

Local Food Identity and Sustainable Commercial Production: Food Business Entrepreneurs in Chanthaburi Province, Thailand

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Abstract Local food identity highlights the unique qualities of regional cuisine. This research investigates entrepreneurs' commercial production of locally distinct foods in Chanthaburi Province, Thailand. Using qualitative methods, data was collected through document analysis, surveys, and in-depth interviews with 65 local food establishments. The findings reveal that most entrepreneurs (52.31%) operate small-scale household businesses with at most five employees. Key ingredients include cardamom (8.93%), cowa leaves (6.19%), durian (6.19%), calamondin (5.50%), mangosteen (4.47%), pepper (4.47%), and *Etilingera pavieana* (3.09%). The commercialization of local food in Chanthaburi primarily focuses on savory dishes (76.92%), with desserts (8.79%), snacks (7.69%), and beverages (6.59%) making up the rest. The most popular savory dish is MooChamuang curry, accounting for 23.88% of menu items. Guidelines for enhancing local food production include improving food standards, promoting healthy diets, supporting the local food movement, advancing gastronomy tourism, and adopting the Bio-Circular-Green (BCG) economic model for sustainability. These findings offer valuable insights for entrepreneurs and stakeholders looking to advance the local food industry and inform strategies for sustainable development.

Keywords Local food identity; Entrepreneurs; Commercial; Gastronomy tourism; BCG Model

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Introduction

Indigenous ingredients characterize local food production and culinary traditions unique to a particular region (Ghosh et al., 2023). This research focuses on the ethical marketing practices employed by food business entrepreneurs in Chanthaburi Province, Thailand, known for its rich natural resources and diverse culinary heritage. Various factors, including geographical influences, cultural practices, and culinary expertise passed down through generations, shape the unique identity of local food (Stein & Santini, 2022; Hernández, 2023). “Enabling Conditions for Local Food Systems to Emerge in Predominately Rural Regions of Portugal. The province’s agricultural abundance, featuring prized fruits like durian and mangosteen, and a vibrant seafood industry, underscores its significance in Thailand’s culinary landscape (Tagong et al., 2023a). Moreover, Chanthaburi’s cultural diversity, comprising Thai, Chong, Chinese, and Vietnamese communities, further enriches its culinary offerings. Despite the abundance of local delicacies, some traditional dishes risk fading into obscurity due to changing consumer preferences and limited market visibility (Tagong et al., 2023b). Hence, there is a pressing need to preserve and promote the cultural heritage embedded within Chanthaburi’s local cuisine. This research aims to analyze the characteristics of local food businesses, identify key raw ingredients, explore popular menu items, and propose strategies to support sustainable growth in Chanthaburi’s local food sector.

Research objective

This research aims to explore and promote sustainable practices within the local food sector of Chanthaburi Province, Thailand, by achieving the following objectives: Analyze the characteristics of local food businesses, identify key raw ingredients, explore popular menu items, and Propose strategies for sustainable growth. Through these objectives, the research seeks to preserve and enhance Chanthaburi’s culinary heritage, ensuring that local food businesses can thrive sustainably in the future.

Literature review

Local food refers to food produced by locals using renowned local ingredients, typically consumed and appreciated within that region. The unique features, such as taste, quality, and appearance, characterize its identity (Ghosh et al., 2023). The geography of each location significantly influences the types and qualities of local food, contributing to the diverse range of local cultures that exhibit distinct and similar traits. Local food reflects the identity and culture of each community, showcasing unique raw ingredients and culinary methods passed down through generations. People residing in the same or similar areas often share similar dietary preferences (Stein & Santini, 2022; Hernández, 2023). Many local vegetables grow naturally, resulting in native meals that are often healthy and free from chemical fertilizers and pesticides. Producing local food for sale can provide employment and income for households. Additionally, cooking local food for family meals requires minimal raw material investment, helping reduce costs (Tagong et al., 2023a).

Chanthaburi Province, located on the eastern coast of the Gulf of Thailand, is characterized by a landscape of forests, coastal plains, hills, and mangrove forests. Chanthaburi is rich in natural resources, and significant in driving the province’s economy. Agriculturally, the province is known for its export fruits, such as durian, known as the “king of fruits,” and mangosteen, the “queen of fruits.” The province is also a major producer of spices and herbs like cardamom, pepper, and *Etilingera pavieana* and has a thriving fisheries sector near the sea, particularly for shrimp cultivation, including white vannamei shrimp and black tiger shrimp. Chanthaburi is a major gem trading center in Thailand and Southeast Asia. It has a burgeoning tourism industry driven by its natural and historical attractions and local wisdom, making it an important secondary province for tourism (Udomsamak et al., 2023).

The ethnic diversity of Chanthaburi’s population has greatly influenced the development of its local cuisine. The province is home to four ethnic groups: Thais, Chong people (indigenous to eastern Thailand) , Chinese, and Vietnamese. The distinctive characteristics of local ingredients give Chanthaburi’s cuisine a unique local identity (Tagong et al., 2023b). Notable dishes from Chanthaburi include braised pork belly with cowa leaves, stir-fried noodles with crab meat, boiled chicken/ fish with cardamom, squid ink soup, leung pork noodle, and durian curry. Many of these dishes are now commercially distributed throughout the province and neighboring areas. The primary raw materials used in these dishes include locally sourced vegetables, fruits, herbs, and aquatic species. These ingredients are often transformed into restaurant dishes or products with extended shelf life, such as durian chips, canned braised pork belly with cowa leaves, and Calamondin concentrate (Tagong et al., 2023a).

Despite the variety of Chanthaburi’s local cuisine, it still needs to be discovered. Some dishes have disappeared due to lack of production or recognition, and the younger generation’s preference for local food is declining. Therefore, preserving and restoring local food identity is crucial to maintaining the cultural foundations of local food consumption. Local food producers in Chanthaburi are vital for preserving, reviving, and growing of local food culture. Collecting academic knowledge on food production with local characteristics for commercial purposes by entrepreneurs in Chanthaburi Province, as well as developing guidelines for improving this production, is one way to assist. This foundational knowledge can spark various concepts contributing to the conservation, restoration, and preservation of Chanthaburi’s local culinary identity. Furthermore, it can create more opportunities for employment and income generation at the industrial level.

Conceptual framework

This study proposes a conceptual framework integrating qualitative research methodologies to target samples with distinctive attributes aligned with the study’s objectives. The selected target population for data collection must meet six specific criteria. A survey conducted among food establishments in Chanthaburi Province identified 65 establishments that met these criteria. Data collection for this study utilized qualitative methods, including document analysis, surveys, and in-depth interviews (Figure 1).

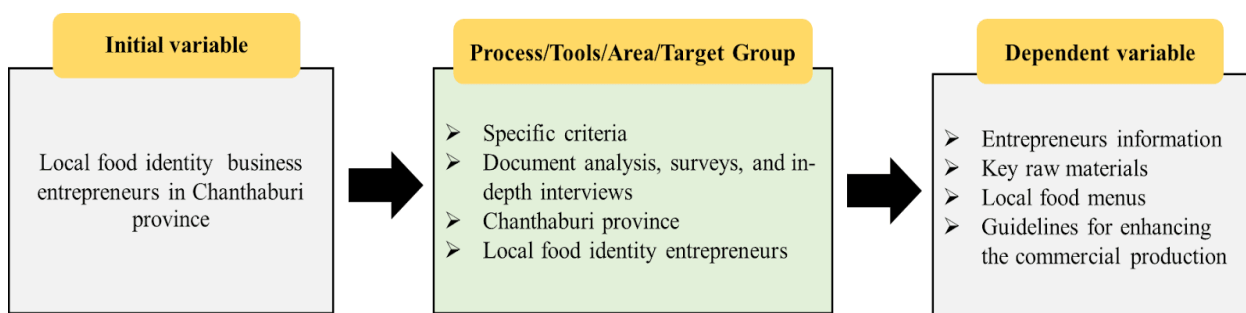


Figure 1 Conceptual framework

Methods and data

1. Sample selection

Qualitative research demands samples with distinctive attributes aligned with the study’s objectives (Ritchie et al., 2024). The chosen target population for data collection must meet specific criteria: (1) operating as a licensed restaurant business in Chanthaburi Province for at least one year, (2) offering at least one locally unique menu item with consistent sales, (3) featuring dishes

incorporating regional ingredients reflective of Chanthaburi's identity, (4) having received business and food handling training from the Department of Health, Ministry of Public Health, (5) voluntarily participating in the survey, and (6) demonstrating a positive attitude towards preserving Chanthaburi's culinary heritage. A survey of food establishments in Chanthaburi Province yielded a sample of 65 establishments meeting these criteria.

2. Methodology and tools

The research methodology employed a tripartite approach to data acquisition, integrating content analysis methods as follows: (1) a comprehensive review of secondary sources, including scholarly literature, academic publications, journals, articles, websites, and related research, to analyze information, concepts, and theories pertinent to local food identity; (2) the use of questionnaires as a research instrument, designed based on insights from the secondary analysis, to gather data from a sample cohort of food business enterprises; and (3) the conduct of structured, in-depth interviews guided by an interview protocol (Interview Guide).

Qualitative data collection methods, including thematic analysis, conversations, and questionnaires, were selected for their ability to elicit nuanced and accurate insights. These interactions created a conducive environment for participants to express their perspectives openly. The questionnaire design process adhered to several key principles: alignment with research objectives and conceptual frameworks, clear delineation of pertinent topics, use of accessible language, avoidance of leading questions, and sensitivity to participant comfort levels (Ugwu & Eze, 2023). The notable stages in the development of the questionnaire included: (1) an exhaustive review of research objectives and conceptual frameworks; (2) identification of data collection requirements to address research objectives; (3) acquisition of relevant data based on identified requirements; (4) formulation of clear and comprehensible questionnaire items; (5) construction of a structured questionnaire covering salient topics; and (6) iterative testing and refinement of the questionnaire in consultation with domain experts to ensure alignment with research objectives.

Primary inquiry areas within the questionnaire encompassed: (1) demographic information about the participating establishment; (2) categorization of establishment type; (3) assessment of business size; (4) identification of key local raw materials utilized in food production and sale; (5) determination of sources for raw materials utilized in food production; (6) exploration of Chanthaburi province's distinctive food menus; and (7) elucidation of strategies employed by enterprises to promote the local food identity of Chanthaburi for sustainable development.

3. Trustworthiness verification

Data triangulation, involving multiple data sources and collection methods, enhanced data credibility. Data verification ensured consistency and reliability by scrutinizing sources and methods for potential discrepancies (Hassenstein & Vanella, 2022).

4. Data analysis

Data analysis constituted a crucial phase aimed at scrutinizing a subset of the gathered data, with initial deductions informing the refinement of study inquiries. This analytical endeavor persisted throughout data acquisition, employing content analysis and non-theoretical classification techniques to categorize and assess the amassed data meticulously. The researcher's adeptness in discerning and categorizing data within the confines of the study framework facilitated the systematic examination of data occurrences, thus laying the groundwork for elucidating causal factors underlying observed phenomena.

Qualitative data analysis commenced with systematic data organization and indexing or coding to facilitate retrieval and interpretation. Subsequent phases involved the synthesis of temporary

summaries and the generation of overarching summaries to distill key insights. They enacted rigorous validation procedures to ensure the trustworthiness of analytical outcomes (Tekhanmag et al., 2023). The resultant findings were delineated across two primary modalities: a narrative or extended textual exposition, constituting an integral component of the primary presentation, and visual displays, such as diagrams, to enhance clarity and audience engagement. They tailored this multifaceted approach to data presentation to effectively address the research objectives while optimizing comprehension and interest among stakeholders.

Results and discussion

1. Profile of food business entrepreneurs selling chanthaburi local food menus

Figure 2 illustrates the demographics of food business entrepreneurs based on questionnaire responses, revealing a predominance of female entrepreneurs (70.77%) compared to their male counterparts (29.23%), indicating a gender by a factor of 2.42 times. Within the entrepreneurial cohort, individuals aged between 25 and 60 were the predominant demographic, comprising 90.77% of the total respondents. Notably, respondents aged 61 years and above represented a smaller proportion, approximately 9.23%, with the age bracket of 31-40 years exhibiting the highest representation at 32.31%. Upon stratification by educational attainment, a plurality of entrepreneurs (46.15%) possessed a bachelor's degree, indicative of a robust educational background within the entrepreneurial landscape. Further delineation by business type revealed the dominance of the restaurant industry, commanding a significant share of 47.69%, followed by enterprises engaged in the sale of food products, souvenirs, and related merchandise, constituting 21.54%. Additionally, the beverage and coffee shop sector accounted for 18.46% of respondents, while establishments within the hotel, resort, and accommodation domain contributed approximately 12.31%. In terms of organizational size, the survey indicated a prevalence of small-scale enterprises, with 52.31% characterized as household businesses employing fewer than five individuals. Subsequently, small businesses with slightly larger operational capacities represented 35.38% of the sample cohort. Medium-sized enterprises, defined by employee counts ranging from 30 to 100 persons, constituted 10.77% of respondents, whereas large-scale corporations, boasting over 100 employees, comprised a modest 1.54% of the surveyed entities.

Entrepreneurs in the study cohort predominantly fall within the working-age demographic and exhibit a degree of educational attainment, with a notable proportion holding bachelor's degrees, indicative of postsecondary education. They recognize this educational background for its substantive contribution to enhancing labor market efficacy by equipping individuals with a blend of general and technical proficiencies. Moreover, vocational competencies and intellectual aptitudes favor entrepreneurial success, such as teamwork, creativity, and dedication to professional endeavors. Leveraging their inherent potential and competencies, entrepreneurs The predominance of female entrepreneurs can be attributed, in part, to historical norms wherein domestic culinary responsibilities traditionally rested upon women—a dynamic that persists to a considerable extent in contemporary society (Hans, 2024). However, societal shifts, including urbanization, increased female workforce participation, and evolving gender roles within both domestic and professional spheres, have precipitated alterations in the division of household labor, including cooking duties. An empirical investigation into global cooking practices revealed disparities in cooking frequency between genders, with women assuming a more prevalent role in meal preparation, particularly during dinner times (Wolfson et al., 2021). Entrepreneurs are adept at managing and nurturing their enterprises to produce locally characteristic foods, fostering sustainability within the culinary landscape (Gürbüz, 2011).

Regarding entrepreneurship within the culinary domain of Chanthaburi Province, empirical findings by Barreto et al (2020) delineate a prevalent trend wherein most entrepreneurs specializing in regional cuisines operate small-scale restaurants with fewer than five employees. Such establishments, typically proprietor-operated or managed by contracted individuals, reflect their proprietors' personal

inclinations and managerial acumen Service-oriented restaurants have gained traction in Asian markets, underscoring the imperative for meticulous service delivery. A judicious examination of service quality reveals responsiveness, pricing strategies, and food reliability as pivotal determinants of customer satisfaction. Consequently, restaurateurs aspiring to excel in service provision should prioritize the optimization of these core facets to engender competitiveness and consumer appeal (Teo et al., 2024).

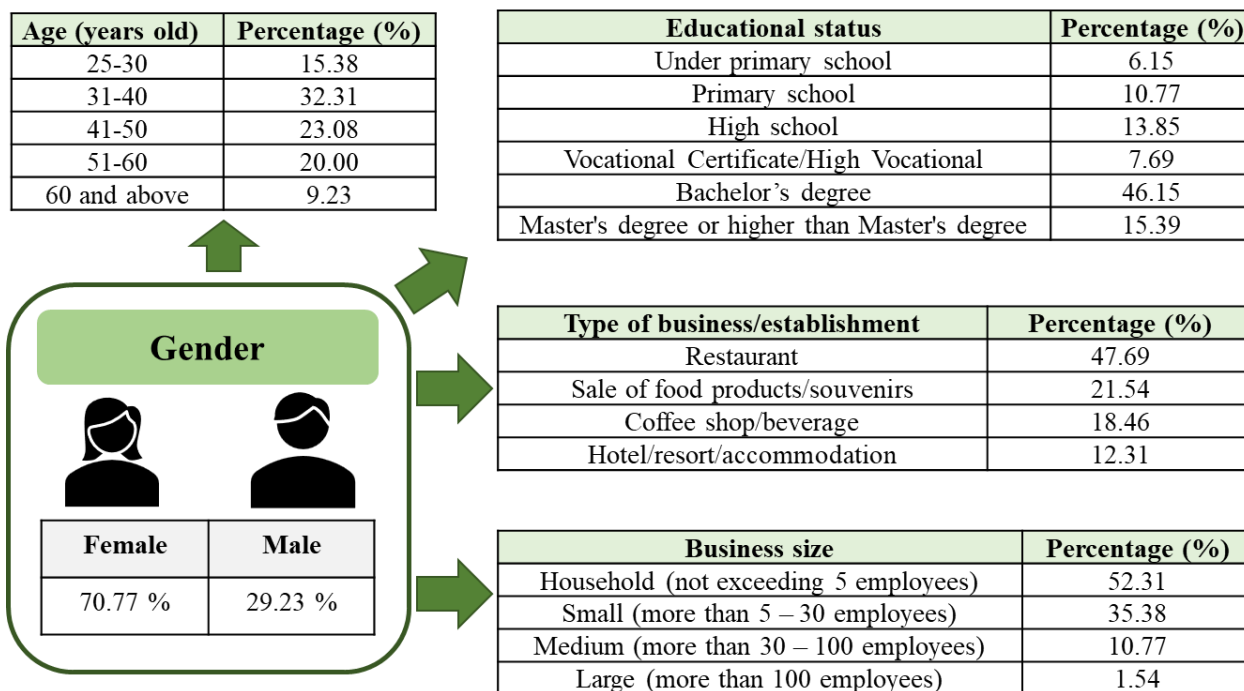


Figure 2 Descriptive statistics of characteristics of entrepreneurship

2. Primary Sources of Raw Materials for Local Chanthaburi Food Production by Entrepreneurs

Figure 3 presents insights into the origin and predominant raw materials utilized by entrepreneurs in the preparation of Chanthaburi local food for commercial sale. The data reveals that fresh markets serve as the primary source of raw materials, accounting for 41.54% of procurement, followed by community agriculture gardens/farms (24.62%), entrepreneurs' private gardens or farms (20.00%), intermediaries or distributors (9.23%), and department stores (4.62%). They categorize raw materials into five main groups: fruits (26.46%), herbs (25.43%), vegetables (20.62%), aquatic animals (15.46%), and meat (12.03%).

The prevalence of fresh markets as the primary source underscores the reliance of entrepreneurs on locally sourced raw materials, primarily obtained from local farmers. Fresh markets play a significant dual role in both economic and cultural contexts. They serve as pivotal hubs where consumers procure fresh produce directly from farmers and engage in communal exchanges, fostering social bonds and community vitality. Moreover, these markets bolster local economies, stimulate cultural tourism, and generate essential income within their communities. Rahimi and Demirbas (2023) emphasize the importance of analyzing and forecasting fresh market growth rates to enable businesses to strategically align with evolving environmental conditions and consumer preferences. However, the finding that only 20% of the ingredients used in Chanthaburi Province's food sector are locally sourced reveals a multifaceted challenge rooted in agricultural practices and economic constraints. Notably,

many of these local ingredients comprise vegetables cultivated primarily for household consumption rather than for commercial purposes. While some entrepreneurs procure raw goods from department stores or external sources in limited quantities, the data suggests a continued emphasis on supporting local agriculture. This symbiotic relationship between the food and beverage industry and local producers enhances farmers' income and contributes to the region's overall economic growth. Additionally, entrepreneurs supplement their supply chain by utilizing raw materials from their gardens, albeit in smaller quantities. This approach not only aids in cost reduction but also allows entrepreneurs to add value to their businesses by integrating vertically within the production process.

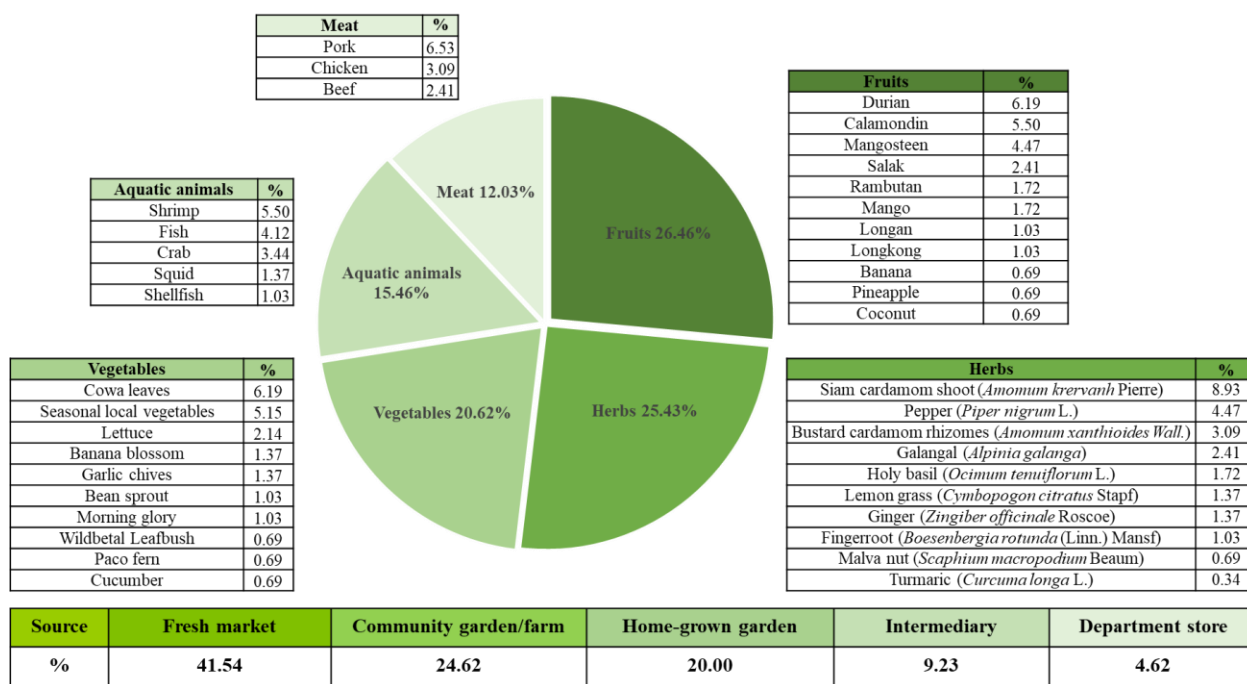


Figure 3 Descriptive statistics of source and raw materials for identical food production

3. Attributes of primary raw materials utilized in Chanthaburi local cuisine production

Figure 4 overviews of the key raw materials employed in producing Chanthaburi's local culinary offerings. Among fruits, durian emerges as the most prevalent ingredient (6.19%), followed by calamondin (5.50%), mangosteen (4.47%), and other assorted fruits. Notably, Siam cardamom shoot (8.93%), pepper (4.47%), and bustard cardamom rhizomes (3.09%) feature prominently among the plant-based ingredients used. Additionally, cowa leaves are a prominent vegetable component, constituting approximately 6.19% of the raw materials utilized.

Chanthaburi Province is an agricultural city and an important fruit production source in Thailand, it has the potential to produce agricultural products with favorable terrain and natural resources, fertile soil, moist air suitable for agriculture, and the ability to grow both horticulture and field crops. The majority of durians used in cooking include durian pulp. The durian pulp varies in color from light yellow to scarlet, depending on the type. The inner pulp is soft. The seeds are semi-soft and semi-hard, with a sweet taste, a circular, oval membrane, a brown seed coat with a smooth surface, a white seed pulp, and an astringent taste. Durian has a distinct smell and taste. Durian is a high-sugar fruit that contains vitamin C, potassium, serotonergic amino acids carbohydrates, proteins, and lipids. Durian also has a high glycemic index, indicating that it is a high-fat food (Charoenphun et al., 2020; Charoenphun et al., 2022). As a consequence, it is best to consume durian within a limit.

85% old durian has 5-6 days of storage, stored at 29-30 degrees Celsius. They can preserve the durian texture for 1-2 days after peeling, but since it is soft and has a pungent odor, it should be kept in a covered container or at room temperature 5–10 °C. Because they harvest durian, quickly, they process it into products. Raise the shelf life and develop a variety of items. Entrepreneurs revealed that they are turning durian into food products, including fresh durian, frozen durian, fried durian, durian crackers, durian cake, durian in syrup. Chefs use durian as an ingredient in many dishes, such as durian sticky rice, durian curry, and Massaman curry.

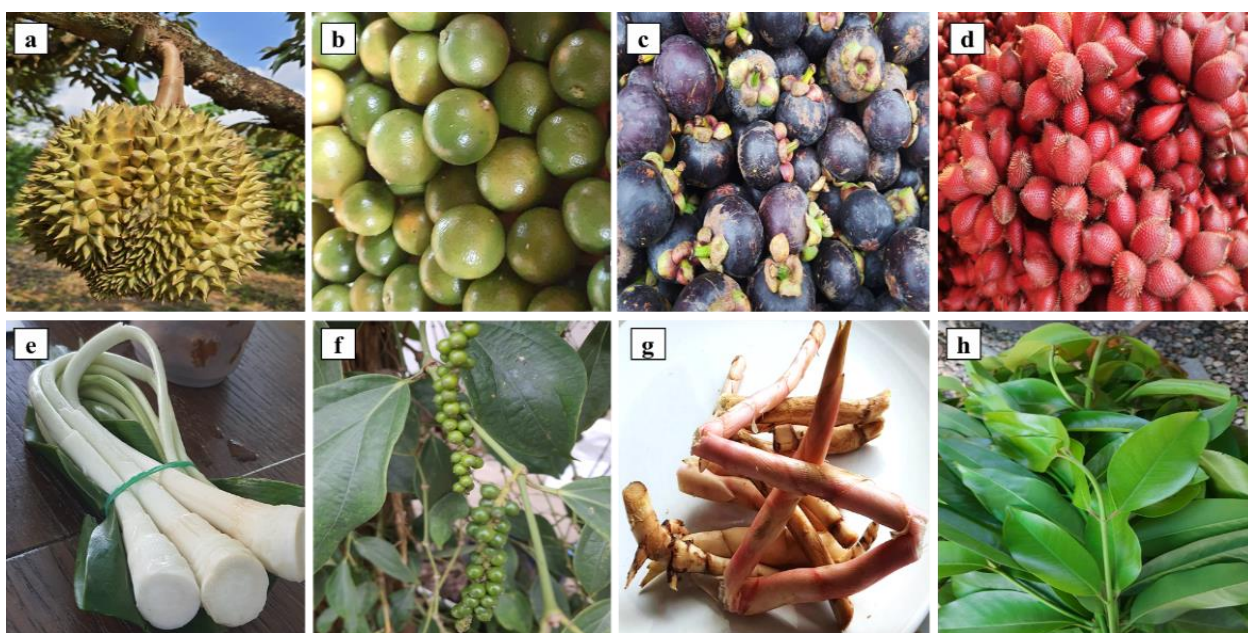


Figure 4 Example of raw materials for identical food production: (a) Durian, (b) Calamondin, (c) Mangosteen, (d) Salak, (e) Siam cardamom shoot, (f) Pepper, (g) Bustard cardamom rhizomes, and (h) Cowa leaves

Calamondin is a small orange with a distinct acid flavor. The fresh calamondin fruit has two pieces. The most important component is water, which accounts for 47.5 grams, followed by juice byproducts (rinds, seeds, and fiber), which comprise 52.5 grams. These byproducts contain 80% liquid and 20% fiber. In general, calamondin fruit chemistry includes 12 calories, minimal fat, 1.2 g of dietary fiber, 37 mg of potassium, 7.3 mg of vitamin C, 54.4 mg of vitamin A, and 8.4 mg of calcium (Venkatachalam et al., 2023). Farmers in Chanthaburi Province mostly cultivate calamondin for their use, but they sell any extra locally. It is growing increasingly popular, prompting some farmers in Chanthaburi Province to enter commercial cultivation. Regarding food consumption, it is used as a seasoning instead of lime during the season when lime is expensive. For example, lime is used to make shrimp paste, chili paste, salt chili paste, and calamondin juice, which many establishments offer on their regular drink menus. The juice is popular among both tourists and locals.

Mangosteen fruits have petals on their crowns that resemble a queen's crown. The fruit has a rounded form. The raw fruit appears green, but when it matures, it turns dark purple. The petals inside, made of white meat, correspond to the calyx beneath the fruit. It has a sweet and pleasant flavor. Generally, one mangosteen comprises 83% skin, 15% flesh, and 2% seeds by weight (Yuvanatemiya et al., 2022). People can process mangosteen in a variety of ways, including freezing it, making juice, jam, preserves, cider, and vinegar. These processed products are often used as raw materials in cooking menus such as mangosteen salad, mangosteen papaya salad, and others.

The salak (*Salacca zalacca*) belongs to the palm family and is in the same genus as ragum (*Salacca wallichiana*). The salak forms lightweight, spherical clusters. The fruit's externally is covered in regularly placed scales that resemble reptile skin (snake fruit). The edible section is the transparent white flesh with a fragrant aroma and a sweet or sour taste reminiscent of pineapple and banana. Each salak fruit contains 1–3 dark brown seeds (Atmaja et al., 2024). The salak has a similar appearance to ragum; however, ragum fruit fortifies. The seeds are more significant, the color is lighter, and the flesh is more orange-colored when ripe; it has a tart and sweet flavor, and the flesh is soft, thin, fragrant, and juicy.

Salak can be used as a fresh fruit or as a raw ingredient to make salak in syrup, salak juice, jam, and salak extracted for flavor in cuisine. Ragum is fresh fruit and provides a sour flavor to dishes such as chili paste, tom yum, soup, rice salad, and sweet foods such as ragum juice, ragum in syrup, and others. Chefs often use herbs and spices as raw materials in local culinary menus in Chanthaburi province.

In Chanthaburi Province, chefs frequently use Siam cardamom shoots (Kawan) and bustard cardamom rhizomes as raw materials for creating local culinary menus: Siam cardamom shoot (Kawan) and bustard cardamom rhizomes (Reaw-Hom) belong to the *Amomum* genus. It belongs to the Zingiberaceae family, which includes ginger, and people use its shoots in local cuisine in Chanthaburi Province. Cardamom can treat bloating, gas, and colic. It treats digestive problems and can kill specific bacteria. Siam cardamom shoot smells similar to as camphor and patchouli. Siam Cardamom seeds include essential oils and chemical components such camphor, α -pinene, myrcene, limonene, linalool, borneol, and α -terpineol (Zhang et al., 2020). Chefs use Siam cardamom shoots as a spice to enhance various dishes-, including massaman curry and red curry paste. People use it to flavor liquor. In Chanthaburi Province, chefs add shoots and leaves to jungle curry to add a fizzy, hot, and fragrant flavor. They cut the shoots and add them to dishes like stir-fried wild boar, stir-fried spicy frog, fried Siam cardamom shoots.

Pepper or Prikthai (*Piper nigrum* L.) is a popular and economically viable crop, and Chanthaburi Province contains the country's most extensive pepper cultivation in **various** areas. Chanthaburi Province has a natural environment, climate, rainfall, and fertile soil. Pepper is a spice with the appearance of small round pellets, a spicy flavor, and a distinct, pungent smell. Chefs can use fresh pepper fruits as raw ingredients in cooking to make savory meals or pickles. People use dried peppers as a seasoning. There are two sorts of pepper based on how they are stored and prepared: black pepper, made by drying completely grown pepper fruits; White pepper is produced by soaking ripe pepper fruit in water, peeling off the outer coating, and drying it. Peppers contain an essential oil that is called pepper oil. The primary constituents of pepper oil are monoterpene chemicals. Important sesquiterpenes include limonene, beta-caryophyllene, beta-pinene, and pinene (Dinh et al., 2020; Tenriawaru et al., 2022). Pepper includes intriguing bioactive chemicals. For example, compounds such as alkaloids, amides, propenylphenols, lignans, neolignans, terpenes, and steroids (Milenkovic and Stanojević, 2021).

Bastard cardamom (*Amomum xanthioides* Wall.) is a cardamom plant that may grow in various environments, including evergreen woods, dry evergreen forests, mountain forests, groves, and shaded regions. Bastard cardamom is used mainly as a spice and herb. People can process it into various products, including rhizomes used to season noodle soup, beef soup, kaeng pa, kaeng liang, spicy stir-fries, and other dishes. People use old rhizomes to cook pork liang noodle soup or kaeng liang curry. The spicy curry paste was stir-fried with wild boar, young rhizomes, and young *Etlingera pavieana* branches and can be consumed raw with chili paste. The roots and rhizomes can be combined to create a fragrant medication because the rhizomes are aromatic and rich in volatile oyster oil. Dried *Etlingera pavieana* sticks can be used as stir sticks in hot beverages such as coffee or tea to impart a pleasant aroma (Atthaisong et al., 2022). Cowa or Chamuang (*Garcinia cowa* Roxb. ex Choisy), a

vegetable with leaves and young shoots, is usually used to prepare local Chanthaburi dishes. It has a tart taste and a fragrant scent. It is used to prepare curries and boiling foods. A popular dish is braised pork belly with cowa leaves (chamuang pork curry). Chamuang leaves have intriguing biological activities such as antioxidant, anti-inflammatory, antidiabetic, and antibacterial abilities (Jhofi et al., 2021).

4. Commercialization of local identity cuisine in Chanthaburi Province

Figure 5 presents a comprehensive analysis of the local identity cuisine menus commercially available in Chanthaburi Province. The data reveals a predominant focus on savory dishes (76.92%), followed by desserts (8.79%), snacks (7.69%), and beverages (6.59%). Notably, signature savory dishes such as Braised pork belly with cowa leaves or Moo Chamuang Curry (23.08%), Stir-fried noodles with crab meat (14.29%), and Chicken/fish boiled with Siam Cardamom shoot (13.19%) are among the most frequently produced items according to number. The most commonly produced desserts are Salak in syrup (4.40%), snacks are Durian chips (3.30 %), and beverages are Calamondin juice (4.40 %). An example of an identical food menu of Chanthaburi province is shown in Figure 6.

Trends in local identity cuisine menus developed and marketed by entrepreneurs in Chanthaburi Province. According to the data studies, the most popular food for sale is savory, including braised pork belly with cowa leaves. Chamuang leaves, a local vegetable, are used as an ingredient in preparing braised pork belly with cowa leaves, a Chanthaburi province's signature dish. It has a unique sour flavor from the sweet Chamuang leaves, balanced with coconut sugar and pork belly boiled till soft and moist in the mouth. This is a curry that does not contain coconut milk. Stir-fry pork belly with a curry combination of dried chilies, galangal, garlic, onions, and shrimp paste. Add water and cook until soft. Season with sour leaves by employing Chamuang leaves at the fan leaves, which means they have just fully unfolded. It is green, not young or old, and the leaves have a smooth structure. Tear it into small pieces and cook it with the pork.

Food business operators in Chanthaburi province produce and sell canned Chamuang pork, which is convenient to eat and can be used as a souvenir. Another popular menu item is stir-fried noodles with crab meat or Sen Chan Pad Pu. Stir-fried noodles with orange noodles are unique. The taste is sweet and sour. The fame of stir-fried crab noodles is partly due to the use of Chanthaburi noodles made from rice flour through a meticulous production process. This is a famous Chanthaburi product because it is chewy and soft when stir-fried with water and seasoned for a mellow taste. Method of producing stir-fried noodles with crab meat. Start by smashing the chili peppers, shallots, and garlic, then stir-frying them in rice bran oil until aromatic, about 2 minutes, and seasoning with tamarind juice. Mix brown sugar and fish sauce, then add water and cook until thick; taste, and season with salt as needed; add the, sandalwood noodles and cook until soft; add, the crab meat and combine to mix, sprinkle with chives, then transfer to a platter. Serve with bean sprouts, cucumber, or chives. Some individuals now replace shrimp with crabs since crabs may be challenging to find and pricey during certain seasons. Chicken/fish boiled with Siam Cardamom shoot, also known as Kai/Pla tum Krawan, is prepared by cooking chicken or fish with spicy herbs, spicy flavor, and fragrant scent of Siam cardamom shoots. Making the Chicken/fish cooked with Siam Cardamom shoot menu begins with boiling the soup until hot, then adding shallots. Boil Siam cardamom until fragrant, add chicken or fish, and season with fish sauce, shrimp paste, and sugar. Finally, add Salacca and bird's eye chili. Turn the heat off and taste. Add lime juice and sprinkle with parsley the taste is more sour. Entrepreneurs in Chanthaburi Province also manufacture and commercially produce local food menus such as: Chicken/pork fried with Siam Cardamom shoot, Leung pork noodles, Squid ink soup, Durian curry, Salt and chili seasoned rice, Rice salad (Khao Yum Chong), Curry Paste (Gang Phla Chanthaboon), Spicy herbed red curry with Silver sillago Fish, Spicy fish herb salad with banana blossom, Coconut milk chili pastes, Spicy crab egg paste.

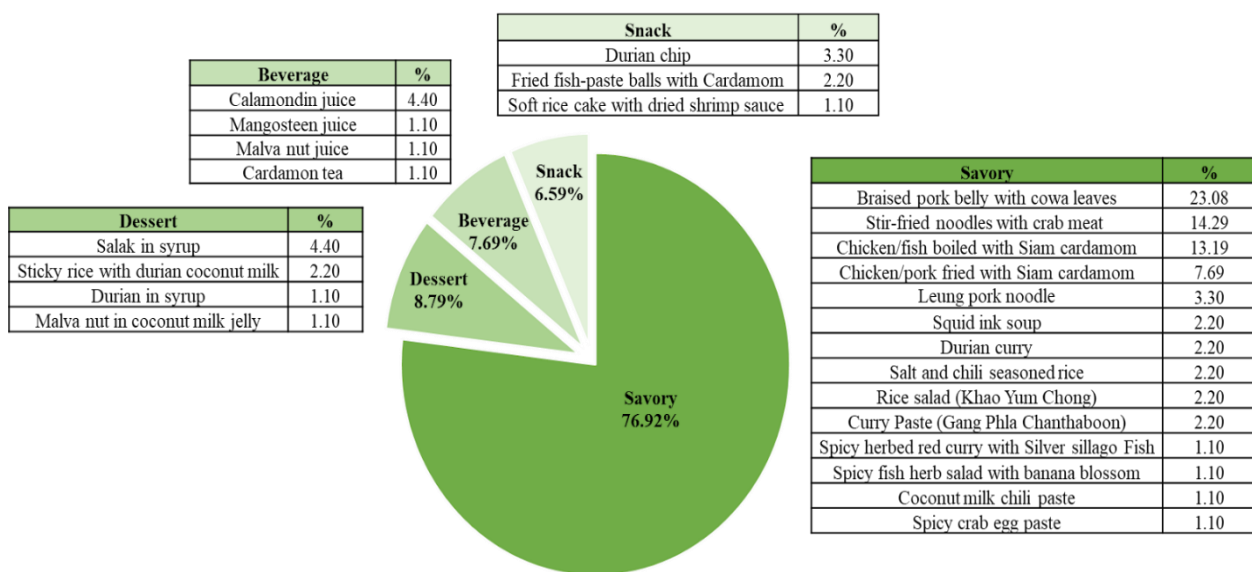


Figure 5 Descriptive statistics of identical food menu of Chanthaburi province



Figure 6 Example of identical food menu of Chanthaburi province: (a) Braised pork belly with cowa leaves, (b) Stir-fried noodles with crab meat, (c) Chicken/fish boiled with Siam cardamom shoot, (d) Squid ink soup (e), Leung pork noodle, (f) Durian curry, (g) Salak in syrup, (h) Sticky rice with durian coconut milk, (i) Siam calamondin juice, (j) Mangosteen juice, and (k) Malva nut juice

The most commonly produced for sale in syrup, a dish with a simple process and few ingredients. Salak in syrup is made by peeling the salak first and slowly removing the seeds with a cutting knife. To prepare the syrup, boil water, sugar, and salt until dissolved. There is no need to wait for the water to boil; taste it as you like, then bring it in and let it boil. Allow the water to float in a glass to cool. Then scoop it into a small bowl and chill.

Durian chips are a popular food that is produced and distributed as souvenirs. Durian chips are produced by cutting the durian pulp in half and removing the seeds, then slicing it into thin sheets, frying it until crisp and golden in color, scooping it up and letting the oil drain, sprinkling it with salt for better flavor, and storing in a container. Calamondin juice is made using a relatively easy technique. Clean the mature calamondin fruit with clean water, then squeeze out the seeds. Heat the water until it is moderately hot before adding the strained calamondin fruit and water. Add in, season with salt and

syrup if desired, continue to boil until boiling, use off heat, allow to cool, pour into glasses or bottles, and refrigerate.

Geography is an important factor in determining the type and qualities of local food identity. Factors influencing the originality of the local food include: (1) raw materials used in cooking, which are local raw materials, both plants, and animals, which may exist naturally or be generated by the community through farming, rearing animals, and afterward Let them prepare ordinary foods; some ingredients, for instance seafood, are only available in that area. Durian, calamondin, mangosteen, salak, Siam cardamom shoot, pepper, bustard cardamom rhizomes, and cowa leaves will be used as raw ingredients to create Chanthaburi's unique gastronomic character. (2) Food preparation and cooking is a simple procedure. It is simple because some areas utilize the same components but have different cooking methods. (3) The method of consuming food is the same in all areas. Suppose one locality has a different way of consuming food than others. In that case, it is considered to be food particular to that locality, such as eating coconut-flavored sticky rice with sour curry, which is a food. Chanthaburi has its unique cuisine, for example. (4) Topographical features, soil health, and water sources influence natural food sources. (5) Climatic characteristics (6) Migration that transfers one locality's culture to another. (7) Improvement in technology has produced several useful tools humans employ to save labor and time. (8) Changes in family and society (9) Developing friendly relations with foreign countries leads to the adoption of various cultures and practices in the lives of people in the community (Moreno & Malone, 2021; Kalenjuk et al., 2023;).

5. Guidelines for promoting local food identity in Chanthaburi Province

Through comprehensive research methods encompassing document analysis, questionnaires, and in-depth interviews, the adaptation strategies employed by entrepreneurs to foster sustainability in Chanthaburi's local food identity can be distilled into several pivotal considerations.

1. **Enhancement of Food Production Standards:** Adherence to stringent food production standards is imperative to ensure local food establishments' quality, cleanliness, and safety. Compliance with food sanitation protocols, encompassing the monitoring and supervision of environmental conditions and personnel engaged in food-related activities is essential to mitigate the risk of contamination by pathogens and hazardous substances. By regulating variables about food handling, selection, preparation, and storage, entrepreneurs can uphold the integrity of local cuisine, thereby instilling consumer confidence and bolstering public health outcomes (Lebelo et al., 2021).
2. **Integration of Local Food Identity with Health-conscious Products:** The transformation of Chanthaburi's distinctive culinary heritage into health-promoting commodities caters to the burgeoning demand among health-conscious consumers. Leveraging insights from traditional Thai, modern, and Chinese medicine, entrepreneurs can harness the inherent therapeutic properties of indigenous ingredients to formulate nutritious and palate-pleasing culinary offerings. By aligning dietary practices with elemental principles and seasonal variations, local food establishments can optimize nutritional efficacy while safeguarding holistic well-being (Vorage et al., 2020).
3. **Promotion of the Local Food Movement:** Localizing food production and consumption processes is a linchpin for fostering community resilience and well-being. Facilitating direct linkages between food producers and consumers, the local food movement engenders socio-economic cohesion while nurturing environmentally sustainable practices. From farm-to-table initiatives to urban gardening endeavors, this grassroots movement underscores the intrinsic value of community-centric food systems in preserving cultural heritage and fostering intergenerational continuity (Roy 2022; Hooper, 2021). Moreover, local entrepreneurs need to manage the seasonal availability of fruits, a critical challenge in ensuring consistent product

offerings and maintaining customer satisfaction. Potential approaches include sourcing produce from neighboring regions to supplement local supply during off-seasons, which can help bridge the gap and ensure a steady flow of fresh fruits. Entrepreneurs might also explore utilizing alternative seasonal fruits that are locally available, allowing them to adapt their product lines to the changing availability while promoting local produce. Additionally, employing preservation techniques, such as canning, freezing, or drying, can extend the shelf life of fruits, enabling businesses to offer various products year-round. Moreover, it delves into the economic implications of these strategies, evaluating the cost-effectiveness and sustainability of each approach. Investigating consumer preferences and willingness to accept alternative or preserved products could provide valuable insights for entrepreneurs. Moreover, exploring innovative technologies and methods for preservation and storage and potential partnerships with agricultural stakeholders could reveal new opportunities for local businesses to enhance their resilience against seasonal fluctuations.

4. **Galvanization of Gastronomy Tourism: Harnessing the allure of gastronomy tourism as a conduit for cultural exchange and economic revitalization entails leveraging Chanthaburi's rich culinary tapestry to attract discerning travelers. By showcasing indigenous culinary traditions through immersive food experiences, culinary festivals, and gastronomic excursions, entrepreneurs can cultivate a distinctive tourism identity that resonates with visitors' desire for authentic cultural encounters. Embracing the soft power of local cuisine as a potent tourism asset amplifies the destination's competitive edge while fostering cross-cultural dialogue and appreciation (Aguirre-Sosa et al., 2023).**
5. **Adopting the BCG Model for Food Sustainability: Embracing the Bio-Circular-Green Economy (BCG) model represents a strategic imperative for advancing food sustainability in Chanthaburi. By harmonizing principles of biodiversity conservation, circular economy practices, and green technology innovations, entrepreneurs can fortify the resilience of local food systems while amplifying socio-economic dividends (Puttha et al., 2023). This multifaceted approach encompasses resource optimization, value chain enhancement, technological innovation, and community capacity-building, catalyzing sustainable development aligned with the United Nations' Sustainable Development Goals (SDGs) (Chandan et al., 2023; National Science and Technology Development Agency, 2024). The BCG Model approach for food sustainability; local identity in Chanthaburi is shown in Figure 7.**

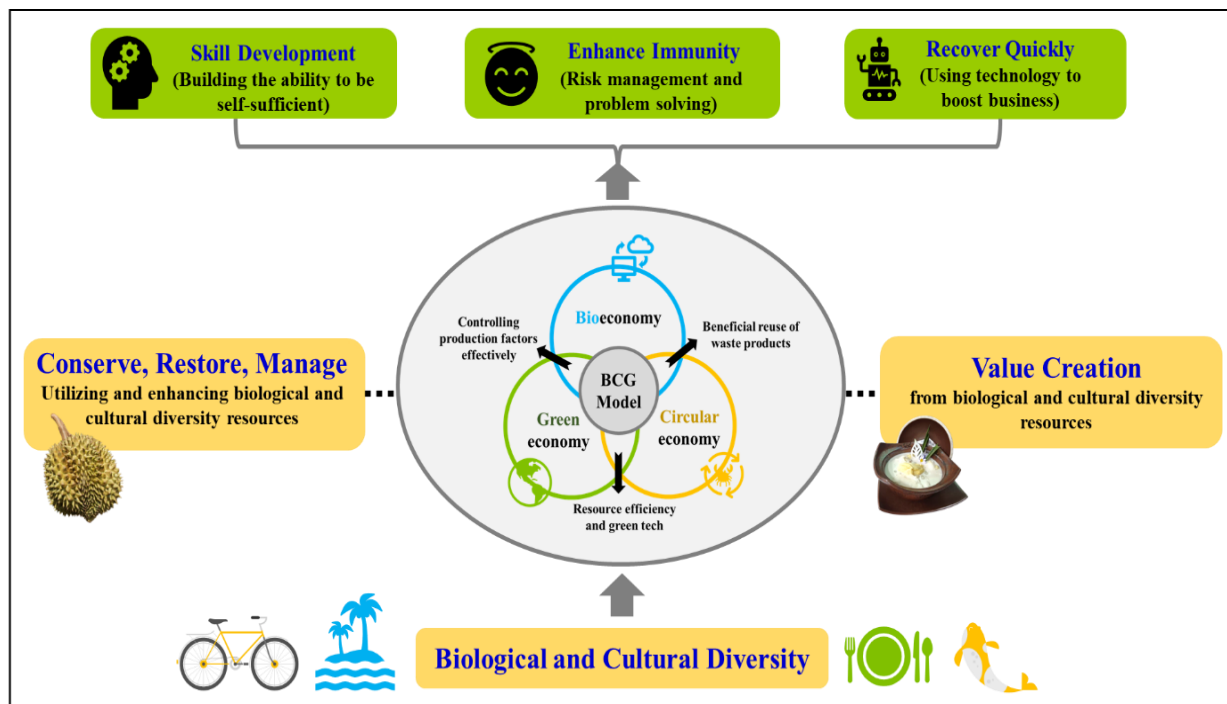


Figure 7 BCG Model approach for the sustainability of Chanthaburi local food identity

Conclusion

An inquiry into the commercial production of local identity cuisine by entrepreneurs in Chanthaburi Province underscores the predominance of small-scale household enterprises utilizing key Indigenous ingredients such as Siam cardamom shoot, cowa leaves, durian, calamondin, mangosteen, pepper, and *Etlingera pavieana*. Among these offerings, braised pork belly with cowa leaves emerges as a prominent emblem of Chanthaburi’s culinary heritage, widely manufactured and distributed by local entrepreneurs. Endeavors to fortify the local food identity in Chanthaburi towards sustainability manifest through multifaceted strategies encompassing the elevation of food production standards to ensure quality and safety, the promotion of health-conscious dietary practices, advocacy for the local food movement as a nexus for community well-being, and the adoption of gastronomy tourism initiatives and the BCG model for food sustainability.

This concerted effort towards maintaining, reviving, and safeguarding Chanthaburi’s indigenous food identity is poised to yield far-reaching benefits for entrepreneurs and stakeholders across the food industry spectrum. The insights gleaned from this research endeavor inform strategic decision-making processes within both public and private sectors, facilitating the development of policies and interventions to optimize food production, distribution, and consumption dynamics. In the face of dynamic economic, social, and technological shifts, the food industry’s need to evolve and adapt remains paramount, necessitating ongoing efforts to enhance resilience, competitiveness, and sustainability across the entire value chain.

Author contributions

Conceptualization, N.C., V.Y. and P.P.; methodology, N.C., V.Y., C.S., P.T., P.P., T.P., K.C. and P.Y.; software, N.C. and P.Y.; validation, N.C., C.S., P.T., P.P., T.P., K.C. and P.Y.; formal analysis, N.C., C.S., P.T., P.P., T.P., K.C. and P.Y.; investigation, V.Y., C.S., P.T. and P.P.; resources, N.C., V.Y., C.S., P.T., P.P., T.P., K.C. and P.Y.; data curation, P.T., P.P., T.P., K.C. and P.Y.; writing—original draft preparation, N.C., P.P., T.P., K.C. and P.Y.; writing—review and editing,

N.C., V.Y., C.S., P.T., P.P., T.P., K.C. and P.Y.; visualization, N.C. and P.Y.; supervision, V.Y., C.S., P.T. and P.P.; project administration, V.Y. and P.P.; funding acquisition, V.Y. All authors have read and agreed to the published version of the manuscript.

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Data availability statement

All data referenced in this article are available upon request.

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Conflicts of Interest

The authors affirm that there are no conflicts of interest to disclose.

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