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Identifying and ranking the factors affecting the different stages of green food industry development

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Abstract

The green food industry is important for the world as well as the country of Iran because it has more expectations for improving the rural economy. Research on the main influencing factor in the green food industry this paper uses systematic study methods to build research models and uses multi-criteria decision-making models to rank indicators. Unlike previous studies, this paper presents the life cycle of the industry and discusses the effects of influencing factors in different periods. In this research, a mixed method (mixed qualitative and quantitative method) with an exploratory approach using the tool development model has been used. By studying the theoretical foundations, a number of indicators have been identified and based on the poll among 15 experts in the green food industry in Tehran, a field study has been conducted. The data were analyzed through a pairwise comparison questionnaire with the help of Expert Choice software. The results of the ranking of the factors affecting the different stages of the development of the green food industry showed that, in the order of the components of the green supply chain, environmental commitment, green corporate identity, green technology management, green human resources management, organizational legitimacy and investment from the most and They are the least important in the group.

Keywords: Green food industry, influencing factor, life cycle, dynamic model.

Introduction

Today, environmental problems are increasingly prominent and are considered a serious threat to humans, and the issue of sustainable development has been widely discussed. Green food is attracting more attention due to its limitations in the use of fertilizers and pesticides for environmental compatibility (Cobb et al., 1999). Compared to traditional foods, green food emphasizes the harmonious coexistence between humans and nature in addition to effectiveness and efficiency, which is often considered as a superior system (Sofos, 2008).

Since 1990, the green food project has been launched in the world for more than 30 years, forming a complete industrial system from basic construction, product development to marketing. According to the data of the International Green Food Development Center, by 2021, the number of certified units in the green food industry in the same year reached 10,492 units, an increase of 2,417 units compared to 2020 and a 29.93% increase compared to the previous year. The number of effective standard units in the green food industry reached 23,493, which was an increase of 4,172 units compared to 2020, which was a 21.59% increase compared to the previous year. Furthermore, the domestic sales of the green food industry fluctuated from 2011 to 2021, and continued to grow after 2016. It reached $521.86 billion in 2021, an increase of $142.9 billion over 2020, which is an increase over the previous year. from 2.82%. Compared to conventional methods of agricultural production, the green food production model reduces the use of nitrogen fertilizers by 39%, reduces the intensity of pesticide use by 60%, and increases the content of soil organic matter by 17.6%.

The development of the green food industry not only protects the environmental environment and increases the quality of food, but also has greater expectations for the prosperity of the rural economy and the achievement of rural revitalization (Lin et al., 2009). However, the current green food industry still has shortcomings. For example, the production is not enough to meet the market demand, especially in the international market. The industrial structure should be further optimized. Products that can be certified by AA grade standards are not enough. Considering this issue, the aim of this article is to identify and rank the factors affecting the different stages of development of the green food industry.

Research literature

Consumer demand and politics have always been recognized as two important factors affecting the green food industry, and their effects have been confirmed by previous studies (Hsu et al., 2016; O'Mahony and Lobo, 2017).

Regarding consumer demand, previous studies have several influencing factors including income and price (Brilla, 2015; Ashman-Weitzel and Zielke, 2017), label (Granqvist et al., 2007; Cole et al., 2017), certification (Garcia). -Yi, 2015), environmental awareness (Cheung et al., 2015), and self-health awareness (Hai et al., 2013). The most research method is bibliometric analysis. For example, Kim et al. (2018) used a multilevel model to investigate the characteristics of US organic food consumers from 2010 to 2014. Barilla (2015) shows various aspects, such as distribution channel and pricing level, of the organic food industry through statistical analysis. Nasir and Karakaya (2014) identified factors that can promote the purchase of organic food through data fitting with the addition of control variables.

As for policy, its regulation can influence industrial development, especially improving public confidence in consumption (Geall and Ely, 2019). For example, Marshall (2000) analyzed the structure and technology of the organic food industry to illustrate the impact of policies. Larson et al. (2013a) compared and summarized several cases that revealed the role of government in determining the direction of development of the organic food industry. Lau et al. (2020) discussed the relationship between government supervision and industrial development based on game theory. Dogolina et al. (2018) assessed the effect of policy in the European organic food industry through principal component analysis and multiple regression.

Regarding the influencing factors in the green food industry, existing researches mainly use theoretical analysis or empirical testing to conduct research. From the external environment, market, technology, government involvement and policies are important influencing factors (Larson et al., 2013b; Huang et al., 2017). From a domestic perspective, recognition, price, household population structure, income, health awareness, knowledge, education level, consumer preferences and organic labels are important influencing factors (Singh and Verma, 2017; Wang Si et al., 2019; Liang and Lim, 2020). For example, Sun et al. (2021) conducted a study on the influencing factors of the green food industry using a geographic weighted model and found that regional economy, natural resource conditions, and environmental quality greatly affect the focus of the green food industry.

This paper finds some gaps to fill through literature review. First, most industries show a cyclical development path (Berner and Dorner, 2017), but few studies take this into account when finding the main influencing factors. More specifically, can one factor affect the green food industry throughout its life cycle? Or does the effect of this factor remain or change? Furthermore, bibliometric analysis is difficult to reveal the internal feedback and future trends of the green food industry.

Therefore, by combining the logistics model and the system dynamics model, this article found the main influencing factors in the green food industry and observed the change of their influence in different stages. Finally, this paper focuses on the impact of financial investment, which is always recognized as a significant factor.

Research methodology

In this research, a mixed method (mixed qualitative and quantitative method) with an exploratory approach is used, which is a tool development model, and this research is in such a way that in the qualitative part, the foundation data technique is used, and in the quantitative part, the factor analysis and modeling technique is used. Is. Mixed research method is a research approach in which a combination of quantitative and qualitative methods is used simultaneously. This method is also known as exploratory mixed research design in internal studies. The statistical population of the research includes academic experts and professors who have professional experience in the field of green food industry, and due to the limited size of the population to 15 people, the census was used and the entire population was considered as a statistical sample.

Finding

In this research, 7 main factors have been identified in order to prioritize the factors and indicators related to the different stages of development of the green food industry based on the hierarchical analysis process method, which is the matrix of paired comparisons of 15 decision makers as shown in Table (1). Pairwise comparisons of each index are presented in Table (1) and Figure (1). According to the table and figure, it is clear that the relationship between all sub-indices is two-way:

Table (1) matrix of primary pairwise comparisons

Indicators							
Corporate green identity	1						
Organizational legitimacy		1					
Environmental commitment			1				
investment				1			
Green management of human resources					1		
Green technology management						1	
Green supply chain							1

Figure (1) prioritization of the main indicators affecting the development of the green food industry

Table (2) prioritization of indicators affecting the development of the green food industry

priority	Weight	standard	row
3	0.149	Corporate green identity	1
6	0.130	Organizational legitimacy	2
2	0.161	Environmental commitment	3
7	0.110	investment	4
5	0.130	Green management of human resources	5
4	0.145	Green technology management	6
1	0.175	Green supply chain	7

According to the above table, it can be seen that according to the main weight obtained in the order of green supply chain components, environmental commitment, organizational green identity, green technology management, green human resources management, organizational legitimacy and investment are the most and least important in The group has On the other hand, considering that the inconsistency rate obtained is 0.09, which is smaller than the standard limit of 0.1, hence the above questionnaire was completed with high accuracy by the respondents.

Conclusions

The simulation results show that the scale of the company is the main influencing factor for the further development of the industry because the structure of green food companies at the country level is not reasonable. There are many small companies and few leading companies whose output value is low. The rapid rise of small firms has caused a further decline in the medium scale in recent years. The main reasons are:

(1) Green food attracts more and more small enterprises due to its low industrial threshold and high profitability.

(2) Some of the small companies continue to exist under local patronage.

This situation will have negative consequences. For example, small companies are not equipped to ensure the quality of food, and small companies are mainly focused on the middle and low markets. Over time, the entire industry cannot cultivate a famous brand and technological innovation, which will gradually lose competitiveness.

The simulation result also shows the negative effect of financial investment. Although this policy is recognized as a vital tool to promote the development of the green food industry, financial investment is not a good measure. A low level of financial investment cannot have a noticeable effect, but a high level will have a negative effect on the maturity period of the green food industry. In the maturity period, the industry has formed a balanced competition pattern, financial investment has broken the role of the market mechanism, and companies are likely to face changes in the market. This is an important addition to policy research on the green food industry.

The green food industry not only reduces agricultural pollution and improves the national health level, but also brings a double expectation of the prosperity of the rural economy and the achievement of rural revitalization. This paper finds the main influencing factor of the green food industry through model development and multi-scenario simulation. Compared to other studies, the research innovation of this paper is to divide the life cycle of the green food industry and discuss the effects of the influencing factors during different periods. The conclusion is presented as follows:

First, the life cycle of the green food industry can be divided into three stages: before 2011, the green food industry grows slowly, and this stage is the budding period. From 2011 to 2019, a large number of companies enter the market, which leads to fierce competition, and this stage is the growth period. Since 2019, the market has gradually stabilized and this period is the period of maturity. The final simulation time is 2030, and the industry shows no signs of faltering.

Second, among company scale, financial investment and R&D intensity, company scale is the main influencing factor that can have positive effects on the output value of the green food industry during the growth period. Others have no apparent effect.

Finally, an unfavourable high level of financial investment will have a negative impact on industrial development, at least in terms of output value. Previous studies have confirmed the role of policy in the green food industry, but financial investment is not a replacement tool, especially in the maturity period.

This article also has research limitations. For example, the system dynamics model uses the output value to measure the level of industrial development, which is incomplete and incomplete. In addition, this paper focuses more on the development of the green food industry from a socio-economic perspective, such as considering the impact of financial support and taxation, which better includes environmental indicators such as water/land use, carbon emissions or biodiversity impacts. . In future research, this paper

will expand the above model by considering more environmental indicators and use various indicators such as product trade and product types to measure the level of industrial development.

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