

## Article

# Application of Fuzzy Delphi Technique Approach in Sustainable Inheritance of Rural Cooking Techniques and Innovative Business Strategies Modeling

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**Abstract:** Transformation and sustainable development must be undertaken in accordance with the trends of the times, which presents challenges to rural areas worldwide. In addition to preserving rural food specialties and presenting them in new ways to attract consumers, these areas must link farmers' production, processing, sales, and management. It is imperative to sustainably pass on rural foods and their cooking techniques and integrate them into innovative business strategies so that delicious rural foods can be sold on the consumer market, boosting rural economies and their development. The main objective of this research was to conduct indicator modeling and empirical analysis for the sustainable inheritance of Taiwan's rural cooking techniques and the development of innovative marketing strategies. The Fuzzy Delphi Technique was used as the main research method to select agricultural experts and rural household economy organizations for indicator modeling and empirical analysis. The results of the research indicate that agricultural experts believe that market operation is the primary developmental focus of cultural inheritance and innovation, whereas household economy organizations believe that education, training, promotion, and development are the primary developmental focuses. The greatest contribution and innovation of this research are the findings that culinary education and training, organized by the farmers' association, can sustainably pass on traditional rural cooking techniques, and the process of incorporating local ingredients into commercial gourmet food should also consider aspects of the economic and marketing strategies of market operation, facilitating the sustainable inheritance of unique, traditional, local, and rural food culture.

**Keywords:** rural food; cooking techniques; sustainable inheritance; agricultural product sale

## 1. Introduction

Government agricultural units, agricultural product operators, and rural agricultural researchers all pay great attention to the development and change of local food in rural areas [1–3]. The foundation of rural food inheritance is to combine local food with local characteristics and encourage the entrepreneurship of farmers [4,5]. Moreover, the integration of local food ingredients with innovative cooking techniques and business models could expand the action and vision of regional development and elevate people from a mindset of self-transformation to thinking and acting in the public interest. These changes

could advance innovative social development and transformation, thereby promoting local traditional culture and enabling its inheritance [6]. The elements of inheritance could also be produced and replicated as a result of the dynamic interaction between tradition and modernity [7]. However, traditional cooking techniques may be lost or gradually forgotten over time. Nevertheless, the continuous rise of rural cuisine's status as a cultural asset could play a key role in cultural exchanges and economic development [8].

The term "agri-food network" refers to the provision of a network closely related to the place of production to improve the quality of food and restore the public's confidence in food production [9]. The network covers producers, consumers, and other actors [10]. Local food ingredients have gradually been marketed and sold together with other aspects of local culture and tradition [11–13]. Two key concepts of agricultural quality food often are the specificity and naturalness of its place of origin. The specificity of the place of origin refers to food production on a local farm, whereas naturalness involves concepts such as organic production, safety, and health [10]. Agricultural food emphasizes localization; the definition of contemporary quality food, such as regional quality food, organic food, and slow food, is related to the region or area of production and the specificity and nature of this region [14]. Therefore, both the local direct market and the extended regional market construct their promotion of quality foods by emphasizing the place of production [15]. When consumers buy wheat products, they are more willing to choose products with higher labeled nutritional values [16]. Thus, consumers will have greater willingness to consume products with high nutritional value and more natural and organic products. The embeddedness of local agricultural food focuses on "local" decisions, and the agri-food network is concerned with building food supply networks and trust relationships. The two have become important components of local agricultural food system research [17]. One strategy of value-added agriculture is using featured agricultural products as local brands, and the success of this strategy requires the transformation and support of the local community. Therefore, the link between food and culture can be constructed by policy.

The development and formation of agricultural cooperatives is a crucial stage of agricultural transformation [18]. Rural communities require effective leadership to promote the cultivation of emerging entrepreneurship ecosystems [6,19]. Research by Shpykuliak and Sakovskas [18] demonstrated that the development and effective management of agricultural cooperatives could help solve socioeconomic issues, improve the welfare of farmers, and ensure the overall development of rural areas. Furthermore, the inheritance of local cooking techniques can be protected through the development of agricultural cooperatives [5]. Under the post-production rural development model, whether the aim is to produce rural cuisine, high-quality food that emphasizes local culture, or even commodities such as public spaces, rural areas must transform to cope with the commercialization process of agricultural products [18].

Delicacies and the enjoyment of delicious food are also important factors for local brand promotion [20,21]. Research on agriculture and tourism by Di-Clemente et al. [22] revealed that food and traditional cooking are the main driving forces of modern tourists. Kim, Eves, and Scarles [23] considered local food tasting to be an opportunity for consumers to meet and communicate with family and friends, thereby building personal relationships or strengthening family connections. Local ingredients and specialty products help enhance overall rural economic development and support the local population [5,24,25].

Every country or region has unique cooking techniques and assets [26,27]. Timothy [28] explained that knowledge and experience inform people about which crops will grow in certain areas and how to cook them and that diets and recipes are passed on to the next generation. In their study of a rural innovation workshop, Huang, Zhang, Sang, and Ou [29] pointed out that in the past, farmers were educated by students, but now, students should learn from farmers. Shukla et al. [30] proposed that knowledge competitions, such as school competitions and community recipe competitions, are tools to encourage informal learning spaces that promote the dissemination of local informal and agricultural knowledge. Accordingly, this research constructed the key indicators for the sustainable

inheritance of traditional rural cooking techniques based on the theoretical viewpoints of Bessière [7]. Through innovative business strategies, traditional cooking techniques featuring local agricultural products can be creatively developed, producing incentives to attract foreign consumers. This also solves the problem of traditional technique loss and addresses the challenges of rural development and innovation. Therefore, the construction and verification of indicators through the inheritance of cooking techniques and innovative business models are the most novel aspects of this research. The results of this study will also solve the problem of inheriting the current cooking techniques in rural Taiwan from the gaps in the literature left by our predecessors.

Earlier literature on the inheritance of rural foods and their cooking techniques and innovative business strategies in Taiwan is sparse. This study uses the Fuzzy Delphi Technique (FDT) to construct rural food business strategies to develop distinctive local ingredients and develop innovative business models that attract foreign consumers. We link this with farmers to jointly promote production, processing, sales and services, retain local traditional culture and incorporate innovative elements, integrate local food into local elements to promote market operations, activate their rural economy and development, and retain and inherit traditional food culture. The study of these novelties also addresses the gaps in the literature. The agricultural policy of the government of Taiwan in recent years has actively encouraged young people to return to their hometowns and invest in agricultural production; in this way, it can promote the advancement of rural food and serve as a hub for the cultural inheritance and innovation of local ingredients. Another principal topic is how traditional rural cooking techniques can be inherited and developed. This topic is investigated in the present study, which uses the FDT and a confirmatory scale to construct key indicators for the inheritance of traditional rural cooking techniques and innovative marketing strategies. The hope is that this research can serve as a reference for the cultural inheritance of cooking techniques and marketing strategies for future agricultural development.

The objectives of this research, based on the research background and rationale described above, were as follows: I. To construct indicators for the sustainable inheritance of rural cooking techniques and innovative business strategies; II. To analyze the weighting of the sustainable inheritance of rural food cooking techniques and innovative business strategies.

## 2. Materials and Methods

### 2.1. Methodology and Framework

First, content analysis was conducted to synthesize the concepts of sustainable inheritance of rural cooking techniques and innovative business strategies proposed by experts and scholars in various agricultural fields. The FDT was adopted to construct triangular fuzzy numbers from the results of our analysis. The total value for the triangular fuzzy number's defuzzification was determined according to the fuzzy set, defuzzify, proposed by Chen and Hwang [31], thereby identifying those indicators that conformed with the research objectives. Personnel of rural household economy organizations were recruited to verify the practicality of the indicators of this study using practical verification.

The Fuzzy Delphi Technique is a combination of the traditional Delphi method and Fuzzy Set Theory, which aims to address some of the ambiguity of the expert panel consensus. It is a more advanced version of the Delphi method in that it utilizes triangulation statistics to determine the distance between the levels of consensus within the expert panel [32]. Furthermore, the objective of using Delphi is to achieve group consensus [33]. Previous studies, from Goodarzi et al. [34], Jahangiri et al. [35] and Rampasso et al. [36], all use FDT to obtain consensus and key factors for expert-opinion decision making.

After reviewing the relevant literature on rural food and business management [5,7,18,28,37–40] and the opinions of expert meetings, the deduced research aspects of this study were derived: (1) innovation competition, (2) market operation, (3) education and training, (4) festival activity, and (5) promotion and development. These five aspects were used as the research framework for the FDT (see Figure 1)



**Figure 1.** Research framework.

## 2.2. Research Instrument

### 2.2.1. Questionnaire Design

The questionnaires of this research were divided into two main categories, described below, which were defined after the expert meeting. The members of the expert meeting were three university professors in the field of agriculture, three senior managers of agricultural cooperatives, and three assistant vice presidents of government agricultural units.

1. FDT expert questionnaire. This questionnaire primarily assessed the sustainable inheritance of various rural cooking techniques and innovative business strategies to evaluate the representativeness of the indicators, including five aspects: innovation competition, market operation, education and training, festival activity, and promotion and development. Measurements were conducted using a scale of 1 to 10, with 1 being the least important and 10 being the most important. The scoring of each aspect was determined subjectively based on the individual's professionalism; subsequently, the fuzzy set defuzzify proposed by Chen and Hwang [31] was applied to determine the total value of defuzzification, and the threshold value of each evaluation criterion of this project was set to 0.50.
2. Confirmatory analysis questionnaire. This questionnaire mainly evaluated the confirmation of indicators after screening to assess the associated importance to the farmers on a practical level. A Likert scale was used for measurement on a scale from 1 to 7.

### 2.2.2. Sampling Design

The FDT questionnaire was sent to participants in the form of online questionnaires. The main research participants were those with more than 10 years of professional qualifications and included (1) university professors of the Department of Agricultural Management, (2) agriculture and culinary organizations, (3) government agriculture and food organizations, (4) agricultural associations, (5) agricultural cooperatives, and (6) agricultural product sales organizations, etc. A total of 36 participants were selected, as shown in Table 1.

The confirmatory questionnaires of this study were distributed on-site. From April 2021 to June 2021, data were collected in 19 counties and cities on the main island of Taiwan. The population is 1841 (Member of rural household economy organizations). Purposive sampling and snowball sampling are the sampling schemes used. A total of 200 questionnaires were distributed and 186 valid questionnaires were issued [41]. The effective rate was 93%.

**Table 1.** Fuzzy Delphi technique general information of experts in various fields.

Number	Unit	Number of People
1	university professors of the Department of agricultural Management	6
2	agriculture and culinary organization	6
3	government agriculture and food organization	6
4	agricultural association	6
5	agricultural cooperative	6
6	agricultural product sales organization	6

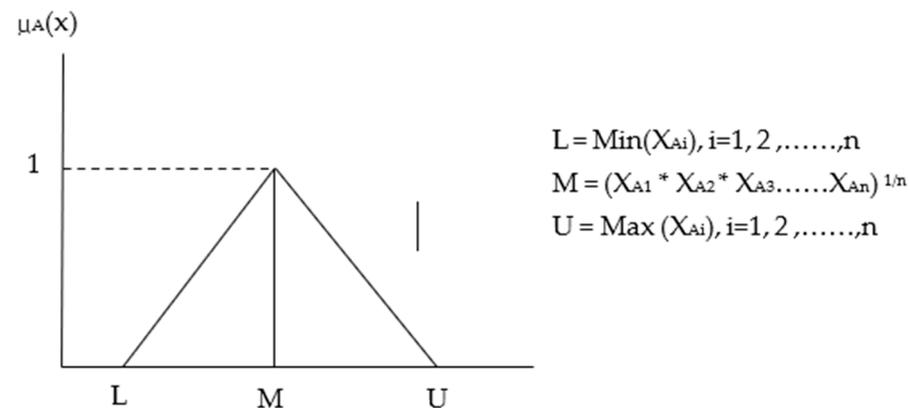
2.2.3. Confirmatory Data Analysis

First, indicators were established through content analysis, and the FDT was then used to screen the indicators for the sustainable inheritance of rural local food ingredients and innovative marketing strategies. These indicators were then averaged for subsequent verification.

This research principally adopted the triangular fuzzy numbers in Table 2 to integrate the experts’ knowledge, which was used to formulate the inspection items and assign points. First, the research team formulated questions, and experts in related fields then expressed their opinions on the importance of the questions with the goal of establishing the sustainable inheritance of the various rural cooking techniques and innovative business strategies. Subsequently, the assessed values of the indicators collected by the various agricultural professionals were used to construct the triangular fuzzy numbers of each criterion in Figure 2 using the formula  $\mu_A(x) = (L, M, U)$ . This study used the fuzzy set, defuzzify, proposed by Lee and Li [42] and Wu, Lee, and Lin [43] to calculate the left threshold value (L), median value (M), and right threshold value (U), which were ultimately used to calculate the total value (T).

**Table 2.** Description of triangular fuzzy numbers.

Threshold Value	Formula
left threshold value (L)	$L_{ij} = \text{Min}(L_{ij}), i = 1, 2, 3, \dots n; j = 1, 2, 3, \dots n$
right threshold value (U)	$U_{ij} = \text{Max}(U_{ij}), i = 1, 2, 3, \dots n; j = 1, 2, 3, \dots n$
median value (M)	$M_{ij} = \left( \prod_{i=1, j=1}^{n, m} mij \right)^{1/n} i = 1, 2, 3, \dots n; j = 1, 2, 3, \dots n$
Total value (T)	$T_{ij} = \frac{U_{ij} + M_{ij} + L_{ij}}{3}$



**Figure 2.** Graph of triangular fuzzy numbers.

### 3. Results

#### 3.1. Triangular Fuzzy Number Analysis of the Sustainable Inheritance of Rural Cooking Techniques and Innovative Business Strategies

After assessing the collected values of the indicator importance of the cultural heritage and innovation of the local ingredients, the triangular fuzzy numbers were established sequentially (Table 3). For innovation competition, the left threshold value (L) of each indicator ranged from 0.500 to 0.700, the geometric mean (M) ranged from 0.706 to 0.818, and the right threshold value (R) ranged from 0.900 to 1.000. For market operation, the left threshold value (L) of each indicator ranged from 0.500 to 0.800, the geometric mean (M) ranged from 0.777 to 0.920, and the right threshold values (R) were all 1.000. For education and training, the left threshold values (L) of all indicators were 0.500, the geometric mean (M) ranged from 0.734 to 0.804, and the right threshold values (R) were all 1.000. For festival activity, the left threshold value (L) of each indicator ranged from 0.400 to 0.500, the geometric mean (M) ranged from 0.648 to 0.733, and the right threshold values (R) were all 1.000. For promotion and development, the left threshold value (L) of each indicator ranged from 0.400 to 0.500, the geometric mean (M) ranged from 0.734 to 0.858, and the right threshold values (R) were all 1.000.

**Table 3.** Triangular fuzzy number analysis table for various agricultural professionals.

Aspects	Criterion	Triangular Fuzzy Number		
		Li	Mi	Ri
Innovation competition	Participate in innovative cooking competitions using local ingredients	0.500	0.706	0.900
	Transform cuisines based on local ingredients from cooking competitions into recipes for inheritance	0.700	0.818	0.900
	Cook ingredients using traditional cooking techniques	0.200	0.715	1.000
	Observe and shadow the cooking competitions incorporating local ingredients	0.500	0.729	0.900
Market operations	Able to make local ingredients into gourmet food for sale	0.800	0.920	1.000
	Able to process local ingredients into souvenirs	0.700	0.904	1.000
	Able to customize local ingredients in response to market demand	0.700	0.870	1.000
	Able to produce delicacies from local ingredients preferred by customers	0.500	0.777	1.000
Trainings	Participate in training in the use of local ingredients organized by the Farmers' Association	0.500	0.773	1.000
	Participate in the local gastronomy and cooking courses conducted by vocational training units	0.500	0.782	1.000
	Learn the cooking techniques of local ingredients from elders	0.500	0.804	1.000
	Refer to the media to use local ingredients to learn and refine culinary skills	0.500	0.734	1.000
	Learn the innovative cooking techniques of well-known chefs using local ingredients	0.500	0.738	1.000
Festival activities	Local ingredients are used for cooking during religious festivals	0.400	0.727	1.000
	Local ingredients are used for cooking at family dinners	0.500	0.733	1.000
	Local ingredients are used for cooking when friends visit for dinner	0.500	0.720	1.000
	Local ingredients are used for cooking when worshipping ancestors	0.500	0.648	1.000
Promotions	Pass on cuisines based on local ingredients to the next generation	0.500	0.858	1.000
	Pass on cuisines based on local ingredients to young people (school students)	0.500	0.792	1.000
	Introduce cuisines based on local ingredients to family and friends	0.500	0.795	1.000
	Print cuisines based on local ingredients in books	0.400	0.734	1.000
	Compile cuisines based on local ingredients into audio-visual teaching materials	0.400	0.786	1.000
	Cross-county, -city, and -regional exchange of cuisines based on local ingredients	0.500	0.738	1.000

Note:  $L_i$  is the left threshold value of the triangular fuzzy number;  $M_i$  is the geometric mean of the triangular fuzzy number;  $R_i$  is the right threshold value of the triangular fuzzy number.

#### 3.2. Numerical Analysis of Fuzzy Set Defuzzification of the Sustainable Inheritance of Rural Cooking Techniques and Innovative Business Strategies

According to Chen and Hwang's [31] fuzzy set defuzzification, the triangular fuzzy number defuzzification of the cultural heritage and innovation indicators for local food ingredients by various agriculture-related professionals (Table 4) was divided into the left threshold value of defuzzification ( $\mu_L$ ), the right threshold value of defuzzification

( $\mu_R$ ), and the total value of defuzzification ( $\mu_T$ ). For innovation competition, the total defuzzification value of each indicator was between 0.625 and 0.782; for market operation, the total defuzzification value of each indicator was between 0.713 and 0.874; for education and training, the total defuzzification value of each indicator was between 0.692 and 0.727 for festival activity, the total defuzzification value of each indicator was between 0.652 and 0.692, and for promotion and development, the total defuzzification value of each indicator was between 0.670 and 0.754.

**Table 4.** Analysis table of defuzzification for the sustainable inheritance of rural cooking techniques and innovative business strategies.

Aspects	Criterion	Defuzzification			Ranking
		( $\mu_L$ )	( $\mu_R$ )	( $\mu_T$ )	
Innovation competition	Participate in innovative cooking competitions using local ingredients	0.754	0.415	0.670	20
	Transform cuisines based on local ingredients from cooking competitions into recipes for inheritance	0.832	0.268	0.782	4
	Cook ingredients using traditional cooking techniques	0.778	0.528	0.625	23
	Observe and shadow the cooking competitions incorporating local ingredients	0.768	0.407	0.681	18
Market operations	Able to make local ingredients into gourmet food for sale	0.926	0.179	0.874	1
	Able to process local ingredients into souvenirs	0.912	0.249	0.832	2
	Able to customize local ingredients in response to market demand	0.885	0.256	0.814	3
	Able to produce delicacies from local ingredients preferred by customers	0.818	0.392	0.713	10
Trainings	Participate in training in the use of local ingredients organized by the Farmers' Association	0.815	0.393	0.711	11
	Participate in the local gastronomy and cooking courses conducted by vocational training units	0.821	0.390	0.715	9
	Learn the cooking techniques of local ingredients from elders	0.836	0.383	0.727	6
	Refer to the media to use local ingredients to learn and refine culinary skills	0.790	0.405	0.692	15
	Learn the innovative cooking techniques of well-known chefs using local ingredients	0.792	0.404	0.694	14
Festival activities	Local ingredients are used for cooking during religious festivals	0.785	0.452	0.667	21
	Local ingredients are used for cooking at family dinners	0.789	0.405	0.692	16
	Local ingredients are used for cooking when friends visit for dinner	0.781	0.410	0.686	17
	Local ingredients are used for cooking when worshipping ancestors	0.740	0.436	0.652	22
Promotions	Pass on cuisines based on local ingredients to the next generation	0.876	0.368	0.754	5
	Pass on cuisines based on local ingredients to young people (school students)	0.828	0.387	0.720	8
	Introduce cuisines based on local ingredients to family and friends	0.830	0.386	0.722	7
	Print cuisines based on local ingredients in books	0.790	0.450	0.670	19
	Compile cuisines based on local ingredients into audio-visual teaching materials	0.824	0.433	0.695	12
	Cross-county, -city, and -regional exchange of cuisines based on local ingredients	0.793	0.404	0.694	13

Note: ( $\mu_L$ ) is the left threshold value of defuzzification; ( $\mu_R$ ) is the right threshold value of defuzzification; ( $\mu_T$ ) is the total value of defuzzification.

After calculating the triangular fuzzy numbers and the total value of defuzzification from the data collected using the FDT questionnaire, the subjective opinions collected during the experts' meeting of this research suggested that the cultural heritage and innovation indicators of local food ingredients with a total value of less than 0.500 should be eliminated. Therefore, the total values of the indicators in this project were all above 0.500. In summary, after the analysis with the FDT, five aspects were identified, which were subdivided into a total of 23 detailed items; these main aspects were (1) innovation competition, (2) market operation, (3) education and training, (4) festival activity, and (5) promotion and development.

### 3.3. Confirmatory Analysis of Indicators for the Sustainable Inheritance of Rural Cooking Techniques and Innovative Business Strategies

Table 5 presents the indicator confirmation for the sustainable inheritance of local food ingredients in rural areas and innovative marketing strategy. Measurements were based

on a seven-point scale. Higher average values of the indicators indicate higher degrees of indicator recognition for the cultural heritage and innovation of local ingredients. In this study, the highest total average values were calculated for “promotion and development” and “education and training” (6.14 points). Within these criteria, “participate in training in the use of local ingredients organized by the Farmers’ Association” ( $M = 6.43$ ) of the education and training aspect, along with “pass on cuisines based on local ingredients to the next generation” ( $M = 6.36$ ), “pass on cuisines based on local ingredients to young people (school students)” ( $M = 6.30$ ), and “introduce cuisines based on local ingredients to family and friends” ( $M = 6.30$ ) of the promotion and development aspect were ranked the highest in the indicator confirmation of this research.

**Table 5.** Indicator confirmation analysis table for the sustainable inheritance of rural cooking techniques and innovative business strategies.

Aspect	Criterion	Mean Value ( $M$ )	Ranking
Innovation competition ( $M = 5.52$ )	Participate in innovative cooking competitions using local ingredients	5.78	13
	Transform cuisines based on local ingredients from cooking competitions into recipes for inheritance	5.00	20
	Cook ingredients using traditional cooking techniques	5.76	14
	Observe and shadow the cooking competitions incorporating local ingredients	5.54	16
Market operation ( $M = 4.77$ )	Able to make local ingredients into gourmet food for sale	4.97	21
	Able to process local ingredients into souvenirs	5.08	19
	Able to customize local ingredients in response to market demand	4.71	22
	Able to produce delicacies from local ingredients preferred by customers	4.32	23
Education and training ( $M = 6.14$ )	Participate in training in the use of local ingredients organized by the Farmers’ Association	6.43	1
	Participate in the local gastronomy and cooking courses conducted by vocational training units	6.22	5
	Learn the cooking techniques of local ingredients from elders	6.11	7
	Refer to the media to use local ingredients to learn and refine culinary skills	5.82	12
	Learn the innovative cooking techniques of well-known chefs using local ingredients	6.11	7
Festival activities ( $M = 5.67$ )	Local ingredients are used for cooking during religious festivals	5.29	18
	Local ingredients are used for cooking at family dinners	6.04	9
	Local ingredients are used for cooking when friends visit for dinner	5.91	11
	Local ingredients are used for cooking when worshipping ancestors	5.43	17
Promotion and development ( $M = 6.14$ )	Pass on cuisines based on local ingredients to the next generation	6.36	2
	Pass on cuisines based on local ingredients to young people (school students)	6.30	3
	Introduce the cuisines based on local ingredients to family and friends	6.30	3
	Print the cuisines based on local ingredients in books	5.72	15
	Compile the cuisines based on local ingredients into audio-visual teaching materials	6.12	6
	Cross-county, -city, and -regional exchange of the cuisines based on local ingredients	6.03	10

#### 4. Discussion

After the establishment of triangular fuzzy numbers and triangular fuzzy numbers defuzzification, this research screened the indicators assessed by professionals in the agricultural food field, eventually identifying a total of 23 criteria for sustainable inheritance and innovative business strategies. Four of these items were related to the innovation competition aspect, four items were related to the market operation aspect; five items were related to the education and training aspect, four items were related to the festival activity aspect, and six items were related to the promotion and development aspect.

#### 4.1. Indicator Screening Results

According to the total value ranking of the defuzzification, this research demonstrated that “able to make local ingredients into gourmet food for sale (0.874)”, “able to process local ingredients into souvenirs (0.832)”, and “able to customize local ingredients in response to market demand (0.814)” of the market operation aspect were the three most important indicators assessed by this study. This indicated that experts considered the contents of the above three indicators to be key items for the sustainable inheritance of rural cooking techniques and innovative business strategies. This result is consistent with the research of Shpykuliak and Sakovska [18] and Jalkh et al. [5]. After the processing of agricultural products, marketing is necessary to increase farmers’ revenue. Farmers’ food ingredients could gain competitive advantage through market sales, and innovative marketing strategies could also raise the price of agricultural products.

#### 4.2. The Confirmation of Screening Results

##### 4.2.1. Innovation Competition

The criterion “participate in innovative cooking competitions using local ingredients” ( $M = 5.78$ ) of the innovation competition aspect had the highest mean value, indicating that inheritance and innovation through cooking competitions were highly recognized by farmers. This was followed by “cook ingredients using traditional cooking techniques” ( $M = 5.76$ ), “observe and shadow the cooking competitions incorporating local ingredients” ( $M = 5.54$ ), and “transform cuisines based on local ingredients from cooking competitions into recipes for inheritance” ( $M = 5.00$ ). The average values of the criteria in this aspect were all above 5 points, demonstrating that farmers generally recognized innovation competitions as a valuable strategy for inheritance and innovation. This result is consistent with the research of Shukla et al. [30]. In addition to learning through the non-formal education system, competitions could also serve as an important channel for farmers to learn new cooking techniques.

##### 4.2.2. Market Operation

Within the market operation aspect, the item “able to process local ingredients into souvenirs” ( $M = 5.08$ ) was the criterion with the highest mean value, indicating that inheritance and innovation through the processing of souvenirs was highly recognized by farmers. This was followed by “able to make local ingredients into gourmet food for sale” ( $M = 4.77$ ), “able to customize local ingredients in response to market demand” ( $M = 4.71$ ), and “able to produce delicacies from local ingredients preferred by customers” ( $M = 4.23$ ). None of these items had values over 5 points, which revealed that although market operation was one of the channels of inheritance and innovation, it was not well-recognized by farmers. This result conflicts with research conducted by Shpykuliak and Sakovska [18]. The economic development of Taiwan’s rural areas faces many challenges, and the development of market operations could effectively improve the economic conditions of farmers and ensure rural development. However, because of regional differences and Taiwan’s dense population, most rural areas have their own local agricultural associations to help integrate their economic sales. Although farmers generally considered market operations to be a potential channel for inheritance and innovation, these aspects were not their first choice.

##### 4.2.3. Education and Training

Within the education and training aspect, the item “participate in training in the use of local ingredients organized by the Farmers’ Association” ( $M = 6.43$ ) was the criterion with the highest mean value, which indicates that the strategy of inheritance and innovation through course training was highly recognized by farmers. This was followed by “participate in the local gastronomy and cooking courses conducted by vocational training units” ( $M = 6.22$ ), “learn the cooking techniques of local ingredients from elders” ( $M = 6.11$ ), “learn the innovative cooking of well-known chefs using local ingredients” ( $M = 6.11$ ), and “refer to the media to use local ingredients to learn and refine culinary skills” ( $M = 5.82$ ).

The mean values of the criteria within this aspect were all above 5 points, indicating that education and training were generally recognized by farmers as a strategy of inheritance and innovation. This result is consistent with the research of Nor et al. [44]. Observing techniques demonstrated by experts, learning traditional knowledge from elders, and professional course training are all ways for farmers to learn; in this way, farmers could enhance their knowledge and the inheritance of knowledge through multiple channels.

#### 4.2.4. Festival Activity

Within the festival activity aspect, the item “local ingredients are used for cooking at family dinners” ( $M = 6.04$ ) was the criterion with the highest mean value, which indicates that the strategy of inheritance and innovation through the cooking of ingredients at family dinners was highly recognized by farmers. This was followed by “local ingredients are used for cooking when friends visit for dinner” ( $M = 5.91$ ), “local ingredients are used for cooking when worshipping ancestors” ( $M = 5.43$ ), and “local ingredients are used for cooking during religious festivals” ( $M = 5.29$ ). The average values of the criteria in this aspect were all above 5 points, indicating that farmers generally recognized festival activity as a strategy of inheritance and innovation. This result was consistent with research conducted by Moscatelli et al. [39] and Raji et al. [45]. Different socio-cultural customs, festivals, religious activities, etc., each have culturally unique dietary customs, and knowledge is passed on through these activities. Food is closely related to inheritance. Farmers can pass on their unique traditional knowledge on different occasions so that the distinct local culture can be inherited through food.

#### 4.2.5. Promotion and Development

Within the promotion and development aspect, the item “pass on cuisines based on local ingredients to the next generation” ( $M = 6.36$ ) was the criterion with the highest mean value, which indicates that passing on knowledge to the next generation through cooking was highly recognized by farmers. This was followed by “pass on the cuisines of local ingredients to the young people (school students)” ( $M = 6.30$ ), “compile the cuisines based on local ingredients into audio-visual teaching materials” ( $M = 6.12$ ), “cross-county, -city, and -regional exchange of the cuisines based on local ingredients” ( $M = 6.03$ ), and “print the cuisines based on local ingredients in books” ( $M = 5.72$ ). The mean values of all criteria in this aspect were over 5 points, indicating that farmers generally accepted promotion and development as a strategy of inheritance and innovation. This result is consistent with research conducted by Almansouri et al. [40] and Raji et al. [45]. The promotion and development of traditional culture rely on diverse channels, such as recipes, teaching, audio-visual films, and communication with others, which enable farmers’ traditional knowledge to be preserved and passed on to the next generation.

## 5. Conclusions

The results of this research demonstrate that the key indicators and aspects agreed upon by agricultural experts and selected by the FDT predominately fell within the “market operation” aspect. However, when re-confirming the acceptance of the aspects and indicators, it was discovered that the participants mostly focused on the aspects of “education and training” and “promotion and development”; this was the major contribution and discovery of this research. The participants sampled in this study were rural household economy organizations; it was therefore inferred that the purpose of the establishment of Taiwan’s early rural household economy organizations was mainly to learn how to manage family resources and cook. Therefore, these rural household economy organizations offer cooking courses, housework management courses, etc. Among them, cooking courses were paramount for local farmers’ food development. Accordingly, most rural household economy organizations at the time of this study believed that the aspects of “education and training” and “promotion and development” were key methods for the sustainable inheritance of rural cooking techniques and innovative business strategies. Nevertheless,

with the changing socio-economic landscape and the development of new types of markets, the agricultural unit of the Taiwan government has provided interventions by scholars and guidance organizations to guide the management of local farmers' organizations, promote the transformation of rural local organizations, and provide diverse development. For example, research by Jiménez-Beltrán et al. [12], Rinaldi [13], Chaichana et al. [25], and Di-Clemente et al. [22] demonstrated that the processing of raw agricultural foods into products with commodity value and the transformation of production-oriented farms into sightseeing-oriented leisure farms, among other strategies, could attract foreign consumers, bolstering the rural local economy and creating rural innovation development.

In conclusion, in the sustainable inheritance of rural cooking techniques and innovative business strategies constructed by the FDT in this study, all experts considered market operation as the primary developmental focus for cultural inheritance and innovation. However, when conducting physical confirmation, the farmers of the household economy organization believed that education and training and promotion and development were the foremost developmental focuses. This indicates that experts and scholars have different ideas from local farmers. Therefore, to inherit and innovate local culture, this research suggests farmers should integrate the innovative business courses of market operation through education training and promotive development; this will enable rural areas to retain traditional food culture knowledge and cooking techniques in the future. This strategy could also consider the economy and business strategy aspects of market operation, thereby promoting the sustainable inheritance of unique local and traditional rural food cultures to avail farmers of greater benefit. This is the purpose of and the greatest contribution of this research.

## 6. Limitations and Future Studies

Experts in various fields in this study were limited to the rural areas of Taiwan. Due to the differing sizes of farms in Taiwan, this study did not consider the farm size, a limitation of this study. It is recommended that researchers expand the sources and categories of experts in the future to make them more representative; this way, such research results may be generalizable beyond the area in which the experts are located, as this study only models the of rural cooking techniques and innovative business strategies in Taiwan. It is suggested that, in the future, researchers investigate different rural cooking techniques and innovative business strategies and compare them with rural Taiwan.

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## References

1. Preiss, P.; Charão-Marques, F.; Wiskerke, J.S. Fostering sustainable urban-rural linkages through local food supply: A transnational analysis of collaborative food alliances. *Sustainability* **2017**, *9*, 1155. [[CrossRef](#)]
2. Schoolman, E.D. Local food and civic engagement: Do farmers who market local food feel more responsible for their communities? *Rural Sociol.* **2020**, *85*, 806–839. [[CrossRef](#)]
3. Arthur, I.K.; Yamoah, F.A. Understanding the role of environmental quality attributes in food-related rural enterprise competitiveness. *J. Environ. Manag.* **2019**, *247*, 152–160. [[CrossRef](#)] [[PubMed](#)]

4. Cadzow, H.; Binns, T. Empowering Freetown's women farmers. *Appl. Geogr.* **2016**, *74*, 1–11. [[CrossRef](#)]
5. Jalkh, R.; Dedeire, M.; Desjardins, M.R. An introduction to food cooperatives in the Bekaa Valley, Lebanon: Territorial actors and potential levers to local development through culinary heritage. *Food Ethics* **2020**, *5*, 1–18. [[CrossRef](#)]
6. Rabadán, A.; Álvarez-Ortí, M.; Tello, J.; Pardo, J.E. Tradition vs. co-innovation: The constraining effect of protected designations of origin (PDO) on the implementation of sustainability measures in the olive oil sector. *Agronomy* **2021**, *11*, 447. [[CrossRef](#)]
7. Bessièrre, J. Local development and heritage: Traditional food and cuisine as tourist attractions in rural areas. *Sociol. Rural.* **1998**, *38*, 21–34. [[CrossRef](#)]
8. Hwang, L.J.J.; van Westering, J.; Chen, H.H. Exploration of the linkages between the gastronomy and heritage of Tainan City, Taiwan. *Adv. Hosp. Leis.* **2005**, *1*, 223–235.
9. Higgins, V.; Dibden, J.; Cocklin, C. Building alternative agri-food networks: Certification, embeddedness and agri-environmental governance. *J. Rural Stud.* **2008**, *24*, 15–27. [[CrossRef](#)]
10. Murdoch, J.; Marsden, T.K.; Banks, J. Quality, nature, and embeddedness: Some theoretical considerations in the context of the food sector. *Econ. Geogr.* **2000**, *76*, 107–125. [[CrossRef](#)]
11. Alonso, A.D.; Liu, Y. The potential for marrying local gastronomy and wine: The case of the 'fortunate islands'. *Int. J. Hosp. Manag.* **2011**, *30*, 974–981. [[CrossRef](#)]
12. Jiménez-Beltrán, F.J.; López-Guzmán, T.; González Santa Cruz, F. Analysis of the relationship between tourism and food culture. *Sustainability* **2016**, *8*, 418. [[CrossRef](#)]
13. Rinaldi, C. Food and gastronomy for sustainable place development: A multidisciplinary analysis of different theoretical approaches. *Sustainability* **2017**, *9*, 1748. [[CrossRef](#)]
14. Renting, H.; Marsden, T.K.; Banks, J. Understanding alternative food networks: Exploring the role of short food supply chains in rural development. *Environ. Plan A* **2003**, *35*, 393–411. [[CrossRef](#)]
15. Nyman, M. Food, meaning-making and ontological uncertainty: Exploring 'urban foraging' and productive landscapes in London. *Geoforum* **2019**, *99*, 170–180. [[CrossRef](#)]
16. Szczepanek, M.; Prus, P.; Knapowski, T. The Assessment of Market Demand for Products Obtained from Primary Wheat Forms with Increased Nutritional Value. In Proceedings of the 27th International Scientific Conference Agrarian Perspectives XXVII "Food Safety–Food Security", Prague, Czech Republic, 19–20 September 2018; Czech University of Life Sciences Prague: Prague, Czech Republic, 2018; pp. 381–387. Available online: <https://ap.pef.czu.cz/dl/69194?lang=en> (accessed on 23 July 2021).
17. Hirschfeld, S.; Van Acker, R. Permaculture farmers consistently cultivate perennials, crop diversity, landscape heterogeneity and nature conservation. *Renew. Agric. Food Syst.* **2020**, *35*, 342–351. [[CrossRef](#)]
18. Shpykuliak, O.; Sakovska, O. Agricultural cooperation as an innovation for rural development. *Balt. J. Econ.* **2020**, *6*, 183–189. [[CrossRef](#)]
19. Adhikari, R.P.; Bonney, L.; Woods, M.; Clark, S.; Coates, L.; Harwood, A.; Eversole, R.; Miles, M.P. Applying a community entrepreneurship development framework to rural regional development. *Small Enterp. Res.* **2018**, *25*, 257–275. [[CrossRef](#)]
20. Muñoz-Martinez, N.; Florek, M. Food-based place branding as holistic place ecosystems: The case of Basque Gastronomic Ecosystem. *Place Brand. Public Dipl.* **2021**, 1–12. [[CrossRef](#)]
21. Freire, J.R.; Gertner, R.K. The relevance of food for the development of a destination brand. *Place Brand. Public Dipl.* **2021**, *17*, 193–204. [[CrossRef](#)]
22. Di-Clemente, E.; Hernández-Mogollón, J.M.; López-Guzmán, T. Culinary tourism as an effective strategy for a profitable cooperation between agriculture and tourism. *Soc. Sci.* **2020**, *9*, 25. [[CrossRef](#)]
23. Kim, Y.G.; Eves, A.; Scarles, C. Building a model of local food consumption on trips and holidays: A grounded theory approach. *Int. J. Hosp. Manag.* **2009**, *28*, 423–431. [[CrossRef](#)]
24. Parrott, N.; Wilson, N.; Murdoch, J. Spatializing quality: Regional protection and the alternative geography of food. *Eur. Urban Reg. Stud.* **2002**, *9*, 241–261. [[CrossRef](#)]
25. Chaichana, T.; Brennan, C.S.; Osiriphun, S.; Thongchai, P.; Wangtueai, S. Development of local food growth logistics and economics. *AIMS Agric. Food* **2021**, *6*, 588–602. [[CrossRef](#)]
26. Vázquez-Martinez, U.J.; Sanchís-Pedregosa, C.; Leal-Rodríguez, A.L. Is gastronomy a relevant factor for sustainable tourism? An empirical analysis of Spain country brand. *Sustainability* **2019**, *11*, 2696. [[CrossRef](#)]
27. UNWTO. Global Report on Food Tourism. Available online: [https://urbact.eu/sites/default/files/import/Projects/Gastronomic\\_Cities/outputs\\_media/Food\\_tourism.pdf](https://urbact.eu/sites/default/files/import/Projects/Gastronomic_Cities/outputs_media/Food_tourism.pdf) (accessed on 21 July 2021).
28. Timothy, D.J.; Ron, A.S. Understanding heritage cuisines and tourism: Identity, image, authenticity, and change. *J. Herit. Tour.* **2013**, *8*, 99–104. [[CrossRef](#)]
29. Huang, Y.; Zhang, J.; Sang, X.; Ou, H. Insight into practical teaching in rural planning in colleges based on the "Rural Innovation Workshop". *Syst. Pract. Action Res.* **2021**, 1–20. [[CrossRef](#)]
30. Shukla, S.; Barkman, J.; Patel, K. Weaving indigenous agricultural knowledge with formal education to enhance community food security: School competition as a pedagogical space in rural Anchetty, India. *Pedagog. Cult. Soc.* **2017**, *25*, 87–103. [[CrossRef](#)]
31. Chen, S.J.; Hwang, C.L. Fuzzy multiple attribute decision making methods. *Fuzzy Mult. Attrib. Decis. Mak.* **1992**, 289–486. [[CrossRef](#)]
32. Ishikawa, A.; Amagasa, M.; Shiga, T.; Tomizawa, G.; Tatsuta, R.; Mieno, H. The max-min Delphi method and fuzzy Delphi method via fuzzy integration. *Fuzzy Sets Syst.* **1993**, *55*, 241–253. [[CrossRef](#)]

33. Mullen, P.M. Delphi: Myths and reality. *J. Health Organ. Manag.* **2003**, *17*, 37–52. [[CrossRef](#)]
34. Goodarzi, Z.; Abbasi, E.; Farhadian, H. Achieving consensus Deal with Methodological Issues in the Delphi technique. *Int. J. Agric. Manag. Dev.* **2018**, *8*, 219–230.
35. Jahangiri, M.; Molaefifar, H.; Rajabi, F.; Banaee, S. Occupational stressors among farmers in Iran using fuzzy multiple criteria decision-making methods. *J. Agromedicine* **2020**, *25*, 28–37. [[CrossRef](#)] [[PubMed](#)]
36. Rampasso, I.S.; Quelhas, O.L.; Anholon, R.; Silva, D.A.; Pontes, A.T.; Miranda, J.D.; Dias, J.O. The Bioeconomy in emerging economies: A study of the critical success factors based on Life Cycle Assessment and Delphi and Fuzzy-Delphi methods. *Int. J. Life Cycle Assess.* **2021**, *26*, 1254–1266. [[CrossRef](#)]
37. Florek, M.; Gazda, J. Traditional food products—Between place marketing, economic importance and sustainable development. *Sustainability* **2021**, *13*, 1277. [[CrossRef](#)]
38. Suárez-Ortega, M.; Gálvez-García, R. Motivations and decisive factors in women’s entrepreneurship. A gender perspective in education and professional guidance. *Procedia Soc. Behav. Sci.* **2017**, *237*, 1265–1271. [[CrossRef](#)]
39. Moscatelli, S.; Gamboni, M.; Dernini, S.; Capone, R.; El Bilali, H.; Bottalico, F.; Debs, P.; Cardone, G. Exploring the socio-cultural sustainability of traditional and typical agro-food products: Case study of Apulia Region, South-eastern Italy. *J. Food Nutr. Res.* **2017**, *5*, 6–14.
40. Almansouri, M.; Verkerk, R.; Fogliano, V.; Luning, P.A. Exploration of heritage food concept. *Trends Food Sci. Technol.* **2021**, *111*, 790–797. [[CrossRef](#)]
41. Comrey, A.L. Factor-analytic methods of scale development in personality and clinical psychology. *J. Consult. Clin. Psychol.* **1988**, *56*, 754–761. [[CrossRef](#)]
42. Lee, E.S.; Li, R.L. Comparison of fuzzy numbers based on the probability measure of fuzzy events. *Comput. Math. Appl.* **1988**, *15*, 87–96. [[CrossRef](#)]
43. Wu, F.G.; Lee, Y.J.; Lin, M.C. Using the fuzzy analytic hierarchy process on optimum spatial allocation. *Int. J. Ind. Ergon.* **2004**, *33*, 553–569. [[CrossRef](#)]
44. Nor, N.M.; Sharif, M.S.M.; Zahari, M.S.M.; Salleh, H.M.; Isha, N.; Muhammad, R. The transmission modes of Malay traditional food knowledge within generations. *Procedia Soc. Behav. Sci.* **2012**, *50*, 79–88. [[CrossRef](#)]
45. Raji, M.N.A.; Ab Karim, S.; Ishak, F.A.C.; Arshad, M.M. Past and present practices of the Malay food heritage and culture in Malaysia. *J. Ethn. Foods* **2017**, *4*, 221–231. [[CrossRef](#)]