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A Study on the Export Priority Indicators of Rice Processed Food for Export Business

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Abstract

As the trade among the countries increases, domestic agriculture is facing a crisis. Especially domestic rice industry is suffering from the rice market opening problem and the domestic rice industry itself. As a counter measure against this, despite the promotion of the rice processing food industry, the export of rice processed food has decreased by an average annual rate of 12.3% since 2011 due to the lack of customized export strategy, such as low price competitiveness, insufficient quality and brand management. As a measure, we selected indicators to prioritize establishment of export strategy of rice processed food business and used AHP methodology to draw the weight for each indicators. The selection of export strategy prioritization indicator was based on the marketing mix theory, various previous research reviews and expert consulting. Five higher level indicators and nineteen detailed indicators were derived, and a weighted value of them was analyzed using a professional package. As a result, the relative importance of higher level indicators was 45.5% for product differentiation, 18.4% for management competence, 13.0% for export infrastructure, 12.0% for product pricing, and 11.1% for product distribution. The relative importance of the lower level indicators was 17.3% for product safety, 15.3% for product quality, 9.1% for management expertise, and 7.0% for product brand. This result is expected to be used as export strategy indicators of rice processed food export business.

Keywords: *flourishing industrialization, food consumption, processed foods*

1. Introduction

As the trade among countries has become widespread, shown by the FTAAP(Free Trade Area of the Asia-Pacific), TPP(Trans-Pacific Partnership, and the RCEP(Regional Comprehensive Economic Partnership) series of multilateral trade agreements. The increase of trade among countries leads to imports of foreign agricultural products. As a result, domestic agricultural products are losing price competitiveness due to cheaper imports.. For this reason, the prices of domestic agricultural products are becoming unstable, leading to increased income instability of farm households and reduced consumption of these (domestic)products.. To solve this problem, the government has actively promoted the export of high quality domestic agricultural products (fresh agricultural produce, and processed food products) as part of the food industry promotion policy. As a result, the size of exports of agricultural products has been on an increase of 9.75% and $ 6.1 annual average . However, considering the top three exports for 2012~2015, the use of domestic agricultural products such as cigarettes, beverages, and coffee preparations is unclear, and items are also limited. Looking at the domestic rice industry, it is gradually losing its price competitiveness due to the increase of imports

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resulting from opening of the market . In addition, the westernized eating habits are also incurring a double reduction in consumption every year, and the financial burden to the government for paying rice direct debts increases due to overproduction . The necessity of exporting and revitalizing rice processed food is emerging as a way to solve the multifaceted problems of the domestic rice industry.. As a countermeasure to this, the government has been promoting the rice processing food industry by announcing the 'Five-Year Basic Plan on Fostering Rice Processing Food Industry and Promoting Rice Utilization' in 2014. However, due to lack of export strategies such as low price competitiveness, lack of quality and brand management, lack of infrastructure and small size of management , exports of rice processed food are decreasing . Therefore, in order to revitalize the rice processing food industry, strategic prioritization is needed and a strategic policy approach is necessary. However, management-oriented research to activate export of processed food in rice is still insignificant. Therefore, this study aims to analyze and prioritize the export strategy priorities of exported rice processed food by conducting research with emphasis on export and management of rice processed food.

2. Literature review

The prior studies are as follows; Kim, Chung-sil et al.(2004) conducted an AHP survey on export management and analyzed the characteristics and priorities of traditional products for export. As a result, the importance of product characteristics, price, product design, alcohol content, and packaging unit were analyzed in order. It suggested that government agencies and related industries arevital as basic information source for overseas market development. Kim Jong-shik(2008) pointed out that export marketing is mainly focused on export products and promotion, and focused on the second most important price in export marketing decision following product quality. This study suggests that acquisition of export price information should be considered from a strategic point of view, unlike previous studies that set prices at the cost or market level. Maeng, Bu-Young(2011) analyzed the relationship between market environment, firm characteristics, marketing mix factors and marketing performance of export Small-Medium Enterprises (SMEs), suggesting optimal marketing strategies and suggesting efficiency and policy implications of export support system. Im, Joon-hyung(2013) analyzed the factors of export-oriented social enterprise using the traditional marketing mix theory(4Ps). Ha, Ji-Young(2017) suggested the competitiveness of the agricultural export market increased due to technological development. Although the studies of the existing production-oriented viewpoint have been variously carried out, studies on distribution and export activation have pointed out that the weak point, export information and know-how are managed separately. Therefore, we prioritize the export information of Smart Farm agricultural products by emphasizing collecting and providing information collectively. Hwang, Gyoung-young et al.(2017) pointed out the problems of agriculture in Korea and emphasized the importance of government support policy as a solution, and analyzed the importance of government support policy by suggesting that 6th industrialization of agriculture can increase the effectiveness of export activation.

Table 1. preliminary research summary

Author	Subject	Major research contents	Methodology
Kim et al (2004)	Product Characteristics of Traditional.	Analysis of the Characteristics of Korean Traditional Goods for Export.	AHP methodology
kim (2008)	Export export strategy of export companies.	Focus on export price determination in export marketing.	clustering analysis
Maeng (2011)	Export small and medium enterprises and export support system.	Analysis of export support systems as an additional alternative of 4ps.	covariance structure analysis, multi-roup analysis
Im (2013)	Export enterpriseization of social enterprises.	An Analysis of the Factors of Export Enterpriseization Using Marketing Mix.	marketing mix(5ps), AHP methodology

Ha (2017)	Smart Farm Export Information.	Demand survey and prioritization of export information.	delphi technique, AHP methodology
Hwang et al (2017)	A Study on Export Activation through Sixth Industrialization	Analysis of Support Policy for Export Revitalization of Sixth Industry in Agriculture.	AHP methodology

3. Analysis model and data collection

3.1 Rice processed food for export business strategy indicator

The draft was made based on 4Ps and 3Ps, a literature review and marketing mix strategy. After that, interview reseach was conducted with experts of different institutes , one internal expert conference, four agronomic scholars, and two institutional experts. The council discussed realistic characteristics of high and detailed indicators, revised intuitive expressions, and simplified the indicators. Finally, the high and low indicators derived by reflecting the feedback were finally determined and layered. The definition of each indicator is as follows.<Table 2>. And then the questionnaire was administered to six internal and external experts who constituted the council and data was collected.

Table 2. description of high level and detailed indicators

High-level indicator	detailed indicators	description
export product differentiation (4)	Packaging & Design	It includes the packaging material, the capacity, the aesthetic characteristics and the indication of the product
	Brand of product	The name of the product, which distinguishes it from other products, and the symbol
	Product quality	The taste and flavor of the product reflects the consumer's taste as the main characteristic
	Product safety	It is a product that is free from the harmful subtances that do exisit in the original raw materials and others harmful subtances can occur during manufacturing, processing and distribution stages. It guarantees safety and health when ingested
export product pricing (4)	Market centered strategy	Determine the appropriate price for each importing country considering the price of the competitor(the domestic commodity) in each country.
	Consumer-oriented strategy	the preference of the consumption layer of the target export country , the age range, and other price determinants.
	Cost-centered strategy for products	Determine the price by adding a certain profit to the cost of the export product
	Price bargaining power with importers	Price negotiation with importers
export product distribution path (4)	Directly in the local market	The export business contacts the local distributors in the target country and sells the products
	Use of domestic corporations	The export business sells its products through external companies(such as trading firms, export agents, export unions, and foreign traders who operate in Korea)
	Overseas corporation use	Sell products through locally established corporations in the target export country
	Local production and sales	The export business produces and sells products with production facilities and sales networks in the target countries

product export infrastructure (4)	Policy and financial support	Support for policies and finances for export of government agencies (including municipalities)
	Information on overseas market laws and regulations	Information on the market, quarantine and statute of the exporting country
	Domestic and foreign buyer information	Information on export business(clearance, marketing) of domestic and foreign buyers
	Production base of products	Internal competence of the company to produce export products (factory location, production environment and facilities, etc.)
business executive competency (3)	Management expertise	Know-how about export, ability to develop and sell products, expertise of management with marketing ability
	Management experience	Management experience overseas export experience
	Management willingness to export	Management's willingness to open new markets

3.2 Application of AHP Analysis Model

AHP analysis was designed by L. Saaty to systematically score and evaluate the relative preferences of various alternatives in the case of multiple evaluation criteria. It evaluates objective factors, subjective factors, qualitative factors and qualitative factors in evaluating and comparing the preferences of alternatives. This analysis layered each subdivision under higher metrics to achieve Goal and then weights the weighted value of the higher metrics of the higher hierarchy. And then, the weighted estimates of the higher indicators are integrated with the evaluated importance of the detailed indicators, and then the priorities are determined.

Step 1: Layering the surface
To achieve the goal of 'exported rice processed food exporting business management index', the index that influences the target was selected by hierarchy of high and detailed indicators through literature review and expert consultation. After setting goals, the hierarchies were organized into a number of items, which are indicators that affect the achievement of the goal. These indicators have specific meanings for achieving the goal, and the lower the hierarchy, the more the final priority is determined. The highest level is the difference of export product, export product pricing strategy, export product distribution path, product export infrastructure and managerial competence. The detailed indicators of the lower level of each upper tier include 19 different indicators such as export product differentiation, export product pricing strategy, export product distribution channel, product export infrastructure 4, and business management competency 3.

Step 2: Pair Comparison
We compared the importance of 9 score to determine the priorities of the top indicators and the detailed indicators for achieving the goals through a pairwise comparison of the importance of the evaluation indicators within the same hierarchy.

Step 3: Estimating the weight
In order to estimate the weights, each indicator is composed of a matrices that are evaluated for importance through pair comparison. And then weights of the indicators to be compared are obtained for each hierarchy. In other words, we used the significance of the indicators obtained from the two-stage pair comparison to estimate the weight of each indicator. The problem here is the consistency of the response. In consistency, there is 'coherence' and 'coherence'. In AHP analysis, only two objects are compared at a time, and individual's

subjective information is also used, so perfect 'coherent coherence' is not established. Therefore, only 'numerical consistency' is established. What is important is the Consistency Ratio(CR), an index that can determine consistency. If the coherence of the expert answers used in the AHP model design is perfect, Saaty says that the value of CR is 0, and conversely, if there is a problem with consistency, it becomes larger than 0. Therefore, the CR value is larger than zero because there is a limit to the decision making ability even in the expert response. However, if the value of CR is too large, it should be considered that there is a considerable problem in the consistency of the decision, so the exclusion or inconsistency factor should be found and corrected or re-examined. In general, the value of CR is considered to be consistent if the reference value of CR is less than 0.1 through pair comparison in the respondent's survey, but in some exploratory studies that have not been attempted in the past, the reference value of CR may be relaxed to 0.15 or 0.2. In this study, we selected the index by deriving common factors through review of the previous research, and if the reference value of CR exceeded 0.1, we corrected the inconsistency factor according to the 'topical consistency' or ensured the consistency of CR through reanalysis.

Step 4: Relative importance synthesis and priorities

In order to achieve the goal, the total importance matrix of detailed indicators under each higher indicator was calculated by combining the weights of upper and lower indicators to determine priorities. The aggregate importance of the indicators in the second tier of detailed indicators for achieving the goal was calculated by the following equation.

$$C[1,k] = \prod_{i=2}^{k} B_i$$

$C[1,k]$: The aggregate weighting of the k-th layer index for the first tier

B_i: $n-1 \times n_i$ matrix including a row constituting an estimated weight vector

$B_i n_i$: Number of Indices in the i-th tier

In this study, we prioritize the importance of indicators in order to find out how the high and low indicators affect the export strategy index of rice processed food export business

4. Analysis results

4.1 Relative weights among high level indicators

The five indicators that make up the upper indicators consisted of export product differentiation, export product pricing, export product distribution channel, product export infrastructure and business executive competency. The results showed that the difference of export products(45.5%) was the most important, followed by the management competency(18.4%), product export infrastructure (13.0%), export product pricing(12.0%), export product distribution channel(11.1%). The coherence index, CI, was derived as 0.01, and the coherence ratio, CR, was found to be a reasonable coherence of 0.00.<Table 3>. While the differentiation of export products and management competence are indicators that are influenced by the internal factors of the management, the lower three indicators are influenced by external factors. This result implys that internal capacity enhancement is a priority for export of rice processed food business.

Table 3. relative weighting and ranking of higher indicators

High-level indicator	weight	ranking
Differentiation of export products	0.455	1
Pricing of export products	0.120	4
Export product distribution channels	0.111	5
Infrastructure of product export	0.130	3
Managerial competence	0.184	2
Sum	1.000	-
CI = 0.01, CR = 0.01		

4.2 Relative weights among detailed indicators

4.2.1 Relative weight of differentiated product specific indicators

The four indicators that constitute the differentiability indicators of export products are composed of packaging and design, product brand, product quality and product safety. The results showed that the stability of product(17.3%) was the most important, followed by product quality(15.3%), product brand(7.0%) and packaging and design(5.9%).<Table 4>. Product safety(17.3%) and product quality(15.3%) were similar and product safety was slightly higher. This seems to reflect the characteristics that are very sensitive to safety due to the nature of the food, and it can be interpreted that the emphasis should be placed on the safety maintenance and management of the product.

Table 4. relative weighting and ranking of product differentiation indicators

detailed indicators	weight	ranking
Packaging & Design	0.059	4
Brand of product	0.070	3
Product quality	0.153	2
Product safety	0.173	1
Sum	0.455	-
CI = 0.01, CR = 0.01		

4.2.2 Relative weight between pricing decision indicators of exported products

The four indicators constituting the pricing indicators of export products consisted of market(competitive price), consumer information, product cost, and importer price negotiation power. As a result, import price negotiating power(4.4%) was the most important, followed by market(3.3%), product cost(2.2%) and consumer information.<Table 5>. The highest price negotiating power of importers(4.4%) can be seen as a result of importers' pricing power in real exports, which can be regarded as an important index to be considered in export activation.

Table 5. relative weighting and ranking of product pricing indicators

detailed indicators	weight	ranking
Market centered strategy	0.033	2
Consumer-oriented strategy.	0.021	4

Cost-centered strategy for products.	0.022	3
Price bargaining power with importers.	0.044	1
Sum	0.120	-

CI = 0.01, CR = 0.01

4.2.3 Relative weights among the distribution channel specific indicators of export products

The four indicators that constitute the distribution channels of export products consisted of direct transactions in the local market, domestic corporations, overseas corporations and local production and sales. As a result, it was found that the use of domestic corporations(4.7%) was the most important, followed by the use of overseas corporations(2.7%), direct market transactions(2.6%) and local production and sales(1.1%). <Table 6>. The use of domestic corporations is relatively high compared to other indicators, which means that domestic rice processing food exports industry is still small and domestic corporations are more effective in communication problems than foreign corporations when entering overseas markets. And the favorability of the management body to cooperate with the domestic corporation seems to have influenced and the use of the domestic corporation shows that it is a more important index to activate the export.

Table 6. relative weighting and ranking of product distribution channels indicators

detailed indicators	weight	ranking
Directly in the local market.	0.026	3
Use of domestic corporations.	0.047	1
Overseas corporation use	0.027	2
Local production and sales.	0.011	4
Sum	0.111	-

CI = 0.02, CR = 0.02

4.2.4 Relative weights among infrastructure indicators of product exports

The four indicators that make up the infrastructure index of product exports consist of the policy and financial support of the government, information on overseas market laws and regulations, domestic & foreign buyer information and production base of products. As a result, government policy & financial support(4.4%) was the most important, followed by product base(4.1%), domestic & overseas buyer information(2.3%) and market information(2.2%).<Table 7>. The government's financial support and product-based indicators are the most important indicators of the export and the others is the scale of rice processing food industry itself. It implied that expanding the size of the rice processing food industry is necessary rather than the export-oriented management.

Table 7. relative weighting and ranking of product export infrastructure indicators

detailed indicators	weight	ranking
Policy and financial support.	0.044	1
Information on overseas market laws and regulations	0.022	4
Domestic and foreign buyer information.	0.023	3
Production base of products.	0.041	2
Sum	0.130	-

CI = 0.01, CR = 0.01

4.2.5 Relative Weight between Management Capability Detailed Indicators

The three indicators constituting the managerial competency indicator consisted of management expertise, managerial experience, and willingness to export management. As a result, management expertise(9.1%) was the most important, followed by management experience(5.4%) and management commitment(3.9%). <Table 8>. Management expertise is about twice as high as the rest of the indicators. It suggested that the export of rice processed food should be preceded by subjective experience of the management and export expertise.

Table 8. relative weighting and ranking of managerial capability indicators

detailed indicators	weight	ranking
Management expertise.	0.091	1
Management experience.	0.054	2
Management willingness to export.	0.039	3
Sum	0.184	-

CI = 0.01, CR = 0.01

4.2.6 Relative weights and rankings of all detailed indicators

Priority is derived for all 19 indicators. As a result, product safety(17.3%) is the most important index in the overall index, followed by product quality(15.3%), management expertise(9.1%),) and packaging & design(5.9%). Indicators showing the least importance were consumer information(2.1%) and local production and sales(1.1%).<Table 9>. The top two indicators are relatively high in terms of product safety(17.3%) and product quality(15.3%), indicating that products are among the most important for revitalizing export of rice processed food.

Table 9. relative weighting and ranking of all detailed indicators

detailed indicators	weight	ranking	detailed indicators	weight	ranking
Product safety	0.173	1	Management willingness to export.	0.039	11
Product quality	0.153	2	Market centered strategy	0.033	12
Management expertise.	0.091	3	Overseas corporation use	0.027	13
Brand of product	0.070	4	Local production and sales.	0.026	14
Packaging & Design	0.059	5	Domestic and foreign buyer information.	0.023	15
Management experience.	0.054	6	Cost-centered strategy for products.	0.022	16
Use of domestic corporations.	0.047	7	Information on overseas market laws and regulations	0.022	17
Price bargaining power with importers.	0.044	8	Consumer-oriented strategy.	0.021	18
Policy and financial support.	0.044	8	Local production and sales.	0.011	19
Production base of products.	0.041	10			

CI = 0.01, CR = 0.01

5. Conclusion

Domestic agriculture faces a crisis as international trade increases. The domestic rice industry is no exception, and it is getting worse because of the risk of opening the rice market in addition to the consumption amount that decreases every year. Further more, financial demands for overproduction and overpayment of rice are

increasing, and countermeasures for revitalization of rice processed food industry are being promoted to solve this problem. This study focused on export promotion of rice processed food and rice processed food business. There have been various studies on the export of agricultural products and the export strategy of management. However, this study focused on the management-oriented research for rice processed food export business and introduced the marketing mix theory and conducted AHP analysis. As a result of the analysis, it was found that the difference of export products(45.5%) and the management competency(18.4%) were relatively important among the five indicators for promoting export of rice processed food. On the other hand, prices of export products(12.0%), distribution channels of export products(11.1%), and product exports(13.0%) were relatively low. Indicators such as the difference in export products(45.5%) and management competence(18.4%), which are relatively high, are influenced by internal factors(export product differentiation, management competence) and external factors. The price of export products, their distribution channels, and the infrastructure of product exports indicating that internal capacity enhancement are a priority for export activation. The importance of product quality(15.3%) and product safety(17.3%) are shown in the differentiation index of exports by the relative weight of each sub-index according to higher rank in order of priority. It appeared as a detailed indicator. It seems that the importance of the safety of the product is considered to be slightly higher due to the characteristics of the food, and it should be emphasized on the safety and quality maintenance of the processed food of rice. The managerial expertise(9.1%) was the highest in the managerial competency detailed indicators. This suggests that managerial experience(5.4%) is higher than management 's willingness to export(3.9%), and management expertise should precede export promotion of rice processed food. The government's policy and financial support(4.4%) and product production base(4.1%) were the most important indicators of infrastructure exports. On the other hand, information on domestic and foreign buyers(2.3%) and information on foreign market laws(2.2%) were low. This can be divided into indicators related to exports(information on domestic and overseas buyer information, information on overseas market laws, etc.) and indicators on the scale of rice processed food industry(government policy, financial support, product production base). Suggesting that expansion of industry size is a priority. This can be divided into indicators related to exports(information on domestic and overseas buyer information, information on overseas market laws, etc.) and indicators on the scale of rice processed food industry(government policy, financial support, product production base) Suggesting that expansion of industry size is a priority. In the pricing decision indices of the export products, the importer's price negotiation power(4.4%) is the most important. The other three indicators are market importance(3.3%), product cost(2.2%) was relatively low. This is a result of the fact that importers' pricing rights are highly reflected and should be considered important in promoting exports. From the detailed indicators of the distribution channels of export products, Domestic corporate use(4.7%) was relatively higher than foreign corporations(2.7%), direct market transactions(2.6%) and local production and sales(1.1%). This indicates that the use of domestic corporations is a more important indicator for export activation, due to the fact that the size of the rice exported food industry is small and communication problems and cooperation with domestic corporations are favorable. Product safety and product quality are the most important indicators of relative weighting by overall detailed indicators, and products are the most important factor for exporting rice processed food. In this study, marketing mix was applied to the export of rice processed food according to the problem of domestic rice industry and the direction of policy government. Especially, it is meaningful to explore management-oriented export strategy. However, it is a limitation of this study because it is necessary to establish a different strategy for each exporting country as well as lack of specificization in field application. Further subdivision studies will be needed using the analyzed parameters.

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