

## **Analyses on the Willingness and the Influence Factors of the Provider to Establish the Livestock Products Traceability System-Take Chengdu for Example**

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**Abstract:** This study analyses on the willingness and the influence factors of the provider to establish the livestock products traceability system-take Chengdu for example. The main livestock provider can be traced back will create an empirical analysis.

**Key words:** Livestock product quality and safety, livestock slaughtering enterprise, traceability system, factors, market, China

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### **INTRODUCTION**

China is the world's largest meat production and consumption country but the product quality and safety of meat to be further improved. The traceability from production to sales records in detail all aspects of livestock in the areas of information and product source and destination. Therefore, once there were something wrong in the products according to record information, the existing problems can be identify in time and eliminate the hazard. In actual production, meat products as the main supply of livestock farmers and slaughterhouses are willing to participate in the body can be traced determine whether there is traceability of products available.

Therefore, the establishment of traceability system affect the factors that will influence the direction of what for the government to formulate relevant policies to encourage and guide enterprises to participate in an important role. In other countries, scholars have traceability and consumer behavior, producers and other major aspects of behavior has made many achievements (Caswell and Padberg, 1992; Buzby and Frenzen, 1999; Pettitt, 2001; Hobbs *et al.*, 2005).

In China, the two companies and the main body of mostly farmers but most or focus on individual enterprises to establish a traceability system of motivation and cost-benefit or focus on the establishment of traceability system, farmers will study and are not to as an overall analysis of the main supply. In fact, the two factor can be traced back towards the supply of products closely related to participated in the system can be traced back to

a certain extent on the consistency of motivation, this study intends to slaughter based on a fixed scale enterprises and farmers in the survey came from the main supply analysis of the supply system can be traced back to entering into the will of its influencing factors.

**Hypothesis:** To establish and improve product quality and safety system can be traced back, on the one hand requires the government to strengthen the system construction, it also requires enterprises to actively participate. But as agricultural enterprises and farmers supply side of economic rational, profit-maximizing behavior characteristics (Yinheng and Xianhui, 2002; Xiangzhi and Dan, 2004; Ling and Deyi, 2005; Rong *et al.*, 2009) and to establish traceability system need to invest some of the cost of production is uncertain there is a certain market risk. Another, significant impact on the supply side factors in retrospective will scale the supply side, the product is exported, policies, risks to consumers and businesses is expected to have traceability of agricultural products of the expected willingness to pay for such variables (QiuHong and Min, 2009).

Therefore, based on this theoretical analysis and the researcher of the farmers and the slaughtering business depth interviews, this study will establish the main supply of livestock products traceability factors influencing factors of production into the main supply, external demand conditions, the livestock industry chain sophistication and the degree of government policy support four types of variables and proposed the following hypothesis.

**The main elements of the supply can be traced back to the entering into the supply system will affect:** Supply-side supply of the main elements include the size of establishment whether the supply side and other industry leaders.

**Supply-side scale:** In general, the larger the scale, capital, technology and human resources the more advantage for the introduction of new technology and new management methods with strong acceptance. At the same time, a shortage of funds is the production of agricultural products processing enterprises and common problems, the establishment of traceability system will require substantial funding. Therefore, assuming that firm size can be traced back to its system will create a positive correlation. In this study, the number of employees and investment by enterprises as a measure of corporate capital of the standard scale.

The main supply of incorporation (since, the implementation of traceability of time is not long, long ago established suppliers to the establishment of traceability system does not form consciousness) has been implemented in China after the establishment of traceability system, it would be easier traceability system.

**Supply side management:** With the development of cognitive psychology, academia, business decisions of managers in the study of the behavior in more and more attention. Studies have shown that the main decision-making factors (such as personal attitude towards risk, personal skills and personal values) influence on the decision-making (Shanduo, 2005). This study assumes that higher educational level managers are more willing to establish traceability system. Whether the supply side industry leaders. Leading enterprises in the market, said the representative of a certain role in the new regulations or technology, leading enterprises in the first implementation. At present, there are national, provincial, municipal, county and other leading enterprises in the certification. Therefore, assuming that access to leading enterprises in the level of accreditation will be more willing to participate in traceability systems.

**The supply of external market conditions will attract entering into traceability system is divided into market demand, technological developments, competition and incentive levels:** Mainly refers to market demand, consumer demand, Yang and Juan (2009) shows that with the traceability of consumer willingness to pay higher meat products. Therefore, demand for consumer products can be traced back higher are willing to pay higher prices, supply-side system can be traced to the

desire to establish more strongly. Meanwhile, most consumers like to eat the fresh livestock products, livestock products on the market are mostly hot meat if stored improperly or too long will affect the product's taste so if the technology is relatively mature level of development can be traced back. The technology is relatively simple, quick, cost of material costs and labor costs are not high, supply is more willing to build the main body can be traced back system.

In addition, the intensity of competition in the main consideration seasonal factors and competitor behavior. The sale of livestock products in the peak season more producers to enter the industry, increased competition, this time back if they can provide the products, you can improve the competitiveness of their products so producers tend to establish traceability system. Peer competitor related behavior can be traced back system will also affect their consideration of establishing traceability system.

**Degree of perfection of the livestock industry chain:** Degree of perfection of the livestock industry chain is the livestock industry and the integration of upstream and downstream tightness. If the livestock industry, a high degree of integration then the establishment of traceability system, lower cost, greater accessibility of information to more accurately establish the more likely the main supply can be traced back system. If the whole industry chain is not completely integrated then the tightness of the upstream and downstream will also affect the possibility of establishing traceability system.

**Government policies:** Production decisions of producers affected to some extent, the policy implications of the government, producers established traceability system is no exception. Government producers have established traceability system requirements, to encourage and support policies, it acts on the supply side have a major impact. Greater government support, the supply system can be traced back to entering into the will of the greater.

#### **DATA AND SAMPLE CASE**

The data used in this study mainly come from the actual survey. This survey was conducted of selected suppliers of livestock products including herds of >1000 farmers and slaughtering enterprises (supply side). Investigation time is January to May 2010.

The survey questionnaires were distributed and 85, back 80 questionnaires were excluded missed the error message key information and the questionnaire, 72 valid questionnaires which is 14 scale farmers, slaughtering

enterprises 58. Taking into account the farm most of the counties established in Chengdu so 14 per household from farming in the suburbs of Chengdu. Certified by the Chengdu municipal government slaughtering number of enterprises in 73, this 58 valid questionnaires, sampling accounting for 79.5% including a number of county-level city of Chengdu.

**LIVESTOCK SUPPLY-SIDE SYSTEM CAN BE TRACED BACK TO THE ESTABLISHMENT OF THE WILL AND EMPIRICAL ANALYSIS**

The supply-side factors of production can be traced back to the establishment of the will of impact analysis system.

**Investment scale:** According to survey, results show that the scale of investment from the slaughter of view, <100 million investment is only 6,1000 there are 20 million yuan accounting for 34.5% from Table 1. The establishment of the enterprise system can be traced back almost with the expansion of the scale of investment, the establishment of traceability system, the proportion is increasing. From the point of view, the number of workers, <50 people, 31 slaughterhouses accounting for 53.4% and the overall number of workers have less than normal but the establishment can be traced back situation, the proportion of various sizes do not differ from established large enterprises to establish which proportion of 51-100 people is the highest (Table 2). Thus according to the scale of investment and number of these two variables, almost is larger the higher the willingness to establish traceability system.

**Established:** View from the companies surveyed, 89.7% of the slaughterhouse was built in 2000; the description of the standardization and large-scale slaughter business was started in 2000. Meanwhile, the 58 slaughterhouses were in 2003 became the designated slaughterhouse, slaughterhouses and 44.8% in 2008, a fixed point. Enterprises to establish a traceability system will be increased year by year to 100% in 2005, established in 2006, established companies have no desire traceability system while the subsequent degree in 2007 and 2008 will have on the rise (Table 3). Established thus can be drawn later, the establishment of traceability system, the stronger sense.

**Management of the situation:** Among the surveyed enterprises, the relative concentration of educational level managers, 52.6% are college and undergraduate, age was scattered around the age of 30-50 are 44.8%, accounting

Table 1: Slaughtering businesses to invest in capital

| Investment capital (million) | No. of enterprises (unit) | Willing to establish traceability system of enterprises (a%) |
|------------------------------|---------------------------|--|
| <100                         | 6                         | 4 (66.7)   |
| 101-300                      | 16                        | 11 (68.8)  |
| 301-6,000,000                | 6                         | 5 (83.3)   |
| 601-9,000,000                | 10                        | 8 (80.0)   |
| >10                          | 20                        | 19 (95.0)  |

Table 2: Number of employees in the slaughter of different enterprises can be traced back system will influence the establishment

| Staff (persons) | No. of enterprises (unit) | Willing to establish traceability system of enterprises (a%) |
|-----------------|---------------------------|--|
| <50             | 31                        | 24 (77.4)  |
| 51-100          | 8                         | 7 (87.5)   |
| 101-300         | 14                        | 12 (85.7)  |
| >300            | 5                         | 4 (80.0)   |

Table 3: The impact of different enterprises established on the establishment of traceability system

| Years | No. of enterprises (unit) | Percentage | Willing to establish traceability system of enterprises (a%) |
|-------|---------------------------|------------|--|
| 2003  | 5                         | 8.6        | 2 (40)   |
| 2004  | 4                         | 6.8        | 2 (50)   |
| 2005  | 2                         | 3.4        | 2 (100)  |
| 2006  | 1                         | 1.7        | 0 (0)  |
| 2007  | 18                        | 31.0       | 15 (83)  |
| 2008  | 26                        | 44.8       | 24 (92)  |
| 2009  | 2                         | 3.4        | 2 (100)  |

for >50 years old was 34.6%. The degree of acceptance for college and undergraduate education as a high school degree >30 and 83.3% of managers aged 20-30 are willing to build can be traced back >50 years old, only 31.6% are willing to build can be seen as the education level increase and younger age, willingness to accept the degree of traceability system is also improving.

**Industry leaders:** Among the enterprises surveyed, 63.7% of the enterprises are leading enterprises including national, provincial, municipal, district (county) level. As can be shown from Table 4, the leading business-to-build will be a higher degree of traceability systems, especially in national and provincial level all willing to establish traceability system.

**To entering into external markets can be traced back to the supply system will impact analysis**

**Determine the business to consumer demand:** This enterprise is expected to represent the consumer willingness to pay. A total of 53 enterprises have established traceability system that will not be a substantial increase in prices will not affect the consumer's willingness to pay in which 53 enterprises in about 83% of the enterprises are willing to establish traceability system. In contrast, consumer willingness to pay is expected to have an impact, consumer demand is not high, only 52.6% of enterprise companies willing to

Table 4: The impact of distribution of enterprises rating system can be traced back to establish

| Levels                          | Quantity (a) | Enterprises willing to establish traceability (a/%) |
|---------------------------------|--------------|---|
| National leader                 | 2            | 2 (100.0)   |
| Provincial leader               | 7            | 7 (100.0)   |
| City, district (county) leading | 28           | 25 (89.3)   |
| Other                           | 21           | 113 (61.9)  |

Table 5: To determine the needs of business-to-consumer

| Consumer willingness to pay | No. of enterprises (unit) | Willing to establish traceability system of enterprises (a/%) |
|-----------------------------|---------------------------|---|
| No effect                   | 53                        | 44 (83.0)   |
| Influential                 | 19                        | 10 (52.6)   |

establish traceability system. That assumption, the supply system can be traced back when entering into consideration the needs of consumers (Table 5).

**Technological development:** In the survey found that 78% of the slaughterhouses have a hand-held card reader, computer, traceability labels and other basic facilities but relatively high on the professional and technical testing room only seven companies have a simple test equipment. The survey also found that companies do not understand the traceability system can be traced back to the complexity of the necessary equipment to invest time and other issues are not understood. Although, the problem is not reflected in the questionnaire but the survey found that if the technology can be traced back a very mature, relatively convenient, corporate willingness to accept will be increased.

**The level of competition:** Through the survey, the sale of livestock products in the summer into the season, the farmers of the decline in the same slaughter business is declining. As breeding and slaughtering of entry, exit threshold is not high so that 10% of companies have chosen to support the off-season does not even care less. They almost do not want to create traceability system in the off-season but the peak season in livestock products in order to compete with other enterprises to improve competitiveness of their products and willing to establish traceability system.

In the same district or county to do research especially when relatively close to the location of the farm, the establishment of farmers will be more susceptible to the influence of other farmers. Doing the survey found that some farmers or large-scale slaughtering enterprises have established the conditions of traceability but not established and asked why 50% are answered on the traceability system do not understand there are 40% is that the competitors did not establish that he did not need to build. These shows the establishment of enterprises

Table 6: Degree of perfection of the industrial chain business of the establishment of traceability system

| Tightness of the upstream and downstream | No. of enterprises (unit) | Willing to establish traceability system of enterprises (a/%) |
|--|---------------------------|---|
| Very close                               | 14                        | 14 (100.0)  |
| General close                            | 24                        | 22 (91.7)   |
| Does not close completely                | 20                        | 11 (55.0)   |

Table 7: The impact of policy on business

| The impact of government policies | No. of enterprises (unit) | Willing to establish traceability system of enterprises (a/%) |
|-----------------------------------|---------------------------|---|
| No effect                         | 17                        | 9 (52.9)  |
| Influential                       | 54                        | 48 (88.9)   |

will be subject to acts of competitors especially nearby on the other hand shows a weak awareness of enterprise competitiveness, the competitiveness of enterprises lack a deep understanding.

**The livestock industry supply chain, entering into the perfect degree of impact analysis can be traced back system:** This is mainly through the slaughterhouses and the farmers contracted companies and supermarkets or slaughter (or processing enterprises) have long-term supply relationship to reflect the two issues. If farmers and supermarkets with (or processing enterprises) are signed then the relations are very close if only one contract is usually closely if no long-term supply agreement is not close completely.

As can be shown from the Table 6, the majority of enterprises are closely linked with the party while 91.7% of these enterprises companies willing to establish traceability system. Integration is not willing to build companies with high traceability system and only 55%. Morefully, explain the higher degree of integration, the enterprise will establish traceability system more strongly.

**The government policy can be traced back to the enterprises to establish a system of impact analysis:** About 76% of enterprises believe that government decisions affecting their own through the interviews found that 64% of the companies that the establishment of traceability system requires strong government support, especially financial and technical and mentioned more than willing to support the establishment of the government traceability system.

The survey shows that there is support in the government; the 88.9% of the enterprises are willing to establish traceability system. These data show that the government has established traceability system manufacturers to encourage and support policies on the supply of the main acts have a major impact and are positively correlated (Table 7).

### **EMPIRICAL ANALYSIS**

For the pervious four assumptions through questionnaires and interviews, slaughtering enterprises, farmers carry out empirical analysis shows that the supply of the main factors of production, external demand conditions, the degree of perfection livestock industry chain enterprises such variables is important to establish traceability system impact in line with expectations.

### **CONCLUSION**

The results show the main supply production factors, external market conditions, degree of perfection of the livestock industry chain and the policy can be traced back system for producers will create an important influence.

### **RECOMMENDATIONS**

The main elements from the supply point of view, the larger the enterprise, established later, the management of the higher education level, knowledge can be traced back to the more higher, the level of the leading enterprise and the establishment of traceability system will higher. Therefore, enterprises can further reduce the number of slaughtering, slaughtering enterprises to expand scale and improve the competitiveness of enterprises, resulting in economies of scale.

The companies believe that the greater the demand of consumers, enterprises will establish traceability system increases. In the season and competitors have established traceability system, the enterprise system can be traced back to the establishment of a higher degree of acceptance. Therefore, there should increase the trace product promotion and increase consumer awareness of traceability of products so consumers are willing to buy back products to promote the supply-side initiative to provide traceability of products.

Upstream and downstream enterprises more closely, the higher degree of integration and the enterprise can be traced back more willing to build system. Government should encourage enterprises to implement slaughtering vertical integration and corporate farms and contract sales, reduce transaction costs between enterprises and trace costs. There can be traced back to technology is relatively simple, quick, lower cost and more willing to build the main supply can be traced back system.

Technologies to increase R and D investment back, according to characteristics of the supply and consumption of livestock products, environment, development of convenient back equipment, to reduce the supply side of trace technology, training, equipment purchase and other inputs, in particular to resolve the slow upload information, data processing slow the problem there will be more companies willing to participate in the system can be traced back to. However, these factors did not do this econometric model analysis, no analysis of the impact of each factor remains to be further studied.

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