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Marketing of Transnational Maize Seed Enterprises from the Perspective of Customer Equity

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Abstract Customer is important equity of an enterprise. Customer equity is the total combined customer lifetime values of all of the company's customers. In the context of invasion of transnational seed companies, how to cope with huge crisis and challenge is a problem to be solved by national companies and government. From the perspective of customer equity driving factors and sub-driving factors, this paper made an empirical study on transnational and national maize seed enterprises using principal component analysis (PCA). Results indicated that the driving factors for customer equity of national and transnational maize seed enterprises are basically similar, while there are large differences in ranking of importance of principal components. Besides, there are great differences in sub-driving factors of customer equity.

Key words Transnational maize seed enterprises, National maize seed enterprises, Customer equity, Marketing recommendations

1 Introduction

According to statistics of FAO, in recent decade, the contribution rate of fine seeds to increase of per unit area yield accounts for more than 25% (up to 40% in US). Seeds play an irreplaceable role in agricultural production and will become a commanding point of future international agricultural or even economic competition. With promulgation and implementation of the *Seed Law of the People's Republic of China* in 2000, more and more transnational seed enterprises enter China. According to statistics, transnational seed enterprises have controlled near 70% of Chinese seed market in recent decade, and their powerful competitiveness and expansion speed bring huge crisis and challenge for national seed market. The safety issue brought about by invasion of transnational seeds has become hot spot of government and scholars. Therefore, it is of great theoretical and practical significance to study strengths and competitiveness of transnational seed enterprises in globalized market environment and find out existing problems of national seed enterprises. In business management, customer is important asset of an enterprise. Customer equity makes the greatest contribution to value of enterprise, and such action is more and more prominent in market economic development. American marketing scholar John E. Hogan *et al.* contended that customer equity management is life value of each customer of enterprise. In business strategic plan, making customer equity management and value evaluation is favorable for better using customer equity and forming unique competitive edge. Therefore, we make effort to study strengths of transnational seed enterprises and weaknesses of national seed enterprises from the perspective of customer equity.

2 Literature review

2.1 Customer equity and its driving factors Blattberg and Deighton (1996) firstly put forward the concept of customer equity. They defined customer equity as financial assets transformed from establishing and keeping excellent relationship and constantly creating customer life value. Later, scholars made definition of customer equity from different perspectives. Now, it has been widely accepted that customer equity is the sum of discount lifetime values of all customers, defined by Roland T. Rust (2004) on the basis of Blattberg and Deighton. Customer equity driving factors are core elements of customer equity theory. Widely accepted driving factors are three dimensional customer equity driving factors, namely, value equity, brand equity and relationship equity, put forward by Rust, Zeithaml and Lemon. Value equity is relatively neutral judgment of enterprise obtained from value feeling of consumers, including quality, service, timeliness of logistics, and convenience of purchase. Brand equity represents subjective comment of customers about products and services of enterprise. Rust (2001) and some scholars studied brand equity from brand awareness (recommendation rate of consumers for first choice products), brand attitude (brand loyalty and association degree of consumers), and social responsibility of enterprise. Yoo and Donthu introduced multi-dimensional brand equity model from the perspective of customer, and made empirical analysis using structural equation model. The relationship equity refers to comments of customers about the closeness of relationship with their enterprises. James (1990) revealed key factors of customer equity, including loyalty item, intimate plan, community related item, and knowledge related item. Rust (2001) and his team stated that these factors provide possibility for maximum repeated purchase of customers, so as to maximize future purchase value of customers and reduce possibility of customers turning to other competitors. Through extensive empirical studies, Taeschler (2002) found that the largest driving factor of customer equity is relationship equity, and the next is brand equity. Besides, some scholars

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supplemented the three-dimensional customer equity driving factor model. For example, Shao Jingbo and Chen Keke (2012) build the four-dimensional customer equity driving factor model from the perspective of social network. This model consists of 4 driving factors: network effect inside enterprise, between enterprises, between enterprise and customers, and between customers. For various reasons, we still adopted Rust's three dimensional customer equity driving factor model as research basis, namely, value equity includes quality, price, convenience degree; brand equity includes brand awareness, brand attitude, company moral rules; relationship equity includes loyalty program, intimate plan, and knowledge building.

2.2 Econometric study of customer equity Rust, Lemon and Zeitham firstly made empirical study on customer equity. They came up with a customer equity based strategic framework, which is helpful for identifying performance of three driving factors. Vogel, Evanschitzky and Ramaseshan studied the relationship between customer equity driving factors and loyalty intentions. Foreign scholars mainly focused on service industries such as retail, aviation, and hotel services. In comparison, domestic econometric studies are mainly concentrated on foreign studies with difference in domestic scholars adding some moderator variables and identifying customer equity driving factors. Shao Jingbo (2010) added moderator variable of cultural difference in studying customer equity driving factors in telecommunication market of China and the United States. Zhou Fuxia (2011) found that reputation propaganda, service quality, and brand awareness have significant influence on customer equity of travel agency. Jin Liang (2010) and Zhao Hong (2012) made empirical study on the relationship between customer equity and loyalty intentions of banks. In sum, domestic scholars focused on service industries of customer equity, basically not touching on manufacturing industry and agricultural fields. Thus, we made empirical study on maize seeds from customer equity driving factors and sub-driving factors, to find out strengths of trans-national maize seed enterprises and marketing implications for China.

2.3 Studies related to maize seed industry The maize industry is called a rising industry in the 21st century. As the core of the whole maize industry chain, maize seed is a concentrated expression of economic benefits. Li Chunhong (2004) and Zhou Xuejun (2009) contended that China's maize seed market still remains at the early development stage and there are drawbacks of blind and extensive planting, poor planning, and hostile competitive environment, so it fails to well satisfy market demands. Wu Chongmei (2011) elaborated impact and challenge faced by China's seed enterprises and she pointed out it is required to establish new seed industry development direction. Zhang Ling (2013) stated that factors influencing development of China's maize seed industry includes opening macro economic environment, and growth of market demand of grain ration consumption, feed consumption, and industrial consumption. Government may support the maize seed industry through investment, subsidy, or tax de-

duction or exemption. Dong Huan (2013) said that a more important driving factor for national maize seed industry is research and development innovation, production mode innovation and marketing method innovation. The above statement reflected that current domestic researches of maize seed industry still remain at macro level, while it is blank in study of maize seed enterprise from the perspective of customer equity, so this study has certain innovation.

3 Empirical study

3.1 Sample selection We took individual maize farmers as study objects. Considering implementation of questionnaire collection, we selected Huang-Huai-Hai Plain summer maize sowing area as the study area. The specific study area includes a large part of Tianjin and a small part of Shandong. Survey time was mainly in summer holidays and National Day. In this survey, we distributed 263 copies of questionnaire and collected 211 copies, the response rate was up to 80.22%. In addition, to make a better comparison between transnational and national maize seed enterprises, we finally selected 200 valid copies (76.50%), and brands of transnational and national seed enterprises accounted for 100 copies separately.

3.2 Questionnaire design Questionnaire includes two parts: basic information of individual and Likert Five Point Scale. The basic information of individual consists of 7 multiple-choice question, including basic information attribute and little production activity information. In the second part, we mainly referred to three dimensional customer equity model of Rust and his team and characteristics of maize seed enterprises. We set 33 indicators and the options include totally agree → somewhat agree → generally agree → somewhat disagree → totally disagree.

3.3 Methods of statistical analysis In this study, we mainly adopted descriptive statistics, principal component analysis, Cronbach α test.

4 Results of empirical analysis

4.1 Basic descriptive statistics In this study, we obtained following results. (i) As to the sex composition, 53% men and 47% women individual maize farmers adopted domestic seed brands, and 37% men and 63% women adopted foreign seed brands. (ii) As to the marital status, most users of two types of seed brands have been married. (iii) As to age structure, both users take on inverted bell, and most users are 46-65 years old, which is basically consistent with age composition of farmers in China. (iv) As to educational level, most seed purchasers received junior middle school education. Users of domestic seed brands are more with senior middle school level, while users of foreign seed brands are more with primary school education. (v) As to maize income, farmers with 30000-50000 yuan maize income would likely to select foreign brands. (vi) As to the brand use time, basic ranking of domestic and foreign brands is basically consistent, the proportion of using one to five years is higher in

domestic brands than foreign brands.

4.2 Principal component analysis (i) KMO test and Barlett test. Currently, widely adopted methods are KMO test and Bartlett sphericity test. In this study, through KMO and Barlett test of national and transnational seed brands, we found that KMO reached 0.739 and 0.858, the mean value of significance of Barlett test is 0.000, reaching significance level, rejecting original hypothesis, so it is suitable for principal component analysis (PCA). Specific test results are listed in Table 1 and Table 2.

Table 1 KMO and Barlett test of national seed enterprises

Take sufficient Kaiser-Meyer-Olkin measure		0.739
Bartlett test of sphericity	Approximate square	1200.047
	df	153
	Sig.	0.000

Table 2 KMO and Barlett test of transnational seed enterprises

Take sufficient Kaiser-Meyer-Olkin measure		0.858
Bartlett test of sphericity	Approximate square	1885.359
	df	171
	Sig.	0.000

(ii) Reliability test. After preliminary PCA, we divided 33 indicators into three principal components, namely value equity, brand equity and relationship equity. Since they are made up of items designed in accordance with maize planting farmers, it is necessary to carry out reliability test using Cronbach α . After screening of indicators of three principal components, we rejected some indicators and obtained optimal Cronbach α of two types of

Table 4 List of principal components of domestic maize seed enterprises

Factors	Questions	Factor load	Cumulative variance of square sum load of rotation value	Factor name
Factor I	2. Do the seeds you purchased have high purity and cleanliness?	0.835	26.368	Value equity
	3. Do the seeds you purchased have high germination rate?	0.821		
	1. Are the seeds you purchased real (varieties, shape, size, color, and appearance features are consistent with attached documents)?	0.758		
	6. Do the seeds you purchased have high yield?	0.740		
	7. Do the seeds you purchased have high ability of resisting plant diseases and insect pests?	0.718		
	10. Is the price of seeds you purchased affordable?	0.640		
	8. Are the seeds you purchased easy to store?	0.614		
	9. Is the price of seeds you purchased acceptable as to the seed quality?	0.604		
Factor II	25. You are very loyal to this enterprise (frequent purchase).	0.751	46.396	Brand equity
	19. When you need purchasing seeds, you firstly think this brand.	0.714		
	13. This seed enterprise has many distribution sites, and it is easy to find a sales outlet.	0.674		
	24. You think this enterprise has strong sense of social responsibility (for example, earthquake donation).	0.670		
	14. You regularly take notice of media ads of this seed enterprise.	0.558		
Factor III	30. This seed enterprise can provide excellent technical guidance before sale.	0.737	61.981	Relation equity
	29. You will introduce seed brands you use.	0.702		
	28. When you purchase the seeds again, service personnel will recognize you and remember your preference and habits	0.665		
	31. This seed enterprise can provide excellent technical guidance during seed use	0.641		
	26. Because of your loyalty, this enterprise provides you more preferential treatment.	0.593		

enterprises. Reliability test results: we deleted 15 questions for domestic seed enterprises and kept 18 questions, rejected 14 questions for foreign seed enterprises and kept 19 questions. For three principal components, Cronbach α of national and transnational seed enterprises belongs to high reliability, as shown in Table 3.

Table 3 Reliability test for three principal components of domestic and foreign seed enterprises

	Enterprise type	Cronbach's α	Question
Principal component I	Domestic	0.889	8
	Foreign	0.929	5
Principal component II	Domestic	0.806	5
	Foreign	0.914	7
Principal component III	Domestic	0.803	5
	Foreign	0.887	6

(iii) PCA results. We combined variables with factor load above 0.5 to a component. In other words, for the same factor, the factor load of corresponding question is greater than 0.5, then it can be deemed as the variable is highly convergent, and we called them value equity, brand equity, and relationship equity. PCA results: there is great difference in ranking of principal components between national and transnational maize seed enterprises. At the same time, the division of national maize seed enterprises is basically consistent with division of three-dimensional customer equity, while there are great differences in transnational maize seed enterprises. Besides, there are large differences in customer equity sub-driving factors between national and transnational maize seed enterprises, as listed in Table 4 and Table 5.

In national maize seed enterprises, the importance of three dimensions of customer equity is value equity → brand equity → relationship equity. In value equity, seed purity, germination rate, authenticity and yield have high factor load, followed by seed price and storage, which are basically consistent with value equity sub-driving factors of Rust and his team, namely, the quality is the most important, the next is price, and finally is conven-

ience. In brand equity, loyalty of customer to brand, brand association (brand attitude) have highest factor load, followed by brand familiarity and company moral rules. In relationship equity, the technical support of enterprise and the brand propaganda have the highest factor load, and the next is interaction between enterprise and purchaser, including knowledge sharing, intimate program, and loyalty plan.

Table 5 List of principal components of transnational maize seed enterprises

Factors	Questions	Factor load	Cumulative variance of square sum load of rotation value	Factor name
Factor I	7. Do the seeds you purchased have high ability of resisting plant diseases and insect pests?	0.886	26.074	Value equity
	6. Do the seeds you purchased have high yield?	0.883		
	8. Are the seeds you purchased easy to store?	0.874		
	32. Technical services provided by this enterprise make you more loyal to this brand.	0.676		
	9. Is the price of seeds you purchased are acceptable as to the seed quality?	0.639		
	31. This seed enterprise can provide excellent technical guidance during seed use.	0.603		
Factor II	2. Do the seeds you purchased have high purity and cleanliness?	0.892	50.149	Relation equity
	1. Are the seeds you purchased real (varieties, shape, size, color, and appearance features are consistent with attached documents)?	0.836		
	3. Do the seeds you purchased have high germination rate?	0.747		
	30. This seed enterprise can provide excellent technical guidance before sale.	0.594		
	33. This enterprise sets up your personal database and can provide necessary product information for you by various media means (short message, QQ, etc).	0.583		
	25. You are very loyal to this enterprise (frequent purchase).	0.583		
Factor III	28. When you purchase the seeds again, service personnel will recognize you and remember your preference and habits.	0.528	73.323	Brand equity
	13. This seed enterprise has many distribution sites, and it is easy to find a sales outlet.	0.888		
	10. Is the price of seeds you purchased affordable?	0.790		
	17. You regularly take notice of the information sent by this enterprise to you.	0.725		
	15. The brand of seeds you purchase is popular in local areas.	0.724		
	26. Because of your loyalty, this enterprise provides you more preferential treatment	0.703		
	29. You will introduce seed brands you use.	0.684		

In transnational maize seed enterprises, the importance of three dimensions of customer equity is value equity → relationship equity → brand equity. In value equity, disease resistance, yield and storage have the highest factor load, and the next is seed price and technical guidance, which are different from value equity sub-driving factors of Rust and his team. Rust and his team believed that technical guidance belongs to knowledge building of relationship equity. In relationship equity, the seed purity, authenticity and germination rate have the highest factor load, and the next is technical guidance before sales, setup of customer information and interaction between enterprise and customers (*i. e.* the intimate program). In brand equity, the brand familiarity has the highest factor load, followed by price acceptance degree and brand loyalty, and finally is brand propaganda.

6 Conclusions and recommendations

6.1 Conclusions (i) National maize seed enterprises have a large gap in business performance of transnational seed enterprises. Through analysis of current situations, we found that the percentage of research and development input to total business income is proportional to total profit amount. Therefore, significant gap in

research and development input leads to large gap in business performance. (ii) Besides, national maize seed enterprises focus on management of value equity and brand equity, and they still explore the relationship equity. (iii) The division of three dimensions of customer equity is basically consistent between national and transnational maize seed enterprises, but the ranking of importance of principal components is greatly different. No matter for national seed enterprises or transitional seed enterprises, maize farmers care most about seed quality, price, and convenience (value equity); for national maize seed enterprises, farmers care more about brand equity, while for transnational maize seed enterprises, farmers care more about relationship equity. Therefore, maize farmers care about quality and service of seeds. This is also an essential reason for transnational seed enterprises rapidly occupying Chinese market. It provides new idea and direction for development of domestic seed enterprises. (iv) There are large differences in composition of customer equity sub-driving factors between national and transnational maize seed enterprises.

6.2 Recommendations (i) Focusing on the value equity. Maize farmers care most about value equity of maize seeds. There-

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private entrepreneurial spirit. We discussed the entrepreneurial spirit from individual, organizational and social level, to improve theoretical and practical significance of the entrepreneurial spirit. The entrepreneurial spirit plays a more and more important role in growth of small and medium sized enterprises. Studies on the entrepreneurial spirit involve Management Science, Organizational Behavioral Science, Psychology, and Economics. This study is limited to qualitative analysis, in the hope of providing reference for healthy development of private small and medium sized enterprises and increasing some new content for researches of the entrepreneurial spirit.

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fore, national enterprises should focus on product quality and differentiation, increase research and development input, and improve seed quality; besides, enterprises should provide technical guidance for farmers in the use of seeds; also, enterprises should promote convenience in purchase of seed products and raise the value equity on the original basis. (ii) Cultivating brand equity. Enterprises may create excellent brand image through maintaining enterprise image, key figures, famous figures, and key matters. Besides, maize seed enterprises should set up excellent brand image to raise their brand equity. (iii) Increasing relationship equity. Empirical results indicate that the importance of relationship equity is only second to the value equity in transnational maize seed enterprises. This well explains source of competitive edge of transnational seed enterprises. No matter before use, during use and after use of seeds, transnational seed enterprises provide technical guidance and technical knowledge for customers. This is worth learning. Besides, transnational seed enterprises include three basic attributes of seeds into the relationship equity. This recommends national seed enterprises caring more about persistence of product quality. In sum, national seed enterprises should attach greater importance to great functions of the relationship equity.

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