Factors Influencing Food Enterprises' Implementation of ISO9000 Series Standards from the Perspective of Economy and System

Zhijing ZHAO, Xiumin WU*

College of Economics and Management, Sichuan Agricultural University, Chengdu 611130, China

Abstract Currently, the food security situation is increasingly serious, and a growing number of food companies choose to implement the internationally accepted ISO9000 Series Standards. Based on the analysis of economic rationality and system drive for food enterprises to implement ISO9000 Series Standards, we determine the economic factors and institutional factors influencing enterprises' implementation of ISO9000 Series Standards, and establish corresponding indicator system. According to survey data on 86 enterprises in Sichuan Province, we draw the following conclusion using the Logit model: enterprise age and enterprise size in economic factors, government's food safety control intensity, consumers, public and media pressure, awareness of senior managers, strategic orientation of quality safety, employees' average educational level in institutional factors, have a significant effect on enterprises' implementation of ISO9000 Series Standards. According to research results, we put forth some recommendations for promoting food enterprises to implement ISO9000 Series Standards.

Key words Food enterprises, ISO9000 Series Standards, Logit model, Economic factors, Institutional factors

In recent years, the vicious global food security events occur frequently, and the food security situation is increasingly grim. Food enterprise is regarded as the main provider of food in modern society and is responsible for the food security, whose behavior of improving quality safety has attracted the widespread attention from various circles of society, becoming a research hotspot. More and more food enterprises have chosen to implement the internationally accepted quality management and quality assurance standard – ISO9000 Series Standards.

Foreign countries have conducted a lot of researches, including motivation, influencing factors and performance concerning the implementation of ISO9000 Series Standards, and research method is mainly based on quantitative analysis[1-6]. However, in the complex context of food safety in China, we have not yet found the domestic authoritative literature on the research of food enterprises' implementation of ISO9000 Series Standards. From the perspective of economy and institution, we establish the theoretical analysis framework of food enterprises' implementation of ISO9000 Series Standards, to analyze the economic rationality and institutional drive on enterprises' implementation of ISO9000 Series Standards, explore the economic and institutional factors affecting enterprises' implementation of ISO9000 Series Standards. It will be of important theoretical and practical significance to enriching and deepening researches on enterprises' quality improvement behavior, explaining enterprises' behavior of implementing ISO9000 Series Standards under new food security situation, and promoting food enterprises' implementation of ISO9000 Series Standards.

Received: December 3, 2012 Accepted: January 4, 2013
Supported by National Philosophy and Social Science Foundation (09XJY024).
* Corresponding author. E-mail: cndwxm@163.com

1 Theoretical analysis framework and research hypothesis

1.1 Theoretical analysis framework Enterprises survive in both economic environment and institutional environment[7], whose behavior not only has economic rationality but also is driven by institutional factors[8-12]. Based on the economic rationality and institutional drive concerning food enterprises' implementation of ISO9000 Series Standards, we nail down the economic and institutional factors affecting enterprises' implementation of ISO9000 Series Standards.

1.1.1 *Economic rationality of food enterprises' implementation of ISO9000 Series Standards.* In economic theory, the enterprises survive in market economy environment, and get returns by providing products or services to the market. The economic environment determines the economic efficiency. The economic environment includes the small internal economic environment (including the corporate organizational structure) and the big external economic environment (including market factors). The small internal economic environment determines the efficiency of the conversion of raw materials into products, namely the production and operation efficiency; the big external economic environment determines the exchange efficiency of the value of the products or services, namely market efficiency. In respect of food enterprises' implementation of ISO9000 Series Standards, ISO9000 Series Standards, as the internationally accepted quality management and assurance standards, can improve irrational production process and the organization running process only from the standardization and standardization characteristics.

Consequently, the implementation of ISO9000 Series Standards is conducive to improving small economic environment within enterprises, improving the operating efficiency of the production and organization, and reducing management costs. Furthermore, implementing ISO9000 Series Standards can improve the quality

safety management level of enterprises, reduce the risk of food safety. At the same time, this also indicates that it transmits the positive information to the market, such as sound quality safety of enterprise product and good quality safety management capabilities. Finally, the implementation of ISO9000 Series Standards can enhance the international competitiveness of enterprises, and break the green trade barriers set for expanding the export markets using the ISO9000 Standards or trust difficulties suffered in the process of exploring the international market.

1.1.2 *Institutional drive for food enterprises' implementation of ISO*9000 *Series Standards*. In the institutional environment, the enterprises' self-improvement behavior is no longer in pursuit of profit maximization, but in pursuit of meeting expectations or requirements of various interests in order to achieve the legitimacy of survival[13-14]. This makes enterprises interested in a variety of certification contests, to fight for the top position in the reputation and have easier access to the resources to maintain business survival[15].

In the context of grave food security situation, a growing number of food enterprises choose to implement ISO9000 Series Standards. Based on awareness of self-protection or risk aversion, the consumers tend to choose the products of enterprises having implemented ISO9000 Series Standards; based on risk aversion, the peer enterprises or investors are more willing to cooperate with the enterprises having implemented ISO9000 Series Standards; the government, as the main regulator of food security, entertains the attitude of encouraging enterprises' implementation of ISO9000 Series Standards; the public and media hold that it is natural for enterprises to implement ISO9000 Series Standards to ensure product quality.

1.2 Research hypothesis Through the analysis of economic rationality and institutional drive concerning food enterprises' implementation of ISO9000 Series Standards, the enterprises' implementation of ISO9000 Series Standards under severe food security situation, is not only the pursuit of economic efficiency, but also the result of drive of institutional factors. Thus we put forth the following assumptions.

1.2.1 *Food enterprises' implementation of ISO*9000 *Series Standards is affected by economic factors*. According to the existing study, the main enterprises' features that have an impact on the economic efficiency of enterprises include enterprise age, enterprise size, market breadth, exports, and expected economic benefits.

(1) Enterprise age. The newly established enterprises regard the implementation of ISO9000 Series Standards as a simple and effective way to lay solid management foundation. The enterprises in rapid development stage take the implementation of ISO9000 Series Standards as the breakthrough point for enhancing the existing level of quality management.

(2) Enterprise size. In order to enhance the level of food quality safety, there is a need for enterprises to make specific investment in safe production and management. The greater the scale of operation, the more the special assets needed, the more the special assets losses suffered in food safety incidents. Furthermore, the enterprises with large size have advantages in capital and technology, which can provide more special funding and technical support, so the enterprises with large size are more likely to implement ISO9000 Series Standards.

(3) Market breadth. If the market scope of the enterprises is broad, there will be great pressure from different markets on product quality safety, thus the implementation of ISO9000 Series Standards may become a necessary means of maintaining market.

(4) Exports. The enterprises with products for export are more likely to face the green trade barriers set by the importing country using ISO9000 Series Standards, so they are more likely to implement ISO9000 Series Standards.

(5) Expected economic benefits. Behavioral economics theory suggests that behaviors stem from motivation, and the implementation of ISO9000 Series Standards can enhance the quality safety management level of enterprises, thereby enhancing the economic efficiency of the enterprise, so if the enterprises have high expectation of this, they are likely to implement ISO9000 Series Standards.

1.2.2 *Food enterprises' implementation of ISO*9000 *Series Standards is affected by institutional factors*. The institutional factors include the government's food safety control intensity, pressure from consumers, the public and the media, and competitors' behavior[16] related to the external stakeholders, and senior managers' awareness, strategic orientation of quality safety, employees' average educational level, experience and tradition related to the internal stakeholders[17].

(1) Government's food safety control intensity. By means of executive orders, laws and regulations, the government controls the enterprises' quality safety behavior. The tighter the control, the more likely the enterprises take the quality improvement behavior that can be easily identified by regulatory agencies to evade punishment or more stringent control intensity, so the greater the intensity of government's food security control, the more likely to implement ISO9000 Series Standards.

(2) Pressure from consumers, the public and the media. Consumers, the public and the media tend to give more expectations and requirements on high-profile enterprises with good reputation. The enterprises also tend to take quality improvement that can be easily identified by consumers, the public and the media in view of this pressure.

(3) Competitors' behavior. According to the system organization theory, when the behavior of an organization is generally accepted by the industry, the social psychological pressure will make a single organization keep up with most other organizations. ISO9000 is widely accepted as the prevailing international quality safety standard. A growing number of enterprises choose to implement ISO9000 Series Standards. In order to avoid losing its competitive edge, the competitive enterprise will also tend to implement ISO9000 Series Standards.

(4) Senior managers' awareness, strategic orientation of

quality safety. The strategic orientation of the decision-making to a large extent determines the efficiency and results of enterprises' decision-making.

(5) Employees' average educational level. If the employees' average educational level is high, it will be easier to promote the decision-making and implementation of enterprises' internal innovation.

(6) Experience and tradition. In the institutional environment, the production and management experience tends to precipitate as enterprises' customary thinking or behavior, so the development direction of the corporate behavior is path-dependent, and the change in traditional habits is more easily accepted by businesses.

2 Variable setting, empirical model and data source

2.1 Variable setting According to the above theoretical analysis and research hypotheses, we divide factors influencing food enterprises' implementation of ISO9000 Series Standards into two categories: economic factors (5 variables), institutional factors (6 variables). Each influencing factor, variable assignment, related explanation and expected direction of action are shown in Table 1.

Table 1 The definition and description of the model variables

Variable type	Variable setting	Variable definition	Expected direction
Economic factors	Enterprise age(X_1)	The years since the establishment of enterprises	+/−
	Enterprise size(X_2)	Number of employees in enterprises	+
	Market breadth(X_3)	Number of sales regions for enterprise product (including the southwest, north, northeast, northwest, central part, south, and east).	+
	Export(X_4)	0 = have no product for export; 1 = have products for export	+
	Expected economic benefits(X_5)	Improve the expected factor value of economic efficiency1 *	+
Institutional factors	Government's food safety control intensity (X_6)	1 = periodic sampling; 2 = occasional sampling; 3 = combination of periodic sampling and occasional sampling	+
	Pressure from consumers, the public and the media(X_7)	1 = general enterprises; 2 = municipal leading enterprises; provincial leading enterprises; national leading enterprises 2**	+
	Competitors' behavior(X_8)	0 = affected by competitors; 1 = not affected by competitors	+
	Senior managers' awareness and strategic orientation of quality safety(X_9)	Senior managers' awareness and strategic orientation of quality safety	+
	Employees' average educational level(X_{10})	The share of employees with degree above junior college in total employees	+
	Experience and tradition(X_{11})	0 = not certified by HACCP; 1 = certified by HACCP	+

Note: 1. As for the questions on "senior managers' awareness and strategic orientation of quality safety" and "expected economic benefits", there are 12 subjective judgment questions in the questionnaire. The questionnaire uses 7 − level Likert scale method, and the reliability test Cronbach coefficient α is 0.869 (greater than recommended value 0.7). In the specific analysis, combined with expert advice, we select the degree of attention of senior managers in enterprises to about 12 problems as measuring indicators, such as "take the implementation of ISO9000 Series Standards as quality safety management strategy", "improve product quality", "reduce food safety risk", "reduce the cost of food safety incidents", "increase market share and economic benefits brought by implementation of ISO9000 Series Standards", "improve the efficiency of the supply chain management", "enhance ability to retain existing customers", "enhance ability to retain new customers". Extreme attention is 1, indifference is 7, and reverse coding is completed. To further simplify the data, using factor analysis, we further extract the main factors characterizing "senior managers' awareness and strategic orientation of quality safety" and "the economic benefits expected". KMO value of factor analysis is 0.69. The analysis results using OBLIMIN skew method show that the characteristic values of two factors are 2.985 and 1.267, respectively, explaining 60.74% of the variance. The first factor explains 32.447% of the variance, and the second factor explains 28.296% of the variance. We select the first factor value as the specific measurement of "senior managers' awareness and strategic orientation of quality safety" and the second factor as the specific measurement of "the economic benefits expected". 2. The enterprises with higher level have higher credibility and reputation, consumers, the public and the media often pay more attention to them, and they withstand greater pressure, so the variable is measured using the level of enterprises.

2.2 The empirical model The meaning of food enterprises' implementation of ISO9000 Series Standards is whether enterprises implement ISO9000 Series Standards, including having implemented ISO9000 Series Standards and having not yet implemented ISO9000 Series Standards.

In the study, the enterprises having passed ISO9000 series certification are regarded as having implemented ISO9000 Series Standards, and the enterprises having not passed ISO9000 series certification are regarded as having not implemented ISO9000 Series Standards. According to the assumption in "**1.2**", enterprises' implementation of ISO9000 Series Standards is affected by economic and institutional factors, expressed as the following functional form:

$$R_i = f(J_{ij}, Z_{iz}, e_i) \quad (1)$$

where R_i represents whether enterprise i has implemented ISO9000 Series Standards; J_{ij} is the economic factor j affecting enterprise i's implementation of ISO9000 Series Standards; Z_{iz} is the institutional factor z affecting enterprise i's implementation of ISO9000 Series Standards; e_i reflects other influencing factors that can not be observed, namely the random disturbance term.

In the analysis, using 0 − 1 indicator approach, we assign value on whether enterprises implement ISO9000 Series Standards. The enterprise having implemented ISO9000 Series Standards is signified by 1, and the enterprise having not implemented ISO9000 Series Standards is signified by 0.

Independent variables not only include continuous variables but also include categorical variables, and the traditional linear regression analysis method requires that the dependent variables

and the independent variables must be continuous variables. Therefore, using binary logistic regression analysis method, we establish empirical analysis model, and the specific form is as follows:

$$\text{Logit}(P_i/1-P_i) = \beta_0 + \sum_{j=1}^{j}\beta_j x_{ij} + \sum_{z=1}^{z}\beta_z x_{iz} + \varepsilon_i \quad (2)$$

where $\text{Logit}(P_i/1-P_i)$ signifies the logarithm ratio of the probability of enterprise i's implementation of ISO9000 Series Standards; P_i is the probability of enterprise i's implementation of ISO9000 Series Standards; β_j, β_z are the regression coefficient of the economic factor and institutional factor, respectively; m is the number of factors that influence the probability; X is the independent variable; X_{ij} is the economic factor j; X_{iz} is the institutional factor z; β_0 is the regression intercept; ε_i is the random disturbance term. This model can reflect the degree of impact of various economic and institutional factors on enterprises' implementation of ISO9000 Series Standards.

2.3 Data source The research data are from a questionnaire survey of food enterprises in Sichuan Province and the interviews with business executives, carried out by the research group "quality safety security system research of agricultural products" from July to October 2010.

Taking into account the distribution of enterprises and availability of data, this survey uses non-random typical sampling method. The survey area mainly includes 20 districts (counties) such as Chengdu, Suining, Meishan, Leshan. 120 questionnaires were distributed, and 87 copies of questionnaires were called back. 1 invalid and incomplete questionnaire was excluded, and finally 86 valid questionnaires were obtained, with validity rate of 71.7%.

In terms of the enterprise size, the enterprises with total assets more than 80 million yuan account for 22.22% of total samples. The enterprises become younger in average age, and the enterprises established more than 15 years account for 8.64% of total samples. 87% of the enterprises are private enterprises; state-owned enterprises and foreign-funded enterprises account for 10% and 3% of total samples, respectively. The proportion of enterprises with business model of production and trade accounts for 64%, followed by production-based enterprises (35%) and trade-based enterprises (1%).

The products operated by enterprises can be divided into the following types: tea (11.11%), meat (14.81%), fruits and vegetables (12.35%), grain and oil, condiments and pickles, beverages and so on (61.73%). In the enterprises surveyed, 29 of them export products, accounting for 33.72%. In terms of the market breadth, 29.63% of the sales areas for enterprise product are throughout China's southwestern, northern, northeastern, northwestern, central, southern and eastern areas. In the enterprises surveyed, 58% of enterprises have passed ISO9000 certification; 42% of enterprises are applying for certification or have not yet applied for certification.

3 Results and analysis

Using SPSS17.0 statistical software, we conduct Logistic regression processing on 86 copies of data concerning food enterprises' implementation of ISO9000 Series Standards. We select the standard level of variable $a = 0.05$, and exclude the standard level $a = 0.10$.

Meanwhile, OR(Odds Ratio) is used to interpret the variable EXP(B) in the model, which represents the corresponding change of odds ratio when there is one unit of change in the independent variable. In regression, we use Backward LR way (deleting variable regression backward stepwise).

In the process, first of all, all variables are substituted into the model for test, and according to the exclusion criteria, the most insignificant independent variables are removed, then the test is continued until the impact of all independent variables is significant.

Finally six variables having significant impact on the dependent variable are derived in the model, namely enterprise age, enterprise size, government's food safety control intensity, pressure from consumers, the public and the media, senior managers' awareness and strategic orientation of quality safety, employees' average educational level.

Through the overall test of the model, the indicator value of −2Log likelihood, Cox & Snell R2, Nagelkerke R2, HL chi-square statistic and forecast accuracy rate are 43.039, 0.588, 0.784, 3.524 and 89.5%, respectively, indicating that the fitting degree of the model is high, and the results are of statistical significance.

Table 2 Model estimation results of factors influencing enterprises' implementation of ISO9000 Series Standards

Variable	B	S.E	Wald	Sig.	Exp(B)
Enterprise age(X_1)	3.765	2.128	3.723	0.052 *	8.353
Enterprise size(X_2)	2.198	1.012	4.718	0.030 **	9.006
Government's food safety control intensity(X_6)	1.970	0.555	12.69	0.000 ***	0.138
Pressure from consumers, the public and the media(X_7)	9.070	0.564	2.589	0.098 *	0.403
Senior managers' awareness and strategic orientation of quality safety(X_9)	0.894	0.515	3.017	0.082 *	2.446
Employees' average educational level(X_{10})	3.154	0.205	12.13	0.000 ***	4.906

Note: *, **, *** denote statistically significant at 10%, 5%, 1% level.

Table 2 shows that food enterprises' implementation of ISO9000 Series Standards is affected by economic factors and institutional factors.

3.1 The impact of economic factors on food enterprises' implementation of ISO9000 Series Standards

(1) The Wald test value of enterprise age(X_1) is significant at

10% level, the coefficient is positive, and Exp(B) value is 8.835. It indicates that the enterprise age has significant impact on enterprises' implementation of ISO9000 Series Standards, the longer the enterprises established, the greater the possibility of implementing ISO9000 Series Standards. The enterprises with long history often have higher requirements on quality safety management, and actively adopt efficient measures to enhance the level of quality safety management.

(2) The Wald test value of enterprise size(X_2) is significant at 5% level, the coefficient is positive, and Exp(B) value is 9.006. It indicates that the enterprise size has significant impact on enterprises' implementation of ISO9000 Series Standards, the larger the size of enterprises, the greater the possibility of implementing ISO9000 Series Standards. The reason may be that enterprises avoid the losses of a large number of special funds or the large-scale enterprises can arrange more special funds for improving their quality safety behavior.

(3) Market breadth(X_3) does not pass the test, indicating that market breadth has no impact on enterprises' implementation of ISO9000 Series Standards. This may be related to the insufficient recognition of ISO9000 by the domestic market. According to the survey results, in the enterprises surveyed, the number of enterprises having implemented green certification is higher than the number of enterprises having implemented ISO9000 Series Standards. The domestic consumers may be more willing to accept green food certification.

(4) Export(X_4) does not pass the test, indicating that the export has no impact on enterprises' implementation of ISO9000 Series Standards. This is inconsistent with the assumptions in this article. The possible reason is as follows: The vast majority of enterprises are based on the domestic market without considering exporting, and there are less export enterprises, accounting for only 20% of the total number of enterprises surveyed, not enough to support the research hypothesis. The test results are consistent with the actual situation of China.

(5) The economic benefits expected(X_5) does not pass the test. According to the survey, many enterprises believe that consumers' recognition of products from enterprises implementing ISO9000 Series Standards is not high, and the economic benefit is not realized as expected. The further reason may be that the certification cost is high and there are difficulties in economic evaluation.

3.2 The impact of institutional factors on food enterprises' implementation of ISO9000 Series Standards

(1) The Wald test value of government's food safety control intensity(X_6) is significant at 1% level, the coefficient is positive, and Exp(B) value is 0.138. It indicates that the government's food safety control intensity has significant impact on enterprises' implementation of ISO9000 Series Standards. When facing high intensity food security control, enterprises are inclined to implement ISO9000 Series Standards, in order to circumvent stringent regulation, and get greater regulatory flexibility.

(2) Competitors' behavior (X_7) does not pass the test, indicating that competitors' behavior has no impact on enterprises' implementation of ISO9000 Series Standards, inconsistent with the assumptions in this article, which may be related to the fact that the food industry in China is not mature enough, the implementation of ISO9000 Series Standards is still in the emerging stage of development, and the implementation rate of ISO9000 Series Standards in the entire industry is still relatively low.

(3) The Wald test value of pressure from consumers, the public and the media(X_8) is 2.589, significant at 10% level, the coefficient is 9.07, and Exp(B) value is 0.403. It indicates that pressure from consumers, the public and the media has significant impact on enterprises' implementation of ISO9000 Series Standards. With improvement in consumers' quality safety awareness, the public and media is playing an important role in regulating enterprises' food security behavior, which is also consistent with reality. The effect of food security incidents is easily and rapidly enlarged by the consumers, the public and social media.

(4) The Wald test value of senior managers' awareness and strategic orientation of quality safety(X_9) is significant at 10% level, the coefficient is positive, and Exp(B) value is 2.446. It indicates that senior managers' awareness and strategic orientation of quality safety has significant impact on enterprises' implementation of ISO9000 Series Standards. If the senior managers of enterprises pay more attention to quality safety, enterprises are more willing to implement ISO9000 Series Standards.

(5) The Wald test value of employees' average educational level(X_{10}) is 12.13, significant at 1% level, the coefficient is 3.154, and Exp(B) value is 4.906. It indicates that employees' average educational level has significant impact on enterprises' implementation of ISO9000 Series Standards. If the enterprise employees' average educational level is higher, the enterprises are more inclined to implement ISO9000 Series Standards, highlighting the important role of employees' quality in the enterprise product quality ad safety.

(6) Experience and tradition (X_{11}) does not pass the test, indicating that experience and tradition has no impact on enterprises' implementation of ISO9000 Series Standards, inconsistent with the assumptions in this article, which may be related to the failure of variable measurement, or the consideration of cost. After completing HACCP system certification, the enterprises may not implement ISO9000 Series Standards, and the compatibility issues are no longer the main content to be considered.

4 Conclusion and policy recommendations

4.1 Conclusion According to survey data on 86 enterprises in Sichuan Province, we draw the following conclusion using the Logit model: enterprise age and enterprise size in economic factors, government's food safety control intensity, consumers, public and media pressure, awareness of senior managers, strategic orientation of quality safety, employees' average educational level in institutional factors, have a significant effect on enterprises' imple-

mentation of ISO9000 Series Standards.

4.2 Policy recommendations According to the results of empirical research, we put forth the following recommendations for promoting food enterprises' implementation of ISO9000 Series Standards.

(1) Food enterprises pay more attention to enhancing the level of quality safety in various stages of their own development, but the procedures of implementation of ISO9000 Series Standards are cumbersome, needing to take a long time and a certain cost, which are subject to the restrictions of capital, technology and other aspects. Government should provide further policy support, such as tax incentives or direct funding and technical support, to improve enterprises' enthusiasm for implementing ISO9000 Series Standards.

(2) Under the grim situation of food security, institutional factors become the main factors affecting food enterprises' implementation of ISO9000 Series Standards. Government should strengthen food safety control, orient the opinion of the public and media, make certification agencies ensure certification service quality, and create the institutional environment for enterprises' implementation of ISO9000 Series Standards.

(3) Employees' quality is one of the factors restricting food enterprises' implementation of ISO9000 Series Standards. Employees' average educational level plays a prominent role in promoting enterprises' implementation of ISO9000 Series Standards. When the corporate decision-makers carry out quality safety management, they should also enhance the quality safety training for employees. In addition, in the implementation of ISO9000 Series Standards, enterprises should assess the certification cost and benefit, and pay attention to compatibility between ISO9000 Series Standards and original certification system, to reduce the cost of implementing ISO9000 Series Standards and ensure the reasonableness and validity of implementation of ISO9000 Series Standards.

References

[1] CARLOS C, HOOKER N, OZUNA TH. ISO 9000 – a marketing tool for U.S. [J]. International Food and Agribusiness Management Review, 2000 (3): 41 –53.

[2] JULIAN B, NURIA A, MARIAN GM, *et al*. Quality management and improvement in the Spanish SME food industry: The adoption of ISO 9000 [C]// The XI Congress of the EAAE (European Association of Agricultural Economists), Copenhagen, 2005.

[3] KATHRYN A, GRANT JH. ISO9000 standards implicit barrier or trade facilitation strategy[C]// The Agricultural & Applied Economics Association 2009 AAEA&ACCT Joint Annual Meeting, Milwaukee, 2009.

[4] GA M. Analyzing the perceived impact of ISO 9000 Standards on U.S. [C]// The Annual American Agricultural Economics Association Meetings, Long Beach, 2002.

[5] GERALD M. An analysis of selected performance indicators for U.S. agribusiness sites registered to ISO 9000 series of standards[J]. Journal of Food Distribution Research, 2000(3): 115 –126.

[6] Evandro Sergio Martins Leite. ISO 9000 certification and organizational learning: the Sebrae/MS case[J]. Organizacoes Ruraise Agroindustriais, 2004, 6(2): 34 –41.

[7] MEYER JW, BRAIN R. Institutionalized organizations: formal structure as myth and ceremony[J]. American Journal of Sociology, 1977, 83(2): 340 – 363.

[8] SHAVELL S. Economic analysis of accident law[M]. Harvard: Harvard University Press, 1987: 300 –311.

[9] ANNANDALE D. Mining company approaches to environmental approvals regulation: a survey of senior environment managers in Canadian[J]. Resources Policy, 2000(26): 101 –124.

[10] WANG ZG, WENG YZ, YANG ZG, *et al*. The effectiveness of adopting HACCP system certification in food industry: from the questionnaire of 482 food manufacturing enterprises in China[J]. China Soft Science, 2006 (9): 69 –75. (in Chinese).

[11] SPARLING D, SPENCER H. Costs and benefits of traceability in the Canadian dairy – processing sector[J]. Journal of Food Distribution Research, 2006(37): 75 –82.

[12] OLLINGER M. The cost of food safety technologies in the meat and poultry industries[C]// The AAEA&ACCI Joint Annual Meeting, Milwaukee, 2009.

[13] SCOTT WR. The adolescence of institutional theory: problems and potentials for organization analysis[J]. Administrative Science Quarterly, 1987 (32): 493 –512.

[14] ASHFORTH BE, GIBBS BW. The double edge of organizational legitimation[J]. Organization Science, 1990(1): 177 –194.

[15] CHEN SH, QI KM. On the transform mechanism of corporate reputation: legitimation and certification contests[J]. Economy and Management, 2010, 24(1): 22 –24. (in Chinese).

[16] DIMAGGIO PJ, POWELL WW. The iron cage revisited: institutional isomorphism and collective rationality in organization fields[J]. American Sociological Review, 1983(48): 147 –160.

[17] YANG DN. A research review of the driving factors of enterprise's voluntary implementation of standardized environment management system: theory framework and empirical analysis[J]. Management World, 2005(2): 85 – 107. (in Chinese).

[18] YANG H. The relation between ISO 9000 series standard and the quality management of food enterprise[J]. Jiangsu Condiment and Subsidiary Food, 2009, (5): 6 –9. (in Chinese).

[19] XIAO X, MA YY. SWOT Analysis on food safety assurance of the manufacturing enterprises in Hebei Province[J]. Journal of Anhui Agricultural Sciences, 2012, 40(16): 8965 –8966. (in Chinese).

(From page 6)

[10] CHARNES A, COOPER ER. Measuring the efficiency of decision making units[J]. European Journal of Operational Research, 1978, 2: 429 –444.

[11] MUSGRAVE RA. The theory of public finance: a study in public economy [M]. New York: McGraw – Hill, 1959.

[12] SHULTZ TW. The value of ability to deal with disequilibria[J]. Journal of Economic Literature, 1975, 13: 827 –996.

[13] LE XB. The empirical study on the urban – rural income gap based on the material capital perspective in China[J]. Journal of Anhui Agricultural Sciences, 2012, 40(9): 5628 –5630. (in Chinese).

[14] TIAN CJ. Analysis of the dynamic relationship among financial fund for agriculture, agricultural output value and farmers' income[J]. Asian Agricultural Research, 2011, 3(7): 27 –30, 42.

[15] CAI JY, ZHANG TL. Empirical study on the effect of abolishing agricultural tax on farmers' income[J]. Agricultural Science & Technology, 2012, 13(3): 682 –685.