

Association for Information Systems AIS Electronic Library (AISeL)

Eleventh Wuhan International Conference on e-Business

Wuhan International Conference on e-Business

5-26-2012

The Design of Financial Coordinated Supervision Platform for Online Payment under Paperless Trade

Ping Song

School of Economics, Wuhan University of Technology, China, songpingwhut@163.com

Dan Huang

School of Economics, Wuhan University of Technology, China, huangdan0601@126.com

Qifeng Yang

School of Economics, Wuhan University of Technology, China, yangqifengwhut@163.com

Yan Zhang

School of Economics, Wuhan University of Technology, China

Follow this and additional works at: <http://aisel.aisnet.org/whiceb2011>

Recommended Citation

Song, Ping; Huang, Dan; Yang, Qifeng; and Zhang, Yan, "The Design of Financial Coordinated Supervision Platform for Online Payment under Paperless Trade" (2012). *Eleventh Wuhan International Conference on e-Business*. 76.
<http://aisel.aisnet.org/whiceb2011/76>

This material is brought to you by the Wuhan International Conference on e-Business at AIS Electronic Library (AISeL). It has been accepted for inclusion in Eleventh Wuhan International Conference on e-Business by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

The Design of Financial Coordinated Supervision Platform for Online Payment under Paperless Trade

Ping Song¹, Dan Huang², Qifeng Yang³, Yan Zhang^{4*},
School of Economics, Wuhan University of Technology, China

Abstract: Online payment is significant for paperless trading, but the problem about money laundering and credit fraud is the biggest bottleneck for its development. Making the abundant customer data and financial transaction data be well ordered is a reliable clue of effectively identifying suspicious financial transactions, which is the core of financial supervision. Based on the analysis of existing payment models problems, this paper proposes an online payment financial coordinated supervision industry chain model under paperless trade, and designs function modules, data standard and interface standard .

Keywords: paperless trade, online payment, financial coordinated supervision platform

1. INTRODUCTION

Paperless trade defines that participants in the trade chain use standard business data transmission and processing completely with information technology instead of paper in the whole contract performance process. It requires the effective coordinated supervision among links of the trade. In the current studies, many scholars have proposed "two chains" or "three chains" integration. For example, Kurt Cavano suggested building a common platform to integrate capital with logistics ^[1]. EMMANUEL LARYEA thought associating business with government was the key to promote fast development of paperless trade ^[2]. Somnuk Keretho thought a electronic trade platform with business, logistics in one of the single window can play a key role ^[3]. But the fast development of international trade requires more efficient and effective paperless trade, It is necessary to establish a electronic trade platform with business, logistics, capital and government. In the domestic research, Kaifu Luo, Junsheng Liu have realized the importance of "4-flows" integration ^[4,5]. Yuzhou Wang analyzed the synchronization problem between capital flow and orders information flow in B2B and explained the current payment models didn't work ^[6]. Hanlin Chen pointed out that capital flow plays the key role in the trade integration ,which need more online payment functions in the electrical supply chain ^[7]. The paperless trade in our country was seriously hindered because of "online payment", and the problem about online payment and credit fraud have been harm to the financial system security. Yun Feng constructed the money laundering and anti-money laundering model after analyzing the money laundering behavior in network ^[8]. Qi Chen constructed a anti-money laundering model based on multi-agent identifying technology ^[9]. However, these anti-money laundering monitoring and identifying technology were mainly designed for banks, foreign exchange market , other traditional financial institutions and financial business. The anti-money laundering technology in the actual application were often based on experience, whose precision, efficiency and instantaneity are not enough. So we need to develop more effective anti-money laundering monitoring and identifying technology. Making the abundant customer data and financial transaction data be well ordered and fully shared is a reliable clue of effectively identifying suspicious financial transactions, which is the core of financial regulation. All of these need to achieve "4-flows" full integration and collaborative management.

* Corresponding author. Email: songpingwhut@163.com(Ping Song) , huangdan0601@126.com(Dan Huang) , yangqifengwhut@163.com(Qifeng Yang)

2. REQUIREMENTS ANALYSIS OF ONLINE PAYMENT FINANCIAL COORDINATED SUPERVISION PLATFORM UNDER PAPERLESS TRADE

2.1 The problems of the existing online payment mode

At present , the main online payment modes in China include traditional bills payment mode, the third-party online payment mode and "commercial banks + third-party online payment platform" mode. The history of the traditional bills payment mode is the longest and the user is the most, but it is not fit for the development of paperless trader. The third-party online payment is limited and can't be the dominant mode. And for "commercial banks + third-party online payment platform" , the study found that there are three prominent problems: (1) No synchronous transfer both capital and order information flow. (2) No interbank payment. It is the biggest obstacle of the interbank payment that commercial bank's interface standards were not unified. (3) No financial coordinated supervision. At present, payment, governmental examination and approval, and logistics distribution are not collaborative in the paperless trade. When enterprises pay through the bank system, the bank system can't know the business details of each enterprise department, and the government regulators can't see the specific capital flow in a trade yet.

In view of our country's existing online payment modes have these deficiencies, so it will bring some difficulties in recognizing customers , identifying large-value and suspicious payment transactions ,and real-time monitoring to financial supervision. To solve these existing problems, this paper designs online payment financial coordinated supervision platform under paperless trade. Through building unified structured data storage formats, unified interface standard, unified authentication mechanism, the information between enterprises can be effectively integrated. Then we can achieve the effective supervision of financial institutions and coordinated supervision between the application system.

2.2 Industrial value chain of online payment financial coordinated supervision under paperless trade

The existing online payment modes in China are running according to the capital flow path. Each online payment roughly need to pass foundation payment layer, backbone payment layer and application payment layer. In figure 1, the service departments are on the left, the services systems provided by them are on the right side in every layer.

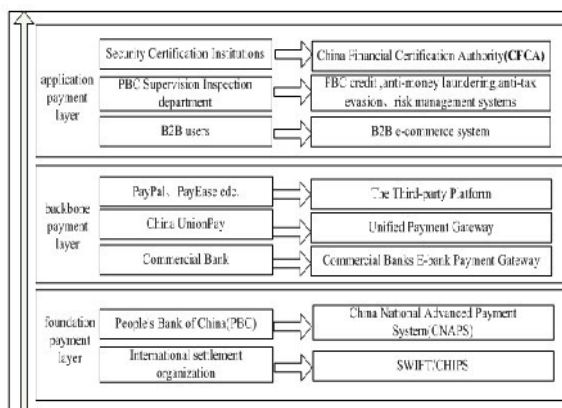


Figure 1. - Online payment industry chain model^[10]

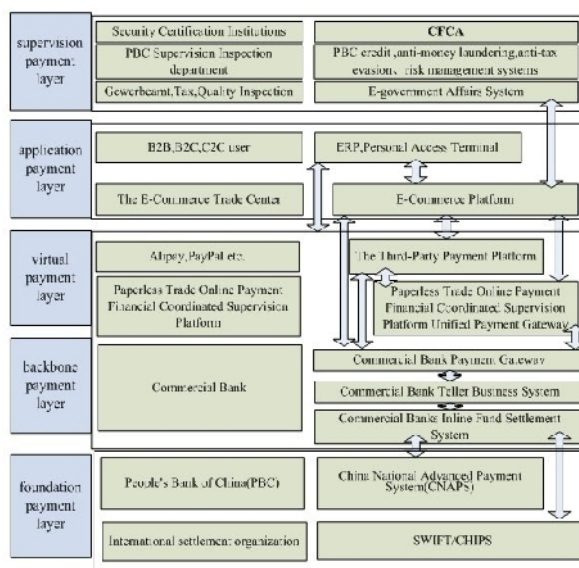


Figure 2. - Paperless-trade-online payment-financial coordinated supervision industrial value chain model^[11]

In this paper the collaborative online payment processing system is in the backbone payment layer of payment industry chain. As shown in figure 2, new processing system will change the connection between the backbone payment layer and the foundation payment layer, the specific performance: (1) Separate virtual payment layer from the backbone payment layer to solve the

interbank payment problem; (2) Separate supervision payment layer from the application payment layer to link the virtual payment layer and the backbone payment layer with the supervision payment layer, finally achieve the online payment financial coordinated supervision under paperless trade. In figure 2, the service departments are on the left, the services system provided by them are on the right side in each layer.

3. THE MAIN FRAMEWORK OF ONLINE PAYMENT FINANCIAL COORDINATED SUPERVISION PLATFORM UNDER PAPERLESS TRADE

In order to effectively prevent online payment credit fraud and money laundering in paperless trade, all paperless trade participants need to collaborate on the online payment financial coordinated supervision platform. The framework of supervision system is shown in figure 3.

B2B transaction is the most important part of paperless trade, but most of the transaction now through the bill of exchange, cheque and other traditional way to pay because we care the safety of the large amount fund. So the design of online payment financial coordinated supervision platform under paperless trade must comply with the following principles: funds transfer safety, payment instantaneity, transaction record integrity, system high stability, system design maintenance, system construction expansibility. According to the above principles and online payment financial coordinated supervision chain model under paperless trade, this paper proceeds as follow: design objective, designs workflow, function modules , data standard and interface standard.

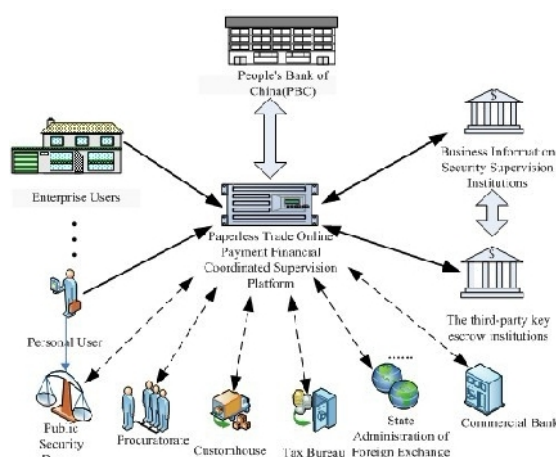


Figure 3. Paperless-trade-online payment-financial-coordinated supervision-system framework

3.1 Design objective

3.1.1 Real-time interbank payment

In order to achieve the online interbank payment, we need to integrate various bank system resources, build unified structured data storage formats, unified interface standard and unified authentication mechanism, it must have conditions as follows: (1) Independent settlement account. In this paper the platform is set up by PBC(people's bank of China), it has a strong government background and can join the clearing of CNAPS (China National Automation Payment System),and has realized the premise of the interbank payment. (2) Commercial bank association account. Because the platform specializes in online payment service, it need commercial bank management network resources. No matter in which bank the buyer or seller open the account, he can use online payment service of the platform. This is because both of the buyer and the seller open an account in the platform before online transactions, he can get an online payment account which is associated bank account. Then the user can use online payment account to complete payments, then platform accomplish the payment between platform and related bank through SWIFT, CHIPS and other international electronic

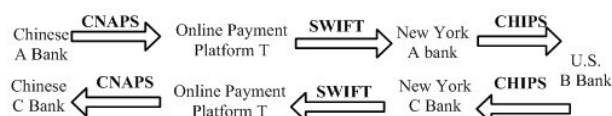


Figure 4. Paperless-trade-online payment-financial-coordinated supervision-platform-multinational-interbank-transfer-process

exchange system and CNAPS, so as to realize an interbank transfer. For example, as shown in figure 4. Chinese A enterprise imports products from the American B enterprise, payment for goods turn from A bank in China to B account in the U.S. bank, then

B enterprise used this money to import products from Chinese C enterprise, and the C open an account in C bank in China, the payment for goods should turn from B bank to C bank. "Online payment platform T" means online payment financial coordinated supervision platform under paperless trade. New York A bank is the correspondent bank of Chinese A bank, the New York C bank is the correspondent bank of Chinese C bank. Because CHIPS only serve banks in New York area, overseas multinational payment have to pay through correspondent banks.

3.1.2 Financial coordinated supervision

Making the commerce chain, financial chain, logistics chain, and government affairs chain included a foreign trade, foreign exchange, customs and tax trade department be concentrate, to realize four chain be interactive shared, and efficiently serve import and export trade, and real-time share and supervise the information in the process of trade. Finally we reach the purpose of application system coordinated supervising. Specific include three aspects: data coordination, information coordination and knowledge coordination.

3.2 Function module design

The platform aims to build a high reliable reputable, professional payment and supervision center, it regards payment as the center, security as the foundation, information flow, capital flow, logistics flow and governmental affairs flow as the link and supervision as the core principle. The main functional modules is shown in figure 5.

(1) Payment module. We need to develop independent online payment system, settlement and clearing system, the interface between platform and commercial bank or PBC, the standard interface between payment system and enterprise ERP or financial system. The payment system serves terminal shopping consumer, merchants, financial institutions, and realize the online settlement, transfer, inquiry etc. through the Internet, it can serve different kinds of merchants .

(2) Security module. Security supervision mainly makes sure the data processing system security by technology and supervision, protects the computer hardware, software, data against the accidental loss and malicious damaging, changing and divulging, and ensure the availability, integrity and confidentiality of data. Security technology system. Ensure the data in the network transmission will not be stolen, modified and damaged and all the network equipment work safely and reliably. Security supervision system. Achieve the dynamic, systematic, fully participant, institutionalized information security supervision Security evaluation system. Choose proper control goals and control mode with formulating information security strategy 'make the risks avoid, transfer or reduced to an acceptable level.

(3) Financial supervision module. The supervisor, customer service personnel and financial personnel of the platform achieve the monitoring and maintaining, realize the perfect supervision function in "4-flows". Establish various capital and credit supervision system, such as money laundering system, against tax evasion

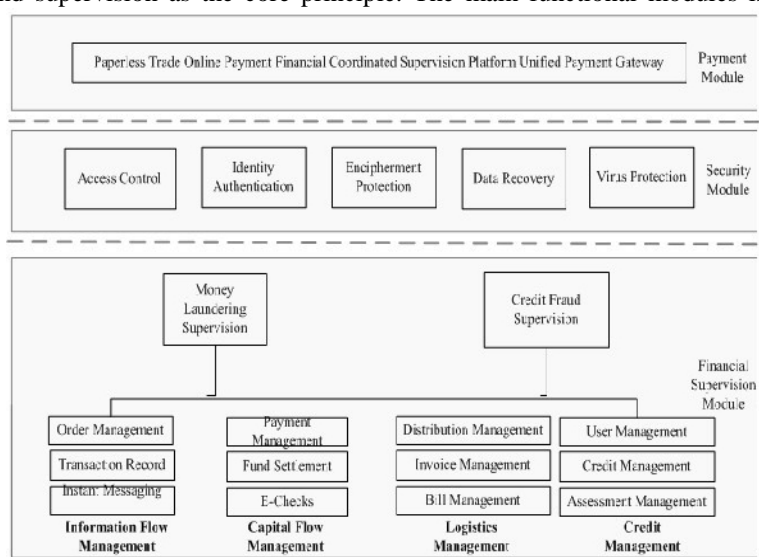


Figure 5. Paperless-trade-online payment financial-coordinated-supervision function-module framework

system and credit rating and evaluation system to realize the dynamic real-time monitoring of trade capital.

4. PROCESS AND STANDARD DESIGN OF ONLINE PAYMENT FINANCIAL COORDINATED SUPERVISION PLATFORM UNDER PAPERLESS TRADE

4.1 Business process design

Importer and exporter examine qualification and identity authentication through China's financial authentication center. The exporter click into government affairs chain system of the platform for handling the export verification sheet and customs declaration etc. Government affairs chain system will send documents directly to the financial chain system because of the communication between each systems. Platform notice the importer transfer fund to his account ,then platform suspend payment for goods.Through logistics chain system, exporter entrusts freight agent to load and transport; After goods is inspected to be qualified by importer, platform will directly send electronic bills to the government affairs chain system for export verification and drawback, then refunds to the exporter account and notify the exporter. To ensure the quality of trade, when importer receives the goods and sends out "goods unqualified" instructions, platform will return temporarily suspended money to the importer, the importer and exporter go to the relevant security departments to processing disputes. The platform will record the transaction, specially assess the credit of importer and exporter and the product quality status, then provide reference for future trade. As shown in figure 6:

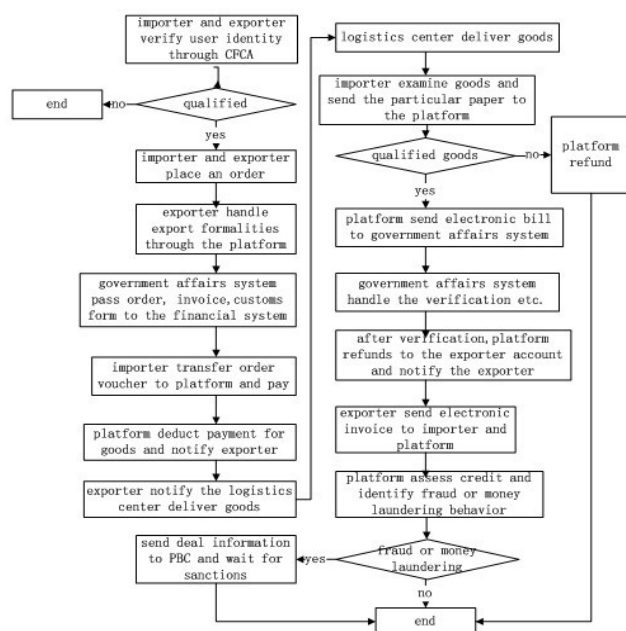


Figure 6. Online-payment-financial-coordination-supervision-paperless-trade-export-business-process

collection efficiency is improved. The payment information and orders, invoices and other information are real-time reflected in internal database of government affairs chain tax network system. The tax system can accurately grasp the real-time data, which is helpful for the government raising efficiency of tax collection and administration.

However, the standardization of data become one of the constraints to realize the above process, this is because: (1) The commercial bank statement formats are not unified. It makes the enterprise develop the information interface to the bank more difficult. (2) Interface standards, payment agreements and authentication mechanisms are not united. The enterprise must develop the interface to every bank payment gateways and sign the relevant payment agreement with every bank. That will cause great waste of resources. (3) Profits allocation

Visibly, the platform has the following advantages: (1) Payments for goods are real-time to the account. The importer transfers the payment to the platform, then platform transfers the payment to the exporter's account after the goods accepted. That get rid of many traditional steps and save a lot of time and cost, ensure the goods and payment of buyers and sellers security at the same time. (2) Import and export formalities are simplified and convenient. Trade enterprises deal with all formalities only through the government affairs chain system of platform. It improves efficiency and saves cost (3) Achieve financial coordinated supervision. Participants can share the trade information synchronously and effectively, and financial regulators track the whole trade to achieve financial coordinated supervision. (4) Tax

is difficult to be properly solved. Every bank has developed independent payment gateway, they don't want to share each other's customer resources.

Therefore, constructing the online payment financial coordinated supervision platform under paperless trade to provide a unified statement format, unified interface standard, unified authentication mechanism, it is urgent need of paperless trade online payment standardized construction in China.

4.2 Data standardization examples design

System internal data includes payment information, the relevant payment contract information, logistics information and government affairs information etc., which is in structured storage. Data structured storage can use two-dimensional logic table to represent data logical storage in databases. (1) Payment information include payer account name, payer account number, payer banks; payee account name, payee account number, payee bank; transaction type, currency, amount, transaction date and serial number etc.; (2) Insurance information include policy-holder, subject of insurance, insurance contract number, the insurance contract effective date, insurance categories, period of insurance, insurance fee term, insurance amount and insurance premium etc.; (3) The letter of credit information include payer account name, payee account name, banks, transaction type and issuing time etc.; (4) Business information include order number, trade time, user name, user ID number and contact method etc.; (5) Contract information include transaction orders and invoices etc.; (6) Logistics information include outbound, inbound and the carrier etc.; (7) Government affairs information include import license, customs, tax, forex payment and forex receipt number and performance.

The above information is contained by commerce chain system, financial chain system, logistics chain system and the government affairs chain system. In order to facilitate each department information sharing, these information adopt unified structured storage, which is a structured data. For example, payment information with two-dimensional table is shown as table 1:

Table 1. Payment information two-dimensional table

field name	type
payer account name	char(23)
payee account name	char(23)
payer banks	char(20)
payee banks	char(20)
transaction type	char(2)
currency	char(1)
amount	char(20)
transaction date	datetime
serial number	char(23)

However, the information aren't completely shared between systems and departments. Four-chain systems realize limited fixed structured data sharing.

4.3 Interface standardization examples design

Structured data transmission needs a unified interface standards. Because there are banks, customs, commodity inspection, insurance and transportation and many other industries and departments on the platform. Each industry and department require different computer types, software system, communication standard, documents format and data format. In this paper, the platform will play an important role, we need to increase information dimensions, including the capital, logistics, business and government affairs information etc. In order to realize high shared, all of the participants must adopt the same standard format and unified interface

standards.

The bank system uses data packets to transmit information, a 1024K data contains a 28 unit account, according to the field different order and length to give different meanings respectively. With using the same interface standards ,the receiving computer system automatically unpack data. The platform also can use a similar manner like that, make all the participant reach a consensus. For example: how many data does the transmission packet total contain; what does each data mean, how long is it; what are main information and satellite information of structured data . Then in paperless trade process, the department which get the packet unpack data segment, and operate in the internal system.

As shown in figure 7,1 to 10 is "payer account name ", "payer account number ", "payee account name", "payee account number", "amount" and other payment information,11 to 15 is "foreign exchange

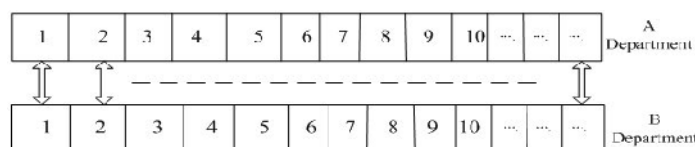


Figure 7. Structured data storage and transmission schemes

verification sheet", "customs clearance numbers", "customs declaration numbers", bank will unpack from 1 to 10,then turn to the internal accounting system transfer. A department and B department intercepted the required length of bytes with computer program, then turn to the department internal operating system. Each department share their customs clearance, freight payment and other trade information after operation on the platform, which greatly increase the trade efficiency, also lay a foundation for online payment financial coordinated supervision under paperless trade.

5. CONCLUSIONS

In the existing domestic and foreign research, the difficulties many countries have in developing paperless trade are mainly "four chain" fully integrated and coordinated management. Many research and practice are reflected in the "two chains" or "three chain" integration, but less in "four chain" integration and system management research, especially regarding financial chain as the core to realize "four chain" collaborative integration. Existing online payment can't realize logistics, bank, customs, taxation and public security departments collaboratively manage in the course of trade, then the trade data and information can't fully shared. It result in serious money laundering, credit fraud problem, which seriously restrict the development of paperless trade. In this paper, we construct online payment financial coordinated supervision platform under paperless trade from the point of view of the financial supervision, design supervision goal, principle, process and standardization etc., solve prominent problems in our country's existing payment mode, realize the information real-time transmission in the process of trade based on four chain collaborative integration, then let financial regulators more effectively identify suspicious financial transactions. About the safety of the platform, coordinatively incentive mechanism and related problems are not involved in this paper, which will be discussed in the future study.

ACKNOWLEDGEMENT

This research was supported by:(1) National Natural Science Foundation of China,under Grant 70973095. Research on Cooperative Management of finance and Taxation for Online Payment under Paperless Trading. (2)National Natural Science Foundation of China,under Grant 71073122. Research on the Mechanism of Coordination Management and the Information Gene as Order Parameter of B2B Online Payment Evolution System. (3) Self-determined and innovative research funds of Wuhan University of Technology, under Grant 2010-Ib-011. Research on Implementation Mechanism of B2B Online Payment Collaboration Management Based on Service Gene.

REFERENCES

- [1] Kurt Cavano. Paperless Trade--Global Company Payment Solution[EB/OL].<http://news.ec.com.cn/topic/apecgslmfirstlt,2004>
- [2] EMMANUEL LARYEA. Facilitating Paperless International Trade: A Survey of Law and Policy in Asia, International Review of Law Computers & Technology[J],2005.VOLUME19,NO.2:121-142
- [3] Somnuk Keretho. Thailand single window electronic logistics platform construction[EB/OL]. <http://tech.163.com/05/0902/17/1SLMP2K800091JOD.htm,2005>.
- [4] Kaifu Luo. Paper trade promote China's modern logistics industry developing[EB/OL].<http://tech.163.com/05/0902/16/1SLKV34D00091JOD.html,2005>.
- [5] Junsheng Liu. Promote Trade Facilitation, Construct Integrate Modern Trade Service System [J].Dalian International Logistics Trade Fair Catalogue,2006(10)
- [6] Yuzhou Wang.B2B Pay-online--Blue Ocean of Payment [J]. Electronic Business World,2006(09):66
- [7] Hanlin Chen, Lingxiang Kong. An Analysis on the Implementation of Electronic Supply Chain in International, 2007,in IFIP International Federation for Information Processing, Volume 251,Integration and Innovation Orient to E-Society Volume 1,Wang,W.(Eds),(Boston: Springer).2007:115-125
- [8] Yun Feng, Chang Yan, Dongmei Yang, Jingjing Zhang. Detection and Supervision for Money Laundering in E-commerce Based on Third Party Online Payment[J].Systems Engineering-Theory &Practice,2008(12): 60-69
- [9] Qi Chen, Ying'an Cui. Research on Anti-money Laundering System Based on Multi-agent and Customer Pattern Recognition[J].Computer Engineering,2007(08):190-192
- [10] Qifeng Yang. presided project of the national natural science funds about "Research on the Mechanism of Coordination Management and the Information Gene as Order Parameter of B2B Online Payment Evolution System" (71073122) (project application),2010.3.
- [11] Qifeng Yang. presided project of National ministry of education humanities social sciences plan funds about "Research on the dominant model and innovation service of the online payment"(07JA630028) (project application),2007.5