THE SELECTION OF OKRA SUPPLIERS FOR EXPORT TO JAPAN BY APPLIED AN ANALYTICAL HIERARCHY PROCESS TECHNIQUE A CASE STUDY: ABC COMPANY, PHOTHARAM, RATCHABURI PROVINCE

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ABSTRACT

Abstract—This research aimed to study causes of study the solutions of supply chain in okra business for export to Japan, case study of ABC Copany, Photharam District, Ratchaburi Province in order to study all of factors that affect to select okra for export to Japan of from Ratchaburi Province. And then selected the district area of okra growers qualified for export to Japan, a case study of ABC Company, Photharam District, Ratchaburi Province. From the research, it was found that the factors for selecting okra for exporting to Japan consisting of 5 factors: 1. A pod must length around 8-11.5 cm. 2. A pod straight, have not bent and look abnormal. 3. A pod must be fresh green. 4. A pod must be pentagonal 5. A pod without of defects that caused of diseases and insects. The nature of this decision usually is complex and unstructured. Management science techniques might be helpful tools for these kinds of decision-making problems. The aim of this paper is to use fuzzy analytic hierarchy process (AHP) to select the best district area of okra providing the most satisfaction for the criteria determined.The managers of a ABC Company, Photharam District, Ratchaburi Province established in Thailand were interviewed and the most important criteria taken into account by the managers while they were selecting district area of okra were determined by a questionnaire. The fuzzy AHP was used to compare these area The computational results show that, Don Tum District 0.5730, Kamphaeng Saen District 0.3150 and Bang Len District 0.1120

Keywords—Okra, Analytic Hierarchy Process, Selection of factors, Export.

INTRODUCTION

Okra is a native plant of Thailand that is easy to grow throughout the year. It is also one of the most important export vegetables in Thailand as it is a nutritious vegetable that is widely popular in many countries. Japanese people are very fond of consuming okra because of its medicinal value. Statistical data on okra exports collected by the One Stop Export Service Center found that Japan is a country that imports okra up to 8,974 tons per year, worth 302 million baht. It is considered an important crop. From data on okra exports in 1997-1999 of the Agricultural Information Center. Office of Agricultural Economics With cooperation from the Customs Department, in 1999, the largest regular customer who bought frozen okra was Japan, volume 2,927 tons, valued at 194.8 million baht, or 97.6% and 96.8% of total export volume and value. In order, followed by Hong Kong 62 tons, 5.7 million baht, United Kingdom 5.7 tons, 0.5 million baht, France 4.8 tons, 7.2 thousand baht, Belgium 300 kg. Between November and June Especially during the months of February to May need a lot. Because in Japan, the weather is very cold, resulting in the inability to cultivate okra and the production cost is high. Therefore, okra must be imported. The demand for okra from Thailand is therefore exported throughout the year, with varying amounts in varying amounts from month to month.

ABC Company in Nakhon Pathom Province Is a company that exports 100% okra to foreign countries by exporting only to Japan, not exporting to the country. by buying green okra from farmers in Mueang District Nakhon Pathom Province The problem that the company encountered was that the quality of the products did not meet the needs of the Japanese market. This is due to the period from January to March when the weather is cold. As a result, okra grows slower and there is a problem of insufficient okra for export. when the productivity has decreased resulting in increased demand lead to loss of business opportunities Therefore, the researcher hopes to know processes and problems in the procurement of okra Including guidelines for purchasing green okra.

Therefore, the research group is interested in solving the problem of procuring more okra. To reduce the loss of opportunities for entrepreneurs and is information for those who are interested in studying about the factors in the selection of okra.

LITERATURE REVIEWS

1. AHP (Analytic Hierarchy Process)

Techniques to support decision making Multi Criteria Decision Making is another popular method used for assessment. Analysis for decision making in various ways, for example, in the work of Kengpol (2004) applied AHP technique to model transportation problems. and investment analysis To help solve the problem of choosing a distribution center location. by comparing the locations of 2 distribution centers in suburban Bangkok under the truck transport legislation or the work of Thiengburanathum, et al. (2006) that has applied the AHP method to assess the transport route from Kun Ming China to Bangkok This method can indicate the importance of the route from Kunming to Bangkok. that it is a new way to connect the economic centers of the two countries, namely Thailand and Yunnan Province, China In addition to the AHP method, there are many other decision-making methods used in the decision-making process. This is evident from several studies of large-scale project decisions. Many techniques will be used to help make decisions. Analytical methods such as Ozcan T, et al. (2011) have studied the selection of warehouse space by comparing different methods. In multi-criteria decision-making principles The methods used in this study were AHP, TOPSIS, ELECTRE and Gray. In the first stage of the study, theories of each method were compared. Then choose the location to set up the warehouse by AHP. TOPSIS, ELECTRE and Gray methods and bring the analysis results to compare. The best alternative is then selected, and a study by Milan and Aura (2002) applied three multi-criteria decision-making approaches to solve the problem of selecting a new aviation hub for an EU airport. Assigned to carry out operations related to air transportation business The three analytical methods for decision making are SAW (Simple Additive Weighting Method), TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) and AHP (Analytic Hierarchy Process). Preliminary selection of alternative airport groups by the criteria used will determine the efficiency of alternative airports. This corresponds to the problem for people with decision-making responsibilities, or in the work of li Y, et al. (2011), the logistics center was selected using the Fuzzy Set principle and the TOPSIS method to select the optimal location of the logistics center. logistics hub In this study, the AFS (Axiomatic Fuzzy Set) principle was used to evaluate the efficiency of the logistics center area and the TOPSIS method was used to analyze the selection of suitable locations. Chen T. C. (2001) applied the Fuzzy principle. In selecting the location of distribution centers, Chou Y. S., et al. (2008) studied the use of fuzzy principles to determine the weight of location selection decisions or considerations in selecting suitable areas as well. This can be seen from many studies that use techniques to support decision making in Multi Criteria Decision Making for analysis, such as the work of Nantakan Konthongkam (2006) that uses a hierarchical analysis technique to Selection of logistics service providers No. 3 or in the work of Patcharee Nimsrikul (2009) mentioned in the literature review on performance assessment and development of logistics performance indicators. rags 4 methods of decision support were used: TOPSIS, ELECTRE, PROMETHEE and AHP methods in considering the selection of suitable provinces as logistics hubs for goods transportation along the Northern Economic Corridor. under and east-west According to the guidelines of the Asian Development Bank (ADB), Apiradee Soravisut (2016) studied the decision to send emergency patients to hospitals (Emergency Patient Assignment) for treatment. Here, a multi-criteria decision-making principle for the allocation of emergency patients to hospitals is discussed. The most popular tool used in multicriteria decision analysis is the multicriteria decision model. Multi-criteria decision making (MCDM) The MCDM method has become very popular in recent years and is often applied in many fields, especially non-technical ones, and Mohamed Hanine et al. 2016) was used to analyze the structure of the ETL software selection problem and weighted according to the selected criteria. The TOPSIS technique was then used to calculate alternative scores. It also mentions that these methods can also have a wide range of applications. A previous review of the paper showed that although there are many effective assessment methods to handle decision-making for different situations, they are not. But there are not many articles on the ECS system in the decision to refer patients to hospitals. ECS management issues such as overcrowded emergency rooms Risks arising from adverse events, lack of expert personnel Limited resources These criteria have a significant influence on the decision-making process in collecting the results. which will be considered in the evaluation criteria system, quantitative

and qualitative criteria to bring these problematic factors as criteria That led to methods and tests to evaluate the feasibility of the best alternatives.

METHODS

This research was a qualitative research that used in-depth interview and documentary search methods for data collection and calculation. Analytical Hierarchy Process (AHP: Analytical Hierarchy Process) to find conclusions and appropriate alternatives.

Decision making refers to the process of selecting an action that has many options. and the results are different. In making this decision there is a process that starts with recognizing the problem. and the final step will lead to rational decision A selection that requires careful consideration leads to satisfactory results. Does not cause problems later It's a quality decision and It is acceptable to different people. Administrative decision-making involves planning that requires decisions to be made before plans are formulated. to put into practice It involves choosing or not choosing. approve or disapprove practice or not practice or establishing rules The decision making process consists of 5 steps:

Step 1 Organize the hierarchy to solve decision-making problems

Step 2: Fill in the input data in the Pairwise Comparison Matrix to find the comparison weight between criteria.

Step 3 Estimating the weight using the Geometric Mean method.

Step 4. Configure the overall weights of the decision components.

Step 5 Checking data consistency (Consistency) in finding the consistency of the data. If the obtained CR value is greater than 0.1, then the obtained data is invalid. If the CR value is less than 0.1, then the data is correct. The consistency ratio can be obtained from the following equation:

where CR = the corresponding proportional value
CI = Conformity Index
RI = sampling index
The Conformity Index (CI) can be obtained from

where n = size of the threshold number
and random index (Random Index, RI).

RESULTS

ROM THE RESEARCH, IT WAS FOUND THAT THE FACTORS FOR SELECTING OKRA FOR EXPORTING TO JAPAN CONSISTING OF 5 FACTORS:

1. A POD MUST LENGTH AROUND 8-11.5 CM.
2. A POD STRAIGHT, HAVE NOT BENT AND LOOK ABNORMAL.
3. A POD MUST BE FRESH GREEN.
4. A POD MUST BE PENTAGONAL
5. A POD WITHOUT OF DEFECTS THAT CAUSED OF DISEASES AND INSECTS.

THE RESULTS OBTAINED FROM THE AHP CALCULATION AND THE NORMALIZATION AND EIGENVECTOR VALUES WERE OBTAINED. THE WEIGHTS THAT WERE RANKED CORRECTLY HERE WERE POD LENGTH 8-11.5 CM. FREE FROM BLEMISHES CAUSED BY DISEASE AND INSECTS THE SHEATH MUST BE PENTAGONAL. AND THE COLOR OF THE PODS MUST BE DARK GREEN, RESPECTIVELY

TABLE 1 TABLE OF THE PRIORITY OF THE FACTORS.

Normalize and Eigenvector	A POD MUST BE FRESH GREEN.	A POD MUST BE PENTAGONAL	A POD MUST LENGTH AROUND 8-11.5 CM.	A POD STRAIGHT, HAVE NOT BENT AND LOOK ABNORMAL.	A POD WITHOUT OF DEFECTS THAT CAUSED OF DISEASES AND INSECTS.		Eigenvector	
A POD MUST BE FRESH GREEN.	0.056	0.023	0.073	0.036	0.086	0.274	0.055	5

Normalize and Eigenvector	A POD MUST BE FRESH GREEN.	A POD MUST BE PENTAGONAL	A POD MUST LENGTH AROUND 8-11.5 CM.	A POD STRAIGHT, HAVE NOT BENT AND LOOK ABNORMAL.	A POD WITHOUT OF DEFECTS THAT CAUSED OF DISEASES AND INSECTS.		Eigenvector	
A POD MUST BE PENTAGONAL	0.167	0.070	0.073	0.060	0.057	0.427	0.085	4
A POD MUST LENGTH AROUND 8-11.5 CM.	0.389	0.488	0.512	0.542	0.514	2.446	0.489	1
A POD STRAIGHT, HAVE NOT BENT AND LOOK ABNORMAL.	0.278	0.209	0.171	0.181	0.171	1.010	0.202	2
A POD WITHOUT OF DEFECTS THAT CAUSED OF DISEASES AND INSECTS.	0.111	0.209	0.171	0.181	0.171	0.843	0.169	3
sum	1.000	1.000	1.000	1.000	1.000	5.000	1.000	

TABLE 2 THE TABLE SHOWS THE PRIORITY OF THE ALTERNATIVES.

	A POD MUST BE FRESH GREEN.	A POD MUST BE PENTAGONAL	A POD MUST LENGTH AROUND 8-11.5 CM.	A POD STRAIGHT, HAVE NOT BENT AND LOOK ABNORMAL.	A POD WITHOUT OF DEFECTS THAT CAUSED OF DISEASES AND INSECTS.	Weight	
Eigenvector	0.055	0.085	0.489	0.202	0.169	Eigenvector	
BANG LEN DISTRICT	0.264	0.122	0.106	0.115	0.074	0.112	11.20 %
KAMPHAENG SAEN DISTRICT	0.407	0.413	0.260	0.405	0.283	0.315	31.50 %
DON TUM DISTRICT	0.329	0.466	0.633	0.480	0.643	0.573	57.30 %

RESULTS FROM AHP CALCULATIONS. SELECTION OF DISTRICT AREAS OF OKRA GROWERS QUALIFIED FOR EXPORT TO JAPAN. IT CAN BE CONCLUDED THAT THE DISTRICTS OF OKRA GROWERS ARE QUALIFIED FOR EXPORT TO JAPAN. THE MOST SUITABLE FROM ALL SCORES WAS DON TUM DISTRICT WITH A WEIGHT OF SIGNIFICANCE EQUAL TO 0.57 OR 57.30%, FOLLOWED BY KAMPHAENG SAEN DISTRICT. WITH A WEIGHT OF SIGNIFICANCE EQUAL TO 0.315 OR 31.50% AND THE THIRD RANK IS BANG LEN DISTRICT WITH A WEIGHT OF IMPORTANCE EQUAL TO 0.112 OR 11.20%

CONCLUSION AND FUTURE WORK

This research has applied the analytical hierarchy process (AHP: Analytical Hierarchy Process). The purpose of this study was to study the supply chain problems in the okra business for export to Japan of Crophy Co., Ltd. and to study the factors affecting the selection of okra for export to Japan. Including to select the district area of okra growers that are qualified to export to Japan, it was found that Crofi Co., Ltd. had problems in the upstream process, namely insufficient production. Therefore, there are 5 factors for buying okra for export to Japan: 1. The length of the pods is 8-11.5 cm. 3. The color of the pods must be dark green. 4. The pod's square must be pentagonal. and 5. without defects caused by diseases and insects and consists of 3 alternative districts for okra growers who are qualified to export to Japan: Bang Len District, Kamphaeng Saen District, and Don Tum District Analytical Hierarchy Process (AHP: Analytical Hierarchy Process) was then calculated to compare the priorities of factors and analyze which alternative factors would have the highest priority in order to draw conclusions and appropriate alternatives.

The results showed that Districts of okra growers qualified for export to Japan The most suitable from all scores was Don Tum District with a weight of significance equal to 0.573 or 57.30%, followed by Kamphaeng Saen District. with a weight of significance equal to 0.315 or 31.50% and the third rank is Bang Len District with a weight of importance equal to 0.112 or 11.20%

suggestion

In this research, Analytical Hierarchy Process (AHP) was used to select districts of okra growers that are qualified for export to Japan. The study population was Crophy Co., Ltd., an okra export business to Japan, Photharam District, Ratchaburi Province. only not distributed to farmers in other provinces that export okra such as Kanchanaburi Suphanburi Province, etc. The next study should analyze other factors that will occur in choosing okra suppliers, such as the cost of transportation. Supplier Trust Factors and the factor of punctuality in exporting goods In bringing this research to be applied in other works Must be adjusted in the hierarchical structure of (AHP: Analytical Hierarchy Process) to be consistent with the criteria used in decision making.

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