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Factor analysis of information asymmetry on pledges of warehouse certificates with the application of the internet of things

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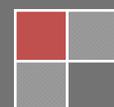
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ABSTRACT

The problem of asymmetric information is the bottleneck of development of pledges of warehouse certificates business, along with the information technique especially the development of the Internet of Things, the establishment of information sharing platform in order to improve the information asymmetry problem become possible. Study on the influence factors to construct the system information is the premise of constructing information sharing platform. I have designed a perception questionnaire named asymmetry information about pledges of warehouse certificates based on the literature analysis and expert investigation, then requested the persons who are engaged in banks, warehousing enterprises, financing enterprises and related scientific research which are about pledges of warehouse certificates to fill in. The paper researches the factors that cause asymmetry information in the process of pledges of warehouse certificates business with the use of exploratory factor analysis on collecting questionnaires. The research shows, the information related pledges of warehouse certificates from financing of enterprises, pledged goods, administrative agencies, and other warehouse receipt pledge business social agencies are the factors which cause information asymmetry in the process of pledges of warehouse certificates business.

KEYWORDS

Pledges of warehouse certificates; Asymmetry information; Exploratory factor analysis; Information sharing platform.



RAISE OF PROBLEMS

Small and medium-sized enterprises (SME) are the most vigorous elements of economic development in all countries. However, the financing difficulty has become the bottleneck that restricts the SME development. The mode of pledges of warehouse certificates has been gradually accepted by the society because of the advantages as relatively low risk, low financing cost and strong operability. This mode was affected by whether risks in loans can be effectively controlled, then the scope and the scale of business have not been successfully expanded. Domestic and foreign scholars have carried out relevant researches on the risks in pledges of warehouse certificates. Among all the reasons that cause the risks in loans, the problem of asymmetric information is a major one.

Asymmetric information was raised by Kenneth J. Arrow for the first time in 1963. In the famous works *The Market for Lemons* published by George Akerlof in the 1970s, the concept was further expatiated. Three U. S. economists, Akerlof, Spence and Stiglitz won the 2001 Nobel Prize for Economics because of the research achievements in asymmetric information market and information economics. In the classical document *Credit Rationing in the Market with Imperfect Information*, through the S-W model^[1], Stiglitz and Weiss (1981) proved that adverse selection caused by information asymmetry is the fundamental reason for the generation of credit rationing. Because of asymmetric information, banks do not have very clear recognition on the actual risk tolerance of every loan applicant. In order to avoid adverse selection brought thereby, banks are more willing to adopt credit rationing to provide loans on the lower interest rates level instead of providing more loans under high interest rates in order to reach the capital supply and demand equilibrium. Zhang Weiying (1997) pointed out that on the capital market there are three types of asymmetric information between the two parties' investment and financing^[2]. Lin Yifu (2004) carried out the discussion on the difficulties in financing of small and medium-sized enterprises in China in terms of information asymmetry, which is considered to be the main reason to cause financing obstacles between small and medium-sized enterprises and financial institutions^[3]. Wu Jinglian (2004) considers that the same problem exists between guarantee institutions and their customers^[4].

In order to solve the problem of asymmetric information, banks and warehousing enterprises that are involved in the operation of pledges of warehouse certificates in recent years are all quite active in solving with application information technology. Now the technology of the Internet of Things has also brought good opportunities for the development of logistics financial information technology. In recent years, researchers dedicated to pledges of warehouse certificates started to suggest using the technology of the Internet of Things to carry out management on the pledges of movable properties. For example, Xu Hongjun (2010) proposed to use the Internet of Things to monitor the risks in pledges of movable properties so as to solve the problem of supervision on the pledges of movable properties^[5]. Jiao Fangmin (2010), on the basis of recognizing the supervision functions of the Internet of Things on pledges of movable properties, structured information system frame to lay a theoretical basis for the establishment of the information platform of the Internet of Things^[6]. However, very few people have studied the problems concerning construction of sub-systems in the information system of pledges of warehouse certificates based on the Internet of Things, which has made the structuring of sub-systems in the information system lack of theoretical support. The researches made in this article analyzes the factors that causes risks and attempts to attribute the factors to the sub-systems of information system based on the blank of the current research, based on the profession of pledge of warehouse certificate, taking the risk management of which as the entry point, and eventually combine these sub-systems to build the information system, and provide theoretical foundation for the construction of information system of the Internet of things.

RESEARCH DESIGNS

Theory frame

In the practice of pledges of warehouse certificates, elements of risk control based on breaking the strategy of information asymmetry are generally existing in many aspects. For example, enterprises with London Clearing House as representative, when controlling risks, mainly consider the risks in credit, contract performance, market, law and circulation, etc. of the opposite party^[7]. The theory sector has quite abundant analysis on factors that cause risks in pledges of warehouse certificates. For example, Liu Jinming (2007)^[8], Yang Juan (2009)^[9] and Zhang Zhonghui (2011)^[10] kept restoring the basis of researches of the previous reachers, generally considering that risks in management, guarantee, pledge proprietorship, policies and laws and technologies are critical factors that cause risks in pledges of warehouse certificates.

However, so-called factors that affect the asymmetry of information of pledges of warehouse certificates in the studies of the theory sector are generally abstract. Operability problem occurs when these items are incorporated into the information system. For example, the factor "if the pledged goods have been insured", if it is investigated according to the regular way if insurance has been purchased, usually it is based on the policy issued by insurance company. Strictly speaking, in the time that fake certificates are overwhelming, the probative force of this item might not be guaranteed. Another example is "safety management system of logistics enterprises", things on system level are generally abstract, which can only be specified with detailed measures of safety management. Analysis on factors of risk management on theory level is not the same as that from the view of information technology. Researches of the Author in this article are to seek for factors of risk management of pledges of warehouse certificates suitable for the development of information system. These factors, as subsystems in the information system can be independent and have operability in reality, eventually can realize the problem of asymmetric information in pledges of warehouse certificates.

In the real operation of pledges of warehouse certificates, harms caused by asymmetric information to banks mainly include such three aspects as false information, improper performance of contract and obstacles in channels for acquiring relevant information from financing enterprises.

(1) False Information

In the operation of pledges of warehouse certificates, under the conditions that the bank cannot get access to the financing enterprise and the actual collateral, it can only learn the information about the enterprise and the collateral from the written files provided by the enterprise, which provides possibility of falsification of the financing enterprise to cheat on the bank to get loan. False information is mainly shown in the following two aspects: first is that the financing enterprise exaggerates its insolvency, profitability, operation management status and operation capacity, etc.; and second is that it conceals the actual situation of the collateral, for example, taking smuggled goods to pledge, while such goods might be sealed and confiscated unconditionally by the customs; another example, the financing enterprise pledges the goods that have been pledged for financing. Because the mortgage right in China is superior than pledge right, if collateral involving in dispute is taken for execution for mortgage in priority, the pledged bank will confront the situation of pledge right falling.

(2) Improper Performance of Contracts

During the period of performance of contract of pledges of warehouse certificates, the goods are supervised by the warehousing enterprise. Improper performance usually has three forms of behaviors: firstly, the financing enterprise pledges defective goods or the goods that do not have consistency in quality and price by taking advantage that the bank and the warehousing enterprise do not totally understand the pledged goods; secondly, by using the characteristic of warehousing enterprise that sometimes focus more on acquiring warehousing cost, the financing enterprise persuade the warehousing enterprise to hide the specific information of the collateral entering and leaving the warehouse; under the situation that warehousing is done in batches, it plays embezzlement trick with the warehousing enterprise, trying to guarantee the package complete, and use inferior goods, and even take out the pledged goods from the package; thirdly, after the expiry of the pledge period, the financing enterprise avoids responsibilities, refuses to repay the loan to the bank, causing unavoidable losses to the bank.

(3) Obstacles of Channels in Acquiring Relevant Information about the Financing Enterprise

Because of lack of departments and organizations that master information of SMEs, banks acquire information about the financing enterprises through their own channels. It is very difficult to completely and correctly get full information about the SME, which will increase the cost of the bank. Before a bank formally gives the pledges of warehouse certificates to a financing enterprise, it shall usually carry out complete review and inspection on the enterprise credit, operation management status and market sales of the pledge. Because some information involves in trade secret of the financing enterprise, which might conceal deliberately, it will be difficult for the bank to directly acquire complete information from the financing enterprise. Even if it can, the authenticity of information cannot be guaranteed. Therefore, relevant information from governmental institutions or social organizations shall be used as support to prove the authenticity of the information, such as the Archives from the administration for industry and commerce and the taxation departments, credit files of the enterprise from other banks, and evaluation on it by cooperators and companies of the same industry, etc. In the process of performing contract of pledge of warehouse certificates, the bank entrusts warehousing company to supervise the goods, so the real-time information of warehousing of the pledge relies on the provision from the warehousing company. In particular, information volume and complicity of operation of goods that are delivered to and from warehouse in batches are increased. How to carry out correct and direct information connection with the warehousing enterprise will directly affect the efficiency of pledges of warehouse certificates.

In terms of the three main aspects mentioned above, based on the first-hand information obtained through interviews and consulting relevant documents, combining research results already available home and abroad, this paper designed a questionnaire and carried out researches according to the following three steps, in which specific plan of every study is given below:

Firstly, by consulting documents to collect classical theories of researches on risks of pledges of warehouse certificates and the indications of risk evaluation, focusing on operability of information, design perception questionnaire on information asymmetry of pledges of warehouse certificates.

Secondly, aiming at perception questionnaire on information asymmetry of pledges of warehouse certificates, investigate relevant banks involving in the operation of the pledges, warehousing enterprises, financing enterprises and researchers in pledges of warehouse certificates; use exploratory factor analysis, check credibility and efficacy of initial model of information asymmetry factors of pledges of warehouse certificates, and finally explore relevant factors;

Thirdly, by analyzing the elements of information asymmetry of pledges of warehouse certificates combine the explored factors in the form subsystems to build information system structure of the Internet of Things.

Design of questionnaire

Considering that the operation of pledges of warehouse certificates mainly has three roles: bank, financing enterprise and warehousing enterprise, and they have different understandings on the problem of information asymmetry of the pledges, the questionnaire has been designed with three parts. The starting part requests the interviewee filling his/her personal information, including industry engaged, duration in the industry, level of knowledge and understanding on the operation of pledges of warehouse certificates.

The second part of the questionnaire is mainly implemented aiming at asymmetric information problems, including 20 items that causing such problems of the information of pledges of warehouse certificates, indicated as in the following TABLE 1:

TABLE 1 : Content of items in the questionnaire

No	Item	No.	Item
1	Relevant information provided by administration for industry and commerce	11	Insolvency of the financing enterprise
2	Relevant information provided by taxation department	12	Growth and innovation ability of the financing enterprise
3	Credit record of the enterprise that participates in financing	13	Legality of the pledged goods
4	Forecast on the prospect of the industry of the pledged goods	14	Reliability of the warehouse certificates
5	Market changes of the pledged goods	15	Customers' credit grading
6	Operation conditions of the financing enterprise	16	Selection on types of pledged goods
7	Safety management facilities for the pledged goods' warehouse	17	Quality of pledged goods
8	Evaluation capacity on the pledge	18	Stability of price of the pledged goods
9	Operation ability of the financing enterprise	19	If the pledge has been insured
10	Profitability of the financing enterprise	20	Warehouse management cost

The aforesaid 20 items will be questioned in the form of 20 topics, each of which is measured by Likert five-grade table, value varying from 1 to 5 (1 indicates that the relation with the pledge of warehouse certificate is very important, and 5 indicates very unimportant).

The third part of the questionnaire involves in information sharing, which is not only the investigation on current situation of information sharing, but also seeking for reference for discussing solutions.

From May 2012 to March 2014, the Author made questionnaire inquiries to workers or relevant personnel of pledges of warehouse certificates. The questionnaires issued were mainly filled and answered in two ways, including paper questionnaire and that on the website (<http://www.sojump.com/jq/1940298.aspx>).

Sample distribution and data processing

As the questionnaire mainly discusses the factors that affect information asymmetry of pledges of warehouse certificates, items involved reached as many as 20, which were answered by single choice. Persons filling the questionnaire might have tiredness or subjective bias; other question forms were attached when designing the questionnaire. The contents, in essence, were corresponding to the single choices of these 20 items, but the point of view of questioning was adjusted so as to check if the person that filled was in consistency. If there were conflict, the questionnaire would be made null. This method increased the effectiveness of the questionnaire. Through checking and arrangement, 12 disqualified questionnaires were eliminated from the 118 collected. The effectiveness rate was 89.8%.

Based on the analysis made on the remained 106 questionnaires, the sample structuring status is as shown in TABLE 2 below.

TABLE 2 : Basic characteristics of samples

Industry	Frequency Percentage		Time of engagement	Frequency Percentage		Level of understanding on pledges of warehouse certificates in China	Frequency Percentage	
	Frequency	Percentage		Frequency	Percentage		Frequency	Percentage
Commercial bank	28	26.4	Below 5 years	40	37.7	Familiar	26	24.5
Futures company	9	8.5	5-10 years	43	40.6	Normal understanding	52	49.1
Logistics company	12	11.3	10-15 years	16	15.1	Heard about	28	26.4
General enterprise	16	15.1	Above 15 years	7	6.6	Not clear	0	0
Scientific research institutes	22	20.8						
Others	19	17.9						

Credibility and validity of questionnaire

In order to guarantee the validity of survey data, before the start of formal survey, design quality of the questionnaire must be inspected so as to carry out quality control on it. Credibility analysis was made on the remained 53 questionnaires. SPSS17.0 statistical analysis result showed α value, which indicates that the credibility of the questionnaire is quite good. See TABLE 3:

TABLE 3 : Reliability statistical easurement

Cronbach's Alpha	Cronbachs Alpha based on standardized items	Number of items
.944	.945	20

TABLE 4 : KMO and bartlett test

Sampling sufficient Kaiser-Meyer-Olkin measurement		.826
Bartlett sphericity test	Similar chi-square	884.343
	Df	171
	Sig.	.000

The α value of the question of “relation between forecast on the prospect of the industry and the pledged goods” is 0.945. Compared to Cronbach's Alpha=0.944 in TABLE 3, this value increased instead of decreased, which indicated that the question was not good and should be eliminated. Credibility analysis was made after incompliance item of α value was raised. Please refer to TABLE 4 for KMO test result:

KMO test result is 0.826, Bartlett sphericity test is 884.343 (df=171), $p=0$, which indicated that common factors existed between items. According to the judgment standard given by Kaiser, when $0.8 < KMO < 0.9$, it meant that validity of data structure is good, factor analysis can be carried out.

RESEARCH RESULT

Main elements analysis approach has been adopted for analysis on exploratory factors by drawing factors with the characteristic value over 1. Varimax was used to carry out orthogonal rotation on the factors. Through SPSS software analysis, 4 factors were taken from the 19 variables in the statistics. It can be seen from TABLE 5 that variable relative coefficient maximum has 4 characteristic roots higher than 1, respectively being 9.671, 2.234, 1.511 and 1.153, jointly explained 76.685% of the 19 variables. That is to say, the preceding 4 factors jointly reflect most of the information of original data. Therefore, it is appropriate to withdraw 4 common factors, can reflect the situation relatively completely. Structure matrix has been obtained as shown in TABLE 6.

TABLE 5 : Total variance of explanations

Element	Initial Eigen Value			Quadratic Sum Withdrawn Loaded Rotation Quadratic sum Loaded a			
	In total	% of variance	Accumulated %	In total	% of variance	Accumulated %	In total
1	9.671	50.900	50.900	9.671	50.900	50.900	5.413
2	2.234	11.761	62.661	2.234	11.761	62.661	5.680
3	1.511	7.955	70.615	1.511	7.955	70.615	4.503
4	1.153	6.069	76.685	1.153	6.069	76.685	6.940
5	.677	3.563	80.247				
6	.593	3.122	83.370				
7	.578	3.040	86.410				
8	.477	2.508	88.918				
9	.413	2.171	91.090				
10	.373	1.962	93.052				
11	.290	1.524	94.576				
12	.268	1.409	95.984				
13	.185	.974	96.958				
14	.159	.839	97.797				
15	.146	.768	98.565				
16	.114	.599	99.164				
17	.083	.438	99.602				
18	.047	.248	99.850				
19	.028	.150	100.000				

Method of withdrawal: analysis on main elements.

After elements are correlated, it is not possible to get total variance by adding quadratic sum loaded.

TABLE 6 : Structure matrix

	Element			
	1	2	3	4
G11 Insolvency of the financing enterprise	.891	-.523	.164	-.344
G10 Profitability of the financing enterprise	.877	-.290	.344	-.493
G6 Operation management conditions of the financing enterprise	.750	-.701	.423	-.487
G9 Operation ability of the financing enterprise	.720	-.573	.496	-.466
G14 Reliability of warehouse certificate	.516	-.908	.356	-.472
G5 Market changes of goods of warehouse certificates	.348	-.836	.211	-.424
G17 Quality of pledge	.307	-.835	.490	-.364
G13 Legality of pledged goods	.599	-.791	.314	-.251
G18 Stability of price of pledge	.495	-.684	.516	-.480
G1 Information about financing enterprise in administration for industry and commerce	.276	-.257	.971	-.397
G2 Information about financing enterprise in taxation department	.206	-.340	.951	-.435
G7 Safety management facilities of warehousing enterprise on the pledge	.271	-.374	.344	-.847
G19 If the pledge has been insured	.131	-.270	.555	-.837
G20 Management expenses	.472	-.091	.418	-.828
G3 Credit record of participating enterprise	.552	-.118	.505	-.821
G8 Appraisal ability of pledge	.355	-.541	.259	-.781
G15 Credit evaluation of financing enterprise	.411	-.455	.412	-.767
G12 Growth and innovation ability of financing enterprise	.575	-.305	.311	-.749
G16 Selection of types of pledges	.567	-.424	.345	-.642

Method of withdrawal: analysis on main elements.
Rotation method: with oblique rotation, Kaiser standard.

From TABLE 6, analysis result on exploratory factors is as follows:

1) According to the loads of 19 variables on each factor, factor attribution was carried out. The loads of variables G11, G10, G6 and G9 on the first factor are respectively 0.891, 0.877, 0.750 and 0.720. The loads of variables G14, G5, G17, G13 and G18 on the second factor are -0.908, -0.836, -.835, -0.791 and -0.684 respectively. The loads of variables G1 and G2 on the third factor are 0.971 and 0.951. The loads of G7, G19, G20, G3, G8, G15, G12 and G16 on the fourth factor are -0.847, -0.837, -0.828, -0.821, -0.781, -0.767, -0.749 and -0.642 respectively.

2) It is found in TABLE 6 that loads of 4 variables attributable to multiple factors are quite close, which indicates that the credibility of these 4 variables are not good, should be deleted. The performance of the loads of these 4 variables with bad credibility is as follows: the loads of G6 attributable to the first factor and the second factor are 0.750 and 0.701 respectively; the loads of G18 attributable to the first factor and the second factor are -0.684 and 0.516 respectively; the loads of G12 attributable to the first factor and the fourth factor are 0.575 and -0.749 respectively; and the loads of G16 attributable to the first factor and the fourth factor are 0.567 and -0.642 respectively.

3) After the processing of the preceding two steps, attribution of remained variables is shown in TABLE 7 below:

TABLE 7 : Variable pooling table

1st factor	G11 Insolvency of financing enterprise	2nd factor	G14 Reliability of warehouse certificate
	G10 Profitability of financing enterprise		G5 Market changes of goods of warehouse certificates
	G6 Operation management conditions of financing enterprise		G17 Quality of pledge
3rd factor	G1 Information about the financing enterprise in the administration for industry and commerce	4th factor	G13 Legality of pledged goods
	G2 Information about the financing enterprise in the taxation department		G7 Safety management facilities of the warehousing enterprise on the pledge
			G19 If the pledge has been insured
			G20 Management expenses
			G3 Creditor record of participating enterprise
			G12 Appraisal ability of pledge
			G15 Credit evaluation of the financing enterprise

4) According to the combinations of variables and elements in aforesaid analysis result, names were given to the four factors respectively.

①The 3 variables corresponding in the first factor are all aiming at relevant situations of the financing enterprises and match quite well the actual situation of operation in reality. This part of information is the most important, and also the easiest to cause information asymmetry. The body that provides such information is the financing enterprise itself, which usually is not willing to share the information. Therefore, it is very difficult to obtain complete and specific information through such approaches as negotiation and contracting. However, with the deepening of enterprise information level, this part of information in fact can be obtained separately as information module. Through information technology approach, relevant data of enterprise's internal system can be connected to the information sharing platform through special channel by using data mining technology. This will guarantee that banks or other loan-issuing enterprises can correctly acquire relevant information, and trade secrets of the financing enterprise not be stolen. The first factor can be named as relevant information of financing enterprise.

②The 4 variables corresponding in the second factor seem to have no relation, but they have something in common, i.e. the information of these 4 parts is surrounding the pledge itself. It seems the easiest to get such information, but the accuracy of which is difficult to be guaranteed.

Firstly, because warehouse certificate is usually issued by the warehousing enterprise, the intermediate body seems to be a third party, isolated from bank and financing enterprise, but in fact has interest relationship with both. With seeking for profits as the main purpose, warehousing enterprise might carry out profit game in front of such relationship and thus conducts act against the regulations. In the business of pledges of warehouse certificates, the operation expenses of the warehousing enterprise are paid by the financing enterprise. Such interest relationship will make the warehousing enterprise be drawn to the side of the financing enterprise so as not to be able to issue warehouse certificate based on reality, causing difference between the pledge on the certificate and the actual pledge. The pledged goods are mainly supervised by warehousing enterprise, which, as professional organization engaged in management of cargo, is professional in providing information about goods, and is demanded by the market as well.

Secondly, pledged goods are always supervised by warehousing enterprise. The supervision effect of warehousing enterprise directly affects the existing value of such pledge in the operation of pledges of warehouse certificates. The keys of supervision of warehousing enterprise are not only shown that static data including quantity, specifications and value of pledge is in conformity with warehouse certificate, but also represented in that dynamic operation of pledge before entered into warehouse, in storage and after delivered from warehouse synchronously with the requirements of the bank. With the maturity of the technology of the Internet of Things, it will make the management focusing on goods easier and easier, so it can be added into the information sharing platform as a sub-module of information. The second factor can be named as relevant information of the pledged goods.

③The 2 variables corresponding in the third factor are all information of administrations. These two departments are the competent organizations that can carry out direct management over financing enterprise by far. They not only have correct information about the financing enterprise that is quite systematic, but also they offer good social services. With the investment and construction of big data of governmental government, it is more and more feasible to get data from these organizations. The third factor can be named as relevant information of administrations.

It is worth explaining and the customs is also related administrative supervision department. However, in pledges of warehouse certificates, information from the customs is mainly used to clarify the identity of import and export of goods. Compared to administration for industry and commerce and taxation department, the probative force to prove the detailed situation of the financing enterprise is not prominent. In practice, many financing enterprises do not involve in import and export. After the arability of technology of the Internet of Things, the RF label technology on the goods can be used to track the source of the goods, including the customs' information. Therefore, relevant information from the customs has not been taken as an item in the questionnaire. In actual practice, information of this part can be taken as optional information module to be selected by areas or departments that have frequent import and export operations.

④The variables corresponding in the fourth factor are quite complicated, involving a wide range. Sources of information comprise warehousing enterprises, insurance companies, other banks, appraisal organs and credit evaluation institutions etc. The common characteristic of the main bodies of information source is that they are all economic entities carrying out independent settlement, and the information provided by them has auxiliary function on evaluating the risks in pledges of warehouse certificates. However, compared to administrative organizations, the information provided by them is quite dispersing, not possessing complete authority. Its correctness relies on the operation management level of the organization. In information system, the subsystem is realized in the form of adding modules and expanded continuously, can be taken as the basis for grading of risks. In the future of big data development, the accessibility of information of such part will become more and more feasible. The fourth factor can be named as relevant information of related collaborated organizations.

DISCUSSION AND CONCLUSION

Through analysis on exploratory factors, the article decides theoretically that the factors affecting information asymmetry of pledges of warehouse certificates are composed of 4 dimensions, i.e. relevant information from financing enterprise, pledged goods, administrative departments and organizations involved. It is worth mentioning that the information about these four parts is relatively independent and complete, scattered in different departments and forming their own system. This has provided a practicing basis for building the information sharing platform planned by the article.

According to the researches made by the article, the conclusion drawn is: the state may break the situation of asymmetric information through technical approaches when solving enterprise financing, especially SMEs' financing, so as to greatly develop the pledges of warehouse certificates. Technical approach mentioned here is to build information sharing platform, starting from the four angles including financing enterprise, pledged goods, administrative departments and organizations involved, to connect the information of such four segments with the information sharing platform in the form of modules. This will not only guarantee the correctness of information, but also reduce the difficulty in acquiring the information so as to guarantee healthy and orderly development of the operation.

Aforesaid findings are the main contributions of this article. The exploration not only provides theoretical basis for building information sharing platform for pledges of warehouse certificates, and can provide reference for solving the problem of information asymmetry for other financing modes.

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