ICEB 2001 Proceedings

International Conference on Electronic Business (ICEB)

Winter 12-19-2001

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Abstract: Although total water Resources in China are not deficient compared with those in other countries over the world, the effective use efficiency is not high. There is a big wastage either in agricultural water use, in industrial water use or in daily living water use. whereby indicating that water resources management in china is till in backward level or state. E-commerce as a major means of economic trade in the 2lst century has brought about new opportunity for economic growth in the countries over the world. On the one hand, E-commerce uses the internet technology to retransform the enterprise production flow process, marketing flow process and resources management, through which the all social resources can be disposed and used in a more rational way; the production cost of the enterprises can be reduced most greatly; the international competitive power of the enterprises can also be raised; and the new economic growing point of the enterprises can be promoted. On the other hand, water is a kind of natural resources with use value as well as of the commercial product through being processed and transported. For this reason, water should be included in commercial economy, which should be operated or disposed rationally via marketing regulation, thus, providing the possibility for E-commerce to enter water resources management system.

This paper deals with the establishment of E-commerce patterns or models for water resources management system by means of combining E-commerce with water resources management system and using water price as an economic means and discusses the possibility, performances and procedures of establishing the E-commerce patterns. Therefore, the E-commerce will provide the applicable operation platform for the E-commerce for water resources management and operation on which water resources development and operation, advocacy and extension as well as information services can be completed, and also on which the inner professional exchanges and cooperations can be carried out so as to satisfy the demands by the decision makers at the different levels. At the same time, facing the international competition, carrying out water resources trade, establishing scientific water price system and realizing the sustainable development strategy of water resources can also be achieved via the E-commerce.

Keywords: E-commerce   water resources   management   water   price pattern

The lower degree of water resource utilization and the great water waste in Agriculture   Industry and life make it clear that the water resource management level is low in our country, although the total water resource in our country is not less than the one in other countries of the world. As the most important economic trade mode in the 21st century, electronic commerce (EC) will bring new opportunities to the economy increase of all the countries in the world. On the one hand, the using of internet technique makes the produce flow   distribution flow and resource management of enterprise been reconstructed and makes all the resources collocated and utilized more reasonable. From the process,

the production cost is reduced greatly and the competition capacity is increased and the new economy growth point is promoted as well. On the other hand, as a valuable natural resource, water should be brought into commerce and be collocated rational from the market adjust, which makes combination of EC and water resource management system possible.

1 Analysis of EC application on water resource

In order to accelerate the development of the electronic information industry, the Chinese government has ploughed much money in the communication engineering computer technique and information disposal designedly from the 1990's. The government has also invested much money on fundamentally establishment and has built the main communication web and Internet and put many "golden engineering" into practice in some important departments such as foreign trade custom bank and revenue. The state directs all the applications of web through policies such as the government web engineering and the enterprise web engineering. In a word, the Chinese government has recognized that EC renovation will bring great influence into Chinese economy.

As the fundamental of national economy, water resource management department must got hold of the opportunity to re-locate and adjust its industry construction. Namely, building a new management system to step on the construction of water resource modern information technology by the leading of EC.

Water resource management is the main responsibility of water resource bureau. Special leading group has been set up to response for the construction and implement of responsibility for, which is to utilize and develop water resource information under the utilization of modern information technique. It mainly includes the collection transmission storage and disposal of water information. The Chinese water resource modern information technology has made many achieves as follows:

1 The collection transmission storage and disposal of water and rainfall information and online flood forecast have been realized primarily in the national water resource system and have had great effort in the flood control and drought fighting.
National hydrological fundamental database and parts of professional databases have been set up primarily.
(2) The increasing office automation level makes the tele-transmission and management of document and file easy.
(3) The established national water information transmission computer wide web has brought many achieves in the practice.
(4) Water resource bureau and some other interrelated institutions have established web sites and offered water resource information to the society.
(5) National flood control command system is in the process of implement.

However, many problems still exist in water resource EC when compared with the developed countries'.
(1) The knowledge about water resource EC is surface, because the introduced time is short of EC and there are many point of views think that water resource is a traditional industry, which is independent with EC.
(2) The investment is greatly insufficient on water resource modern information technology. Water resource information be collected often scatter in the remote western areas and many water works are aging and disrepairable. That is why a great deal of fund is needed.
(3) Common information platform of water resource is still not been established. Due to the neglect of standardization and the weakness of fundamental work, the

information system developed has many disadvantages such as slow speed lower efficiency bad currency capacity short life cycle narrow content and lack of big database shared by the entire water resource industry etc. although water resource information system has some improving on practicability real time and diversification, it still can't meet the need of society. Many kinds of application software and databases has been developed, but the integration capacity is not good and systems can't be linked each other, which leave resource unused in great extent.

(4) Uniform planning and normative management is absence in the water resource EC. Lower and repeated develop phenomenon is widely. For example, water resource engineering is supervised by water resource bureau while water distribution by the city construction department and sewerage disposal by environmental conservation department. The united property of water resource application and conservation is split artificially. Some data indicate that there are 400-million m^3 water can be saved per year in Beijing and 100-million m^3 water in Tianjin, which will fill the water shortage gap in 2005 in Beijing approximately and will supply the water shortage in 2001 in Tianjin respectively. Shanghai has set up a special water affair bureau to realize the uniform planning detaching water taking charge and water quality and quantity management, which is a great progress in the modern information technology and commercialization of water resource management.

2 Concrete thoughts of water resource EC development

EC is an intricate system engineering including information flow capital flow and substance flow. Water resource EC development must depend on the completion of the three aspects. Combining the advantages of water resource and its users, the EC mode B2B should be adopted.

There are also three aspects in water resource management EC.

As for the information flow, water resource management departments set up their web sites and offer all kinds of water resource information online to satisfy the user. They also provide information about water supply plan and its implement to collocate water resource rationally. At the same time, they introduce some achieves policies rules and other knowledge of water resource and trade or distribute water resource on the electronic business platform.

As for the capital flow, the management department can receive water resource charge and water charge. It's an urgent affair to set up scientific water charge system for lower water charge and inadequate water conservation in China.

The substance flow is an aspect about delivery. Water resource is a special kind of commerce, which can flow and be polluted easily and can be dispatched in space and time through pipe net and trench system. Thus, the construction of pipe and trench system is very important.

The concrete thoughts above can be understood from several aspects as follows:

(1) Constructing computer and network system and spreading the utilize of water resource GIS MIS and other correlative assistant software system so as to form a favorable network circumstance.

(2) Water resource modern information technology includes four aspects:

a The implement of office automation in water resource department

b the construction of water resource net site

c the implement of "golden water engineering", which means to realize water resource modern information technology and network connection and information sharing
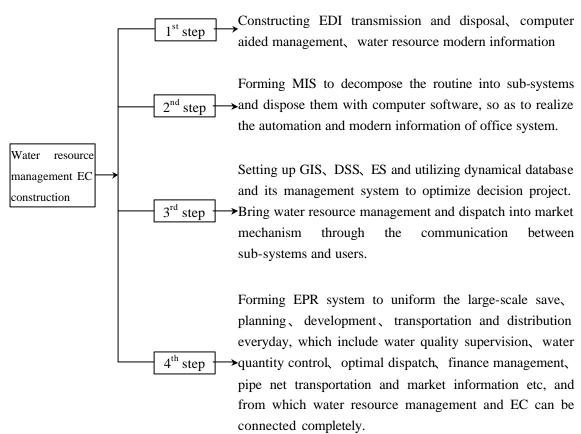
in the correlative areas.

d   layout rational hydrologic station web to realize water resource modern information technology.

3 The construction of public water resource fundamental information platform including information source development and fundamental database construction. modern information technology management of water resource is the basis of commercialization. On the base of it, water resource management will be brought into the good market cycle, in which commercialization course of water resource will be accelerated by water price as a lever. For instance, JTSin in USA is an agency that sells electric power resource on network. The member of power station may enter the dynamical database expediently to understand the surplus or shortage of power resource in different fields. Then, he can offer real-time trade online and make the power resource be dispatched reasonably. Therefore, construction of water resource EC platform should be step up to rational dispatch the limited water resource by B2B mode and market adjusting.

4 Construction the complex water resource MIS can obtain such alteration of water resource in time as the alteration of water quantity water quality water supply and demand capacity, so as to form the basis of management and dispatch. Some kinds of database database management system model bank and its management system should be established based on the decision support system (DSS) and export system (ES) to come into being a completed water resource EC system.

The steps of constructing water resource management EC can be shown as the figure below:

Water resource management EC construction

1st step → Constructing EDI transmission and disposal computer aided management   water resource modern information

2nd step → Forming MIS to decompose the routine into sub-systems and dispose them with computer software, so as to realize the automation and modern information of office system.

3rd step → Setting up GIS DSS ES and utilizing dynamical database and its management system to optimize decision project. Bring water resource management and dispatch into market mechanism through the communication between sub-systems and users.

4th step → Forming EPR system to uniform the large-scale save planning development transportation and distribution everyday, which include water quality supervision water quantity control optimal dispatch finance management pipe net transportation and market information etc, and from which water resource management and EC can be connected completely.
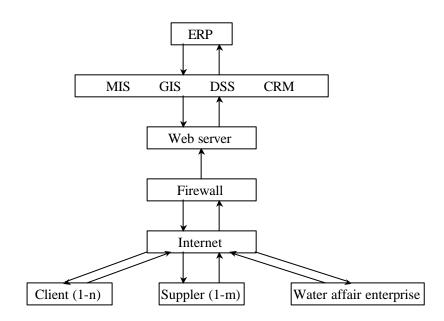
3 Model of water resource EC development

Water resource is natural state commerce. It's characteristics are single production simple serve channel and complex distribution trench. Water is

necessities for the whole society and almost all the industries are the user of it, so the relationship between them is intricate and intimate. Therefore, serve chain management system (SCM) is not necessary in water resource industry but client relationship management system (CRM). In addition, GIS and MIS are needed for the space-time specialty of water and web server is needed for the user to know water status such as water quality and quantity water pollution sewage disposal flood control etc. The B2B mode will be the primary one in water resource development, which is decided by the client characteristic of it.

The key point of water resource EC is decision management system. We must depend on two measures. One is technical measure including DSS

intelligence DSS (IDSS) ES and visual DSS (VDSS) to help decision. The other is to adjust water price according to supply and demand relation and dynamical water price policy so as to form a scientific water price system and help to form a perfect water market.

ERP is a software system widely used in enterprises. It can save the large-scale business information and uniform planning producing transportation and distribution as a whole. The combination of ERP and EC is the development direction. Thereby, we should fell water resource EC and Intranet Extranet Internet together to build a integrated EC pattern. The pattern can be shown as the figure below:

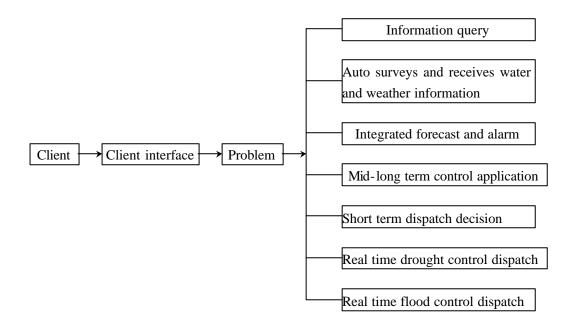**Water resource EC development pattern figure**

Direction:

(1) All the water demand departments in industries agriculture and town life are water resource clients. The demand and content degree of these departments can be reflected on the web dynamically.

(2) Water suppler include rivers reservoirs and

groundwater.

(3) Water affair enterprise include catchment's management office reservoir management office city water company and so on.

DSS is the core of the water resource EC in this pattern. Therefore, we must introduce the function and structure in the figure below:

From the thoughts and assumption above we can see that EC is able to re-build the traditional water resource industry and to make it modern information technology and commercialization. It also can accelerate the optimal collocate and rational application and reduce the cost and improve water resource management level, so as to form a big and uniform water resource market in our country as a whole. Thus, EC is an inevitable decision of water resource management.

Reference:

1   Chinese common computer Internet international unite management method (the old post bureau publicizes on 1996.4.3)

2   Chinese public multimedia communication management method (the old post bureau publicizes on 1997.9.10)

3   Chinese Internet domain name register management temporary method (State Department information office publicizes on1997.6.3)