be planted with this variety. However, conditions at the farmer level still describe a situa-

tion that is not yet profitable for them. Pomelo fruit experienced an increase in sales during Chinese New Year. Outside of that time, the number of requests can be said to be relatively low when compared to other citrus varieties. If there are no strategic efforts, the number of farmers cultivating pomelo will decrease. This is also influenced by the fact that the bargaining position of farmers is low. Prices are entirely determined by middlemen. Imperfect market structures force farmers to sign forward contracts that set minimum prices. Some of the agricultural commodity marketing problems faced by farmers include high levels of competition between farmers in the market, price transmission in international markets, which puts pressure on domestic prices [9], production that does not match market demand, and a long marketing chain due to the many marketing institutions involved in it. This problem will ultimately be detrimental to farmers as the first party because the prices received by farmers are meager compared to the prices that reach consumers. This problem is a significant concern because it can hamper the potential of pomelo fruit as a superior commodity in Magetan Regency. As an anticipatory step and improvement of the already running system, a strategic development plan by the authorities in the region needs to be carried out.

Based on the background above, it is important to choose the right marketing strategy for pomelo orange farming in Magetan Regency. In terms of cultivation capacity, farmers are highly expected to produce more. Increasing orange production will increase growth in production center areas [10]. Apart from that, the right marketing strategy will be able to increase farmers' income, improve farming performance, capture opportunities to provide more value for consumers, and help facilitate product sales [11]. It is appropriate that the development of pomelo oranges should receive great attention. Therefore, it is necessary to develop a marketing strategy for pomelo oranges in Magetan Regency that suits the conditions. The Analytic Network Process (ANP) method is used to determine the alternative priority of the pomelo orange marketing strategy. The ANP method was chosen because it can produce a main strategy based on the assessment of each criterion consisting of several subcriteria (nodes). Each sub-criterion has a relationship with other sub-criteria inside and outside the criteria so that the assessment given by the respondents is comprehensive, not only disconnected at one criterion. In essence, all variables in a phenomenon have a relationship or influence, not standing alone as a single assessment. This is what makes ANP a valid and comprehensive strategy selection method. The aim of this research is to analyze the priorities for selecting the best strategy based on the results of Analytic Network Process (ANP) calculations to obtain the right marketing strategy for pomelo oranges in Magetan Regency.

Analytic Network Process (ANP) is a technique that helps solve various problems by considering many criteria. Initially used to determine the priority of choices in multi-criteria situations, ANP has now developed into a model that can be applied to solve various problems [12–15]. This is possible because ANP uses intuition as the main input, but this intuition must come from decision-makers who have sufficient information and a deep understanding of the problem at hand. Basically, ANP is a general theory of measurement that functions to determine the ratio scale through pairwise comparisons, both discrete and continuous. This comparison can be based on actual measurements or basic scales that reflect the relative intensity of preferences. ANP also pays special attention to deviations from consistency and accommodates measurements and dependencies between groups of elements in its structure [16].

2. Materials and Methods

The research was carried out in Magetan Regency, Central Java Province, because it is Indonesia's main center of pomelo production. The time for conducting the research was in October 2022. The research stage began with a survey to the Department of Agriculture and Food of Magetan Regency to see the condition of pomelo farming and the problems there. After conducting the survey, the researcher compiled a questionnaire with attributes or criteria based on the results of the survey in the field. After the questionnaire was completed, the researcher conducted interviews with experts, namely the Head of the Horticulture Division from the Food Crops, Horticulture, Plantation and Food Security Department,

Magetan Regency; pomelo orange farmers in Magetan Regency; and representatives of the Field Agricultural Extension Officer Sukomoro District, Magetan Regency. All respondents were selected because they were parties who knew the condition of pomelo in Magetan Regency and were involved in interactions with farmers. In addition to using survey and interview methods, direct observation or observation was carried out to capture phenomena that were not included in the questionnaire. The results of the observations were written in brief notes which could then be additional information in the discussion results. The time of conducting the research was in October 2022.

The analysis method used to select a profitable marketing strategy for pomelo oranges is the Analytical Network Process (ANP) method. The ANP method is an application of mathematical theory that can analyze influences using a complex assumption approach through problem decomposition and alternative solutions to obtain strategic priorities [17]. ANP is a development of the Analytical Hierarchy Process (AHP) method. The difference between these two methods is that in ANP, there is interaction between nodes within each cluster and between clusters. Clusters are constituent components in the ANP network structure, and nodes are constituent components of each cluster. To determine clusters and nodes in an ANP network structure, journal references, observations, and interviews are used to obtain this data/information. The analysis process using the ANP method begins by breaking down the problems that occur and continues by creating an ANP network structure [14]. In **Figure 1**, the determination of marketing resource criteria in this research is based on the assessment point scheme that was developed by Hooley et al. [18]. Hooley et al. [18] developed a marketing criteria assessment framework for companies with the aim of creating a competitive advantage. The network structure consists of seven clusters as shown in **Table 1**.

Table 1. Alternative strategy determination cluster.

Cluster	Definition	Measurement
Managerial capability	Managerial capability refers to the capacity of an organization to manage various aspects of its operations. Managerial ability is a person's expertise in carrying out management functions [19], which includes the ability to manage a company that can form accurate assessments and estimates regarding company efficiency, as well as synthesize reliable information for future estimates [20]. Managerial ability creates all other capabilities in the organization for a sustainable future [21].	1. Service Management 2. Planning Management (operations) 3. Human Resource Management
Market innovation capability	Market innovation capacity refers to the ability of an organization to create and introduce new products and conduct sales promotions. Innovation plays an important role considering its relationship with marketing effectiveness which can affect the company's financial performance [22]. Innovation drives companies to progress and continue to develop [23].	1. Ability to launch products 2. Sales promotion
Customer linking capabilities	Customer linking capabilities are the ability to build and maintain good relationships with customers and understand their needs. Customer linking capabilities are among the most valuable things for organizations because they take time to develop, depend on resource integration, and are inherently difficult for competitors to imitate. Customer linking capabilities are distinctive capabilities that have the potential to create a competitive advantage for companies that develop them [24].	1. Good relationship with customer 2. Consumer income 3. Consumer tastes
Human resources assets	Human resources assets refer to the quality and value of the workforce in an organization. Human resources are the most important strategic resources in an organization; investment in human resources is crucial in an organization [25]. Human resource management as a valuable strategic asset has become a key element in achieving organizational success [26]. Regardless of technological advances, human resources play a strategic role in the effective use of physical and financial resources [27].	1. Quality of human resources 2. Wages
Reputational assets	Reputational assets include public perception of a company based on credibility and product quality. Reputational assets play an important role in building trust [28]. A company's reputation cannot be identified as an asset in the balance sheet, but a company's reputation can influence investor trust, staff recruitment, supplier attitudes and various other stakeholders in its capacity as relationship capital [29].	1. Credibility from customers 2. Product quality

Table 1. *Cont.*

Cluster	Definition	Measurement
Alternative strategy	Alternative strategies refer to approaches taken by a company to achieve marketing goals and improve operational efficiency. Alternative strategies can be real or additional strategies to solve problems with several additional advantages and benefits [30].	1. Carrying out distribution activities in the marketing process of pomelo oranges 2. Increasing market share with the cooperation of various parties 3. Improving post-harvest quality

Source: [19–30].

Every cluster consists of nodes that are connected to each other using arrows. Based on the network structure that has been formed, respondents can provide assessments through a questionnaire with a score scale of 1–9, where a score of 1 means equally important and a score of 9 means very important [15]. All expert answers are input into the super decision, then processed to obtain the supermatrix value. The scores obtained from the experts' assessments must be tested for consistency by first calculating the consistency index (CI).

$$CI = \frac{\lambda \text{max} - n}{n - 1} \quad (1)$$

λ max is the average value obtained by dividing the matrix elements of all priorities by the priority vector [31], n is the number of elements in the judgment matrix [32, 33].

The CI value is used to calculate the consistency ratio (CR) by calculating:

$$CR = \frac{CI}{RI} \quad (2)$$

RI is a random index obtained from Castañeda, Rojas and Cueto [33] in **Table 2**.

Table 2. Random Index (RI) values.

n	1	2	3	4	5	6	7	8
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41

The logical consistency value has a CR value ≤ 0.10. This means that the result is correct. If the value is more than 10%, then the decision data value must be corrected [34]. If the CR value is less than 0.1, then the expert assessment is consistent, but if the CR value is more than 0.1, then the experts' answers are inconsistent, and there needs to be a re-assessment from the experts [35]. Expert assessments that have been declared consistent will then produce supermatrix results. The supermatrix consists of three stages, namely unweighted supermatrix, weighted supermatrix, and limit supermatrix [36]. The unweighted supermatrix is obtained from the original values of the eigenvectors of the pairwise comparison matrix, the weighted supermatrix is obtained from the original values of the eigenvectors of the pairwise comparison matrix multiplied by the cluster matrix, and the limit supermatrix is from multiplying the weighted supermatrix with the matrix itself, up to several times to get the result stable [14]. Supermatrix limits are used to determine the best priority from several alternatives [37].

3. Results

The determination of clusters, nodes, and the structure of the ANP network, which includes alternative strategies and criteria (managerial capability, customer linking capabilities, market innovation capabilities, human resources assets, reputational assets), is carried out through literature studies, brainstorming and discussions with experts (**Figure 1**). Each cluster consists of nodes that are connected between one cluster and another. The results of the data analysis showed that the consistency ratio (CR) value in each paired comparison matrix was less than 0.1, which means that the assessment of all experts provided consistent results.

Based on the results of interviews with the Head of Horticulture, Field Extension Officers, and farmers in Magetan Regency, five pomelo cultivars have been

released by the Ministry of Agriculture, namely Nambangan, Sri Nyonya, Bali Merah, Magetan and Gulung. The most widely cultivated pomelo cultivars in Magetan Regency are Nambangan, Sri Nyonya, and Bali Merah/Pomelo Magetan. The current price on the market is around IDR 5,000.00 - IDR 7,000.00 per fruit. Sales of pomelo oranges in Magetan Regency are carried out in two ways, namely online and direct purchases from farmers. Direct purchasing means purchasing on land without looking at the quality of individual oranges, also called wholesale. Prices tend to be cheaper and the quality of the fruit is a mixture of good grade pomelo oranges and ordinary ones. Meanwhile, the type of pomelo with the greatest interest in the online market is Bali Merah/Pomelo Magetan. This is because this type tends to taste sweeter, and the color is more attractive. Quality is a top priority for online sales. Selling prices on online markets tend to be more expensive than buying in bulk.

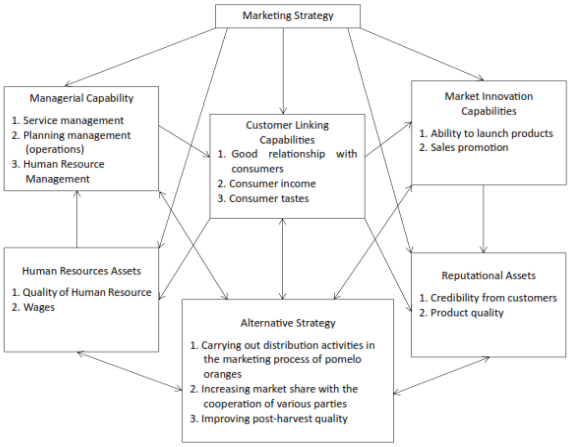

Figure 1. ANP network structure.

These findings highlight the significant diversity and market demand for grapefruit cultivars in Magetan Regency, with Nambangan, Sri Nyonya, and Bali Merah varieties proving to be particularly popular among local consumers and online markets. The price differences between wholesale and online sales underscore the importance of quality standards in the online market, where consumers are willing to pay more for high-quality grapefruit, especially the Bali Merah variety known for its sweetness and attractive color. This dual-marketing strategy not only accommodates diverse consumer preferences but also provides farmers with the flexibility to optimize their revenue streams.

The overall priority of each alternative is calculated through a synthesis process. The results obtained from each subnetwork are synthesized to obtain the overall priority of the alternatives. To obtain more accurate results, this synthesis process considers each weight generated from various sub-criteria and existing cluster networks. In this final stage, the overall weight results will be shown along with the priority ranking of each subcriteria for all clusters. The synthesis results from expert respondents will be explained below. The results obtained show statistically the consensus of the experts, who, as a whole, consist of respondents from the Head of the Horticulture Division, Field Extension Officers, and pomelo orange farmers in Magetan Regency. By involving respondents from various backgrounds, ranging from the Head of Horticulture, Field Extension Officers, to pomelo farmers in Magetan Regency, these results are expected to reflect the most relevant and applicable strategies to increase the competitiveness of pomelo products in the market. The overall priority results of these alternatives will be selected as the appropriate marketing strategy for pomelo orange farming in Magetan Regency. The chosen marketing strategy is expected to not only be in accordance with current market conditions, but also be able to support the sustainability of pomelo farming businesses in the future. The following are the priority results of data processing using the ANP method.

The synthesis results of the managerial capability cluster are shown in **Table 3**. This cluster consists of three nodes, namely service management, planning management (operations), and human resource management.

Table 3. Weight of managerial capability sub-criteria.

No	Managerial Capability	Normalized by Cluster	Limiting
1	Service management	0.25192	0.021502
2	Planning management (operations)	0.64893	0.055388
3	Human resource management	0.09915	0.008463

The synthesis results based on the managerial capability cluster show that planning management (operations) is the most prioritized node with a value of 0.64893, then in next place is service management (0.25192), and the last is human resource management (0.09915). Planning management has an important function in achieving goals, especially in achieving efficient expenditure and maximizing profits [38]. Good planning allows business actors to anticipate dynamic market changes and challenges and prepare strategic steps to deal with them. In addition, careful planning also helps in the use of resources more effectively and efficiently, so that businesses can maintain competitiveness and add value to stakeholders. In the business world, the planning stage requires a significant amount of time allocation. Business people look for various options and the best scenarios to achieve the goals they have set. Structured planning is not only a guide in achieving goals, but also a tool to adapt and develop according to market needs and changing economic conditions. This applies to all stages of business, including marketing. Even though conditions in the field will be different, careful planning will minimize the risks that will inevitably occur. Risk in a business is a challenge that is difficult for business people to avoid [39] but can be overcome and managed with good planning management. On the other hand, incomplete planning will cause delays at each stage and result in increased costs or failure to achieve business goals [40]. This applies to all sectors, including horticulture. Pomelo fruit is still rarely cultivated by farmers due to low interest in buying the commodity. This fruit has a high selling value in the international market. This great potential will be wasted if it is not planned carefully. The goal is that this commodity can be spread over a wider area so that it is not concentrated in one center or several areas. This careful planning can begin with cost planning to market targets. In addition, supporting factors such as land availability, selection of superior varieties, and proper maintenance also need to be considered in order to produce quality products and meet market demand. With the right strategy, grapefruit commodities can grow rapidly, create new market opportunities, and improve farmers' welfare.

The synthesis results on the customer linking capabilities cluster are shown in **Table 4**. This cluster consists of three nodes, namely good relationship with consumers, consumer income, and consumer tastes.

Table 4. Weight of customer linking capabilities sub-criteria.

No	Customer Linking Capabilities	Normalized by Cluster	Limiting
1	Good relationship with consumers	0.42840	0.083597
2	Consumer income	0.12384	0.024166
3	Consumer tastes	0.44775	0.087373

The synthesis results based on the customer linking capabilities cluster show that consumer tastes are the most prioritized node with a value of 0.44775, then in next place is good relations with consumers (0.42840), and the last is consumer income (0.12384). Business activities cannot be separated from a commitment to meeting consumer needs. Along the way, it is not uncommon for business people to experience increases and decreases in sales charts due to changes in consumer tastes. Pomelo oranges are a commodity that is rarely consumed by the general public because production quantities are still limited. As a producer, understanding what consumers taste is a strategy to increase the existence of pomelo oranges. An increase in consumer tastes will generally have an impact on increasing demand and vice versa [41]. In Indonesia, pomelo is a fruit that is rarely consumed by the public, usually this fruit experiences an increase in demand during Chinese New Year. This season, demand for pomelo fruit has increased by up to 50%. The demand is differentiated into various preferences, where on average consumers like red pomelo, sweet with a combination of sour, juicy, and easy-to-remove skin. This creates opportunities for producers to innovate in pomelo production, such as improving the taste quality and durability of the fruit so that it can be better accepted by a wider market.

Consumer tastes greatly determine the quality that will be produced in the next planting and harvesting period. This effort can be started from pre-planting by selecting quality seeds. Good seeds also need to be supported by post-planting care in accordance with good fruit and vegetable cultivation guidelines to minimize early harvests that can reduce fruit quality. The right harvest period will determine the quality of taste and texture of pomelo fruit. Pomelo fruit that is ready to be harvested requires post-harvest handling in accordance with the Regulation of the Minister of Agriculture of the Republic of Indonesia Number 22 of 2021. Post-harvest handling is a fairly important stage because of the characteristics of the fruit which is easily rotten and oxidized. Therefore, the right marketing strategy is very important to attract consumer interest and increase pomelo consumption outside of certain periods, such as holidays.

The synthesis results on the market innovation capabilities cluster are shown in **Table 5**. This cluster consists of two nodes, namely the ability to launch products and sales promotion.

The synthesis results based on the market innovation capabilities cluster show that sales promotion is the most prioritized node with a value of 0.82696 and next in line is the ability to launch products (0.17304). A marketing activity cannot be separated from promotion. This is an effort to convey information to potential consumers regarding the products offered [9]. Currently, promotional media is developing very quickly. Many competitors are competing to use digital platforms to facilitate purchasing transactions [42]. Easy and efficient forms of offering are a trend that is being intensively pursued by business practitioners. In this case, digital marketing that utilizes online platforms is the main choice, considering the increasing number of consumers who are active in cyberspace. In addition, the use of technology such as content personalization and data-based advertising is also increasingly effective in attracting the attention of increasingly selective consumers. Conventional forms of promotion are starting to be abandoned because they do not suit the needs of today's consumers, who want everything to be fast and practical [43]. Even though there are many similar products on the market, business people can win by using the right media and promotional methods. The use of social media, online advertising, and influencer marketing are very effective strategies in reaching a wider audience. Digital technology allows marketing to be more targeted and efficient, providing a competitive advantage for business people.

According to Alexandrescu and Milandru [44], promotions in the modern era have a complex concept because the activities carried out do not just inform about the presence of the product being sold but also aim to attract the interest of potential buyers to consume the product being offered. In terms of promoting horticultural products, digital media is currently developing rapidly. Many digital platforms offer convenience for delivery services to customers' locations. When the Covid-19 pandemic hit the world, many delivery services were launched to meet household needs, one of which was fruits and vegetables. Consumers can choose various types of vegetables and fruits, even those that are rarely found when buying offline. In addition, with the search and recommendation features based on preferences, consumers can quickly find products according to their needs, increasing convenience in shopping. Pomelo fruit is still rarely found on the market, but with the right promotional media, consumers can easily reach it. People who initially did not know what pomelo fruit is and its benefits can be educated through the inclusion of information that can be added to the marketplace with the use of interesting diction. In addition, with positive testimonials from other consumers on digital platforms, trust in product quality is increasing.

The results of the synthesis on the human resources assets cluster are shown in **Table 6**. This cluster consists of two nodes, namely quality of human resources and wages.

Table 5. Weight of market innovation capabilities sub-criteria.

No	Market Innovation Capabilities	Normalized by Cluster	Limiting
1	Ability to launch products	0.17304	0.021421
2	Sales promotion	0.82696	0.102369

Table 6. Weight of human resources assets sub-criteria.

No	Human Resources Assets	Normalized by Cluster	Limiting
1	Quality of Human Resource	0.84433	0.047379
2	Wages	0.15567	0.008735

The synthesis results based on the human resource assets cluster show that human resource quality is the most prioritized node with a value of 0.84433, and wages (0.15567) are next in line. Human resources play an important role in maintaining and improving business performance [45]. In today's modern era, human resources are not just production inputs that are employed like machines, but there are rights as humans that must be fulfilled [46]. Therefore, taking care of human resources is a must for a business. According to Oluwatoyin [47], human resources are assets whose quality must be maintained so that they can last for a long period of time. Maintaining good human resource quality can be done by holding training with the aim of increasing their competence [48] and providing workers with the rights they should have [49]. Continuous training allows employees to keep up with the latest industry and technology developments, as well as strengthening interpersonal skills that are essential for effective teamwork. In addition, providing appropriate rights will increase job satisfaction, which in turn reduces turnover and increases employee loyalty. Apart from that, initial selection can be carried out, such as the level of education that has been completed [50] and previous experience [51]. The better the quality of human resources, the more effective and efficient the work will be. This certainly provides benefits for a business because targets can be realized more quickly. A rigorous selection process will ensure that individuals who are accepted have the basic knowledge and skills needed to optimize their performance in the workplace. The better the quality of human resources, the more effective and efficient the work will be.

The results of the synthesis on the reputational assets cluster are shown in **Table 7**. This cluster consists of two nodes, namely credibility from customers and product quality.

The synthesis results based on the reputational assets cluster show that product quality is the most prioritized node with a value of 0.72379, and next in line is customer credibility (0.22023). Consumers, as buyers, need clear information regarding the product they are going to buy. One of the main considerations for potential buyers before deciding whether the product is worth buying or not is its quality [52]. Product quality is a crucial element in determining consumer purchasing decisions, especially when the product is an item that will be consumed directly. This is especially the case with fresh produce. Pomelo fruit sold in fresh form will give buyers the perception of providing different standards compared to other non-fresh products. According to Guan, Liu and Zhai [53], consumers will buy fresh products with priority considerations such as color that is not pale, fresh, pollution-free, and organic. In addition, consumers also tend to pay more attention to cleanliness and product handling that meets health standards. The thing one needs to pay attention to when marketing fresh products is the supply chain. The longer the supply chain, the more it can cause a decrease in quality [54]. The length of the supply chain is directly related to the product's resistance to damage, which can reduce consumer satisfaction. Even though pomelo fruit tends to have a longer shelf life compared to other types of fruit, the outer appearance of this fruit will become wrinkled, dull, and not smooth over time [55]. Therefore, it is very important to pay attention to product quality because the first impression from consumers will have an impact on potential repurchases and, of course, increase profits. Consumers who are satisfied with the quality of a product tend to become loyal customers and recommend the product to others. Especially for pomelo as a horticultural commodity, product quality requires definite and integrated standards because of the characteristics of agricultural products that experience accelerated ripening after being harvested. In order not to be damaged, special treatment is needed to maintain the quality of the fruit, both in terms of the suitability of the environment around the product and the packaging used. This special treatment may include proper temperature control, safe packaging, and hygienic handling.These treatments are to maintain

the quality of pomelo to remain optimum, so that consumers get the best quality fruit.

Table 7. Weight of reputational assets sub-criteria.

No	Reputational Assets	Normalized by Cluster	Limiting
1	Credibility from customers	0.22023	0.042821
2	Product quality	0.72379	0.140736

The synthesis results on the alternative strategy cluster are shown in **Table 8**. The resulting weights are the result of connections from all clusters and nodes that are interconnected to the alternative strategy.

Table 8. Weight of alternative strategy.

No	Alternative Strategy	Normalized by Cluster	Limiting
1	Carrying out distribution activities in the marketing process of pomelo oranges	0.22074	0.076193
2	Increasing market share with the cooperation of various parties	0.40229	0.138858
3	Improving post-harvest quality	0.37696	0.130115

The synthesis results based on alternative strategy clusters show that increasing market share with the cooperation of various parties is the most prioritized node as a marketing strategy for pomelo oranges in Magetan Regency with a value of 0.40229. Alternative strategies in second and third place are improving post-harvest quality (0.37696) and carrying out distribution activities in the marketing process of pomelo oranges (0.22074). The strategic priority in marketing pomelo oranges is to increase market share with the cooperation of various parties. Collaboration can involve the Food Crops, Horticulture, Plantation and Food Security Department of Magetan Regency, the private sector, or farmer groups. This will expand the distribution network and accelerate the process of marketing grapefruit to a wider market. In addition, because technology is developing more quickly, marketing pomelo oranges can use social media as a promotional medium. This, of course, requires collaboration with service providers, such as shipping expeditions, so that products can be sent to wider areas. This collaboration allows for efficiency in delivery, thereby reducing logistics costs and accelerating product distribution to consumers [56]. In Indonesia, the development of pomelo oranges is still limited [57]. As a producer, Magetan Regency has excellent potential to market it to a wider area. With good and consistent quality, grapefruit from Magetan can compete with similar products from other regions. The marketing of pomelo oranges requires collaboration with various parties so that pomelo oranges are distributed not only within the local area of Magetan Regency but also outside the region. This increase in market reach will open up opportunities for local economic growth and improve farmer welfare. To make this happen, producers need to pay attention to the post-harvest quality of pomelo oranges. This, of course, requires proper post-harvest activities and adherence to procedures [58], from harvesting to packaging [59]. Post-harvest quality improvements, such as selecting safe and efficient packaging materials, are essential to maintaining product freshness until it reaches consumers. The perishable nature of agricultural products requires more complex handling. If post-harvest handling is not appropriate, it will reduce product quality. Therefore, strict supervision during the distribution and storage process is also very necessary. Nonetheless, even though proper post-harvest handling is achieved, if the distribution is still too long and with inappropriate storage space, it will also reduce the quality of the product when it reaches consumers. For this reason, it is important for all parties involved to ensure that the distribution process is carried out quickly and in optimal conditions. Through collaboration with various parties, efforts to market pomelo fruit within and outside the region will be accommodated more systematically and targeted. This collaboration can also create more efficient distribution channels and accelerate grapefruit access to wider markets. Through collaboration, there will be an exchange of knowledge that makes it possible

to respond better to changes [60].

4. Conclusions

Pomelo in Magetan Regency has the potential to be developed because it has a location that supports cultivation. This condition makes Magetan Regency one of the centers of pomelo fruit production in Indonesia. This fruit is rarely consumed by Indonesians, but its existence is quite sought after when the Chinese New Year celebration season approaches. The content in it is rich in vitamin C, so the taste of this fruit tends to be sour. As a center area, Magetan Regency strives to be able to compete with other center areas. This study analyzes the priority strategy that can be used as a reference for determining the marketing development strategy for pomalo fruit. Of course, in determining the priority strategy, there needs to be variables or criteria that can be used as assessment attributes. This research uses five criteria clusters: Managerial Capabilities, Customer Linking Capabilities, Market Motivation Capabilities, Human Resources Assets, Reputation Assets, and one strategic alternative cluster. The results of the synthesis show that planning (operations) management is the node prioritized in the Managerial Capabilities criteria, consumer tastes are the node prioritized in the Customer Linking Capabilities criteria, sales promotion is the node prioritized in the Market Motivation Capabilities criteria, HR quality is the node prioritized in the Human Resources Assets criteria, and product quality is a prioritized node in the Reputation Assets criteria. Meanwhile, the strategic priority in marketing pomelo oranges in Magetan Regency is to increase market share with the cooperation of various parties. Strategic steps that can be taken are by using social media platforms. In this era of very rapid technological development, people cannot be separated from the internet and gadgets that are held every day. Millions of Indonesians cannot be separated from all the information presented through social media. They find it much easier to access information through social media, as well as to meet their needs, both from eating and drinking, clothing, and not least transportation access. Likewise, shopping needs can be accessed through digital platforms. The ease of access that is currently felt by the community is one of the reasons for a businessman to expand his marketing using social media and the features that support it. Therefore, pomelo fruit which has not been widely consumed by the community, can one day become one of the fruits served not only during Chinese New Year, but also at other events or simply for daily consumption. The next sequence is improving post-harvest quality, and the last is carrying out distribution activities in the marketing process of pomelo oranges.

Author Contributions

The first author, as well as the corresponding author, K., took the lead in the research design, conceptualization, and supervision; R.D.P., K.Y.P., and A. supported the first author in collecting data, summarizing the results from the field survey, data analysis, and original draft preparation; R.W.N. supported writing, review, and editing.

Funding

This work received no external funding.

Institutional Review Board Statement

Ethical review and approval were not applicable as this study did not involve human or animal participants.

Informed Consent Statement

Informed consent is not applicable as this study does not involve human participants.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

Acknowledgments

We thank the Head of the Horticulture Division; Food Crops, Horticulture, Plantation, and Food Security Department, Magetan Regency; Pamelo Orange farmers

in Magetan Regency; representatives of the Field Agricultural Extension Officer Sukomoro District, Magetan Regency; and Universitas Sebelas Maret.

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Kalsum, U., Susanto, S., Junaedi, A., et al., 2021. Flowering and fruit quality characteristics in some seeded and seedless pummelo cultivars. Biodiversitas. 22(1), 378–385. DOI: https://doi.org/10.13057/biodiv/d220146

[2] Aji, T.G., Susanto, S., Sukma, D., et al., 2017. Improvement of shelf life and sensory quality of pummelos by fruit waxing and wrapping. Journal of Tropical Crop Science. 4(1), 13–20.

[3] Sharma, S., Singh, B., 2024. Nutritional, bioactive, and health potential of pomelo (Citrus Maxima): An exotic underutilized fruit. Current Research in Nutrition and Food Science. 12(2), 940–958. DOI: https://dx.doi.org/10.12944/CRNFSJ.12.2.35

[4] Sheik, H.S., Vedhaiyan, N., Singaravel, S., 2014. Evaluation of central nervous system activities of citrus maxima leaf extract on rodents. Journal of Applied Pharmaceutical Science. 4(9), 77–82. DOI: https://dx.doi.org/10.7324/JAPS.2014.40914

[5] Zheng, Z., Xu, Y., Qu, H., et al., 2024. Enhancement of anti-diabetic activity of pomelo peel by the fermentation of Aspergillus oryzae CGMCC23295: In vitro and in silico docking studies. Food Chemistry. 432, 1–9. DOI: https://doi.org/10.1016/j.foodchem.2023.137195

[6] Barrion, A.S.A., Hurtada, W.A., Papa, I.A., et al., 2014. Phytochemical composition, antioxidant and antibacterial properties of pummel (Citrus Maxima (Burm.) Merr. against escherichia coli and salmonella typhimurium. Food and Nutrition Sciences. 5(9), 749–758. DOI: https://doi.org/10.4236/fns.2014.59085

[7] Yora, R., Rahayu, A., Nahraeni, W., et al., 2017. Distribution of pummelo Citrus Maxima (Burm.) Merr. accessions in Magetan Regency. Agronida. 3(1), 10–17. DOI: https://doi.org/10.30997/jag.v3i1.1016

[8] Makkumrai, W., Huang, Y., Xu, Q., 2021. Comparison of pomelo (Citrus maxima) grown in China and Thailand. Frontiers of Agricultural Science and Engineering. 8(2), 335–352. DOI: https://doi.org/10.15302/J-FASE-2021391

[9] Alam, A.S., Fathima, A., 2022. Implication of theory of planned behavior and marketing mix variables in assessing the mindset of consumers for solar products in India. International Journal of Energy Sector Management. 17(1), 128–144. DOI: https://doi.org/10.1108/IJESM-07-2021-0003

[10] Irawan, A., Yuristia R., 2021. The economic feasibility of Gerga's orange (Citrus sp.) agribusiness as a new source of economic growth in Bengkulu, Indonesia. Economia Agraria y Recursos Naturales. 21, 29–45.

[11] Amalia, F., Widyakto, A., Prapti, L., 2021. Digital marketing strategy on agricultural product. Economics & Business Solutions Journal. 5(1), 29–45.

[12] Tohidi, A., Ghorbani, M., Karbasi, A.R., et al., 2020. Prioritization of business strategies and marketing resources using the analytic network process (ANP) approach. Journal of Agricultural Science and Technology. 22(3), 611–624.

[13] Sanusi, Bareduan, S.A., Larisang, et al., 2024. Critical indicators for sustainable coconut supply chain using analytical network process. International Journal of Sustainable Development and Planning. 19(5), 1703–1711. DOI: https://doi.org/10.18280/ijsdp.190508

[14] Nugroho, R.W., Kusnandar, Sutrisno, J., 2023. Urban farming development strategy to achieve sustainable agriculture in Magelang, Indonesia. International Journal on Advanced Science Engineering Information Technology. 13(1), 289–296. DOI: https://doi.org/10.18517/ijaseit.13.1.17162

[15] Kusnandar, Harisudin, M., Riptanti, E.W., et al., 2023. Prioritizing IoT adoption strategies in millennial farming: An analytical network process approach. Open Agriculture. 8(1), 1–11. DOI: https://doi.org/10.1515/opag-2022-0179

[16] Minzoni, A., Mounound, E., Zahraei, M.F., 2015. Using ANP to design a living system like balanced operating model for intangible services. International Journal of the Analytic Hierarchy Process. 7(2), 148–170. DOI: http://dx.doi.org/10.13033/ijahp.v7i2.267

[17] Usak, M., Hseih, M.Y., Chan, Y.K., 2021. A concretizing research on making higher-education sustainability count. Sustainability. 13(5), 1–4. DOI: https://doi.org/10.3390/su13052724

[18] Hooley, G.J., Greenley, G.E., Cadogan, J.W., et al., 2005. The performance impact of marketing resources. Journal of Business Research. 58, 18–27. DOI: https://doi.org/10.1016/S0148-2963(03)00109-7

[19] Komaludin, A., Wahid, N.N., 2017. Analysis of the ability to prepare financial reports, managerial skills, entrepreneurial spirit and motivation as determining factors for operational performance. Jurnal Ekonomi Manajemen, 3(2), 104–113. (in

Indonesian). DOI: https://doi.org/10.37058/jem.v3i2.331

[20] Ng, S., Daromes, F.E., 2016. The role of managerial ability as a mechanism for improving profit quality and company value. Jurnal Akuntansi dan Keuangan Indonesia. 13(2), 174–193. (in Indonesian). DOI: https://doi.org/10.21002/jaki.2016.10

[21] Robinson, S.P., Judge, T.A., 2019. Organizational Behavior, 18th ed. Pearson Education: London, United Kingdom. pp. 1661–1663.

[22] Elwisam, Lestari, R., 2019. Implementation of marketing strategies, creative product innovation and market orientation to improve the marketing performance of MSMEs. Jurnal Riset Manajemen Dan Bisnis, (JRMB). 4(2), 277–286. (in Indonesian).

[23] Wiyono, H.D., Ardiansyah, T., Rasul, T., 2020. Creativity and Innovation in Entrepreneurship. Jurnal Unit Kewirausahaan. 1(2), 19–25.

[24] Rapp, A., Trainor, K.J., Agnihotri, R., 2015. Performance implications of customer-linking capabilities: Examining the complementary role of customer orientation and CRM technology. Journal of Business Research Performance. 63, 1229–1236. DOI: https://doi.org/10.1016/j.jbusres.2009.11.002

[25] Todericiu, R., Lucia, F., Stanit, A., 2014. Reflections on human resources – Vital intangible assets of organizations. Procedia Economics and Finance. 16, 575–579. DOI: https://doi.org/10.1016/S2212-5671(14)00842-9

[26] Faugoo, D., 2024. Human resources as valued assets/human capital: An essential prerequisite for organisational success. Proceedings of the 5th International Conference on Management, Education, Social Sciences and Innovation 2024 (ICMESSI2024); 27 July 2024; Kuala Lumpur, Malaysia. pp. 1–11.

[27] Reeta, 2015. Human resources as assets: An overview. International Journal of Innovative Research and Development. 4(5), 238–240.

[28] Johansson, A.C., Zhu, Z., 2023. Reputational assets and social media marketing activeness: Empirical insights from China. Electronic Commerce Research and Applications. 61, 1–13.

[29] Adeosun, L.P.K., Ganiyu, R.A., 2013. Corporate reputation as a strategic asset. International Journal of Business and Social Science. 4(2), 220–225.

[30] Aithal, P.S., Aithal, A., 2018. The concept and importance of alternative strategy as parallel strategy to be followed in organizational decisions to ensure success. International Journal of Management, Technology, and Social Sciences (IJMTS). 3(2), 1–15. DOI: https://doi.org/10.5281/zenodo.1302779

[31] Esen, H., 2023. Analytical hierarchy process problem solution. IntechOpen. London, United Kingdom. pp. 10-13.

[32] Molinos-Senante, M., Gómez, T., Caballero, R., et al., 2015. Assessment of wastewater treatment alternatives for small communities: An analytic network process approach. Science of the Total Environment. 532, 676–687. DOI: https://doi.org/10.1016/j.scitotenv.2015.06.059

[33] Castaneda, M.P., Rojas, J.G., Cueto, J.L., 2021. Application of AHP and GIS for determination of suitable wireless sensor network zones for oceanographic monitoring in the South Carribean sea upwelling zone. International Journal on Advanced Science Engineering Information Technology. 11(5), 1696–1703. DOI: https://doi.org/10.18517/ijaseit.11.5.14293

[34] Viarani, S.O., Hilma, R.Z., 2015. Supplier selection analysis using analytical hierarchy process method in Indarung VI project PT Semen Padang. Jurnal Laporan Kerja Praktek. 14(01), 55–70. (in Indonesian).

[35] Kurian, M.C., Shalij, P.R., Pramod, V.R., 2019. Maintenance strategy selection in a cement industry using analytic network process. Journal of Quality in Maintenance Engineering. 26(4), 509–525. DOI: https://doi.org/10.1108/JQME-07-2017-0048

[36] Saaty, T.L., 2004. Decision making – the analytic hierarchy and network process (AHP/ANP). Journal of System Science and Systems Engineering. 13(1), 1–35. DOI: https://doi.org/10.1007/s11518-006-0151-5

[37] Mazumder, B., 2018. Intergenerational mobility in the United States: What we have learned from the PSID. The ANNALS of the American Academy of Political and Social Science. 680(1), 213–234. DOI: https://doi.org/10.1177/0002716218794129

[38] Garcia-Garcia, G., Singh, Y., Jagtap, S., 2022. Optimising changeover through lean-manufacturing principles: A case study in a food factory. Sustainability (Switzerland). 14(14), 1–20. DOI: https://doi.org/10.3390/su14148279

[39] Susanto, A., Meiryani. 2018. The importance of risk management in an organizations. International Journal of Scientific and Technology Research. 7(11), 103–107.

[40] Alchammari, K.R.A., Ali, B., Alshammare, J., 2021. The relationship between project planning, risk management and knowledge integration on project success. Academy of Strategic Management Journal. 20(4), 1–11.

[41] Suantara, I.G.P.E., Artana, M., Suwena, K.R., 2014. The influence of taste and price on consumer decisions in purchasing Honda motorcycles in Buleleng Regency. Journal of Indonesian Management. 4(2), 1–10. DOI: https://doi.org/10.53697/jim.

v2i3.920

[42] Botelho, L.V., Freitas, J.V., da Camara, A.O., et al., 2022. Digital marketing of online food delivery services in a social media platform before and during COVID-19 pandemic in Brazil. Public Health Nutrition. 26(1), 1–11. DOI: https://doi.org/10.1017/S1368980022002191

[43] Melović, M., Baynazoğlu, M.E., Šerić, N., 2022. Family businesses in tourism – the use of digital technologies in times of uncertainty and crisis. Journal of Family Business Management. 13(1), 185–209. DOI: https://doi.org/10.1108/JFBM-06-2022-0086

[44] Alexandrescu, M.B., Milandru, M., 2018. Promotion as a form of communication of the marketing strategy. Land Forces Academy Review. 23(4), 268–274. DOI: https://doi.org/10.2478/raft-2018-0033

[45] Wardana, I.M., Sukaatmadja, I.P.G., Setini, M., 2022. Formulation of business strategies to improve business performance by SWOT and SQSPM approach in era pandemic: A study on culinary MSMEs. Quality - Access to Success. 23(188), 47–55. DOI: https://doi.org/10.47750/QAS/23.188.07

[46] Cross, D., Swart, J., 2022. The (ir)relevance of human resource management in independent work: Challenging assumptions. Human Resource Management Journal. 32(1), 232–246. DOI: https://doi.org/10.1111/1748-8583.12389

[47] Oluwatoyin, A.S., 2014. Human resources accounting and disclosure in financial statement: Literature review. Research Journal of Finance and Accounting. 5(22), 64–76.

[48] Dammert, A.C., Nansamba, A., 2019. Skills training and business outcomes: Experimental evidence from Liberia. World Development. 162, 106120. DOI: https://doi.org/10.1016/j.worlddev.2022.106120

[49] Honcharenko, O., Neskorodzhena, L., Iefremova, I., et al., 2022. Development of the concept of corporate social responsibility: Practice in Ukraine. Comparative Law Review. 28, 367–392. DOI: https://doi.org/10.12775/CLR.2022.012

[50] Duy, D.T., Trung, T.Q., Lan, T.H.P., et al., 2022. Assessment of the impacts of social capital on the profit of shrimp farming production in the Mekong Delta, Vietnam. Aquaculture Economics and Management. 6, 152–170. DOI: https://doi.org/10.1080/13657305.2021.1947414

[51] Anjum, S., 2020. Impact of internship programs on professional and personal development of business students: A case study from Pakistan. Future Business Journal. 6(1), 1–13. DOI: https://doi.org/10.1186/s43093-019-0007-3

[52] Zsófia, P., Attila, K., 2022. Relationship between customer satisfaction, intention to repurchase and recommend to buy fashion products online. Statisztikai Szemle. 100(3), 285–312. DOI: https://doi.org/10.20311/stat2022.3.hu0285

[53] Guan, G., Liu, D., Zhai, J., 2022. Factors influencing consumer satisfaction of fresh produce e-commerce in the background of COVID-19—A hybrid approach based on lda-sem-xgboost. Sustainability (Switzerland). 14(24), 1–19. DOI: https://doi.org/10.3390/su142416392

[54] Yan, B., Liu, Y., Fan, J., 2022. Two-echelon fresh product supply chain with different transportation modes. Annals of Operations Research. 1–24. DOI: https://doi.org/10.1007/s10479-022-05092-6

[55] Sirisomboon, P., Lapcharoensuk, R., 2012. Evaluation of the physicochemical and textural properties of pomelo fruit following storage. Fruits. 67(6), 399–413. DOI: https://doi.org/10.1051/fruits/2012034

[56] Wan, M., Xu, J., Li, C., 2024. Dynamic path for green product development: A game-theoretic analysis of product-process innovation with supply chain collaboration. Computers & Industrial Engineering. 195, 1–24. DOI: https://doi.org/10.1051/fruits/2012034

[57] Pratama, E.Y., Susanto, S., 2019. Effect of leaf number ratio on pamelo orange fruit quality (Citrus maxima (Burm.) Merr.). Buletin Agrohorti. 7(1), 25–30. DOI: https://doi.org/10.29244/agrob.v7i1.24405

[58] Zhang, M., Yang, H., Zhu, F., et al., 2021. Transcript profiles analysis of citrus aquaporins in response to fruit water loss during storage. Plant Biology. 23(5), 819–830. DOI: https://doi.org/10.1111/plb.13269

[59] Nur Salihah, B., Rosnah, S., Norashikin, A.A., 2015. Mass modeling of Malaysian varieties pomelo fruit (Citrus Grandis L. Osbeck) with some physical characteristics. International Food Research Journal. 22(2), 488–493.

[60] Gonzales-Mon, B., Mancilla-Garcia. S., Bodin., et al., 2024. The importance of cross-scale social relationships for dealing with social-ecological in agricultural chains. Journal of Rural Studies. 105, 1–13. DOI: https://doi.org/10.1016/j.jrurstud.2023.103191