

# Development of Transportation Supervision Information System of Frozen Seafood Processing Enterprises Based on ERP

Zheng Lin<sup>1</sup>, Luo Yuegang<sup>1</sup>, Kang Jing<sup>1</sup>, Shi Zhanqun<sup>2</sup>, Ball Andrew<sup>3</sup>

<sup>1</sup>Dalian Minzu University, No. 18, Liaohe West Road, Jinzhou New District, Dalian, Liaoning Province, China. Zip code: 116600

<sup>2</sup>Hebei University of Technology, China

<sup>3</sup>The University of Huddersfield, U.K.

**Abstract:** The quality of frozen seafood products is closely related to the transport conditions, this paper used ERP system to supervise and manage the whole process of food processing and transportation. Experiment results demonstrated that the system played a good role in all the processing, circulation, consumption and supervision procedures of frozen seafood products. Realizing the unified planning, efficient management and coordination of the frozen seafood processing and transportation, and thus ensure the possibility and validity of the whole process of frozen food processing.

**Keywords:** ERP system; frozen seafood; information system.

## INTRODUCTION

At present, domestic food safety problem has become one of the focus topics, and perishable, difficult to keep frozen seafood safety problem has the highest frequency of occurrence (Elbanna, 2007). Recently, Frozen Salmon, squid and other food safety issues have erupted frequently, and these have attracted the attention of the majority of consumers and related departments. In the food safety incidents, fresh products occupy the vast majority and this situation has greatly hindered the long-term development of frozen seafood industry. Therefore, frozen seafood industry must improve its efficiency in food safety management (Li, *et. al.*, 2015).

The rapid development of ERP management technology provides technical support for the solution of the food safety problem. ERP management system is the combination of goods information and the Internet, based on the ERP technology to build a frozen seafood management system (Vogt, 2002), the quality of frozen seafood is controlled and the production channel and circulation process of frozen seafood are monitored in virtue of the collection system of frozen seafood information, furthermore, the frozen seafood circulation information can be collected and preserved in real time, so as to the late product traceability (Brehm, *et. al.*, 2001). At the same time, because the ERP management system can reflect the logistics distribution in the supply chain system in real time, reduce the loss of the transportation information in a certain range and help the logistics industry improve the storage and transportation capacity (WANG, *et. al.*, 2009), the

frozen seafood ERP management system can also help the logistics transportation industry achieve information management synchronization, and this can further reduce the occurrence probability of frozen seafood safety accidents (Hwang, *et. al.*, 2015). Moreover, frozen seafood ERP management system can improve the management efficiency of the frozen seafood industry effectively and confirm the food safety issues can be traced, and these guarantee logistics and distribution of frozen seafood trade, to further perfect the safety management system of frozen seafood (Vlachos, *et. al.*, 2014). Therefore, the research of frozen seafood ERP management system construction with food safety as premise has become a hot topic among scholars. But due to the specificity of frozen seafood transportation process, the research on the ERP management system of frozen seafood is relatively less, and the current research is mainly focused on the construction of frozen seafood distribution system and so on, consequently, this paper researched the construction of frozen seafood ERP management system in the perspective of food safety.

## MATERIALS AND METHODS

ERP management system based on food safety is a comprehensive system with advanced management technology and open information sharing system. The construction of management system model need take the food safety as standard; meanwhile the transfer and sharing of frozen seafood safety management information under the ERP management system need to be realized. The food safety ERP management system constructed in this paper mainly integrated

every aspects of the frozen seafood supply chain. With the help of ERP management system, all node information of frozen seafood was recorded and identified based on the source point of frozen seafood, and thus each enterprise in the supply chain of frozen seafood would have a platform to share information and data resources, and in this platform these enterprises can interact and exchange. The frozen seafood safety management based on ERP

management system integrated supply chain enterprises, eliminated the overlapped information and reduced resource consumption, and further the safety management of frozen seafood was strengthened. Before building the model of frozen seafood ERP safety management system, the frozen seafood ERP management supply chain system was firstly established as shown in Figure 1.

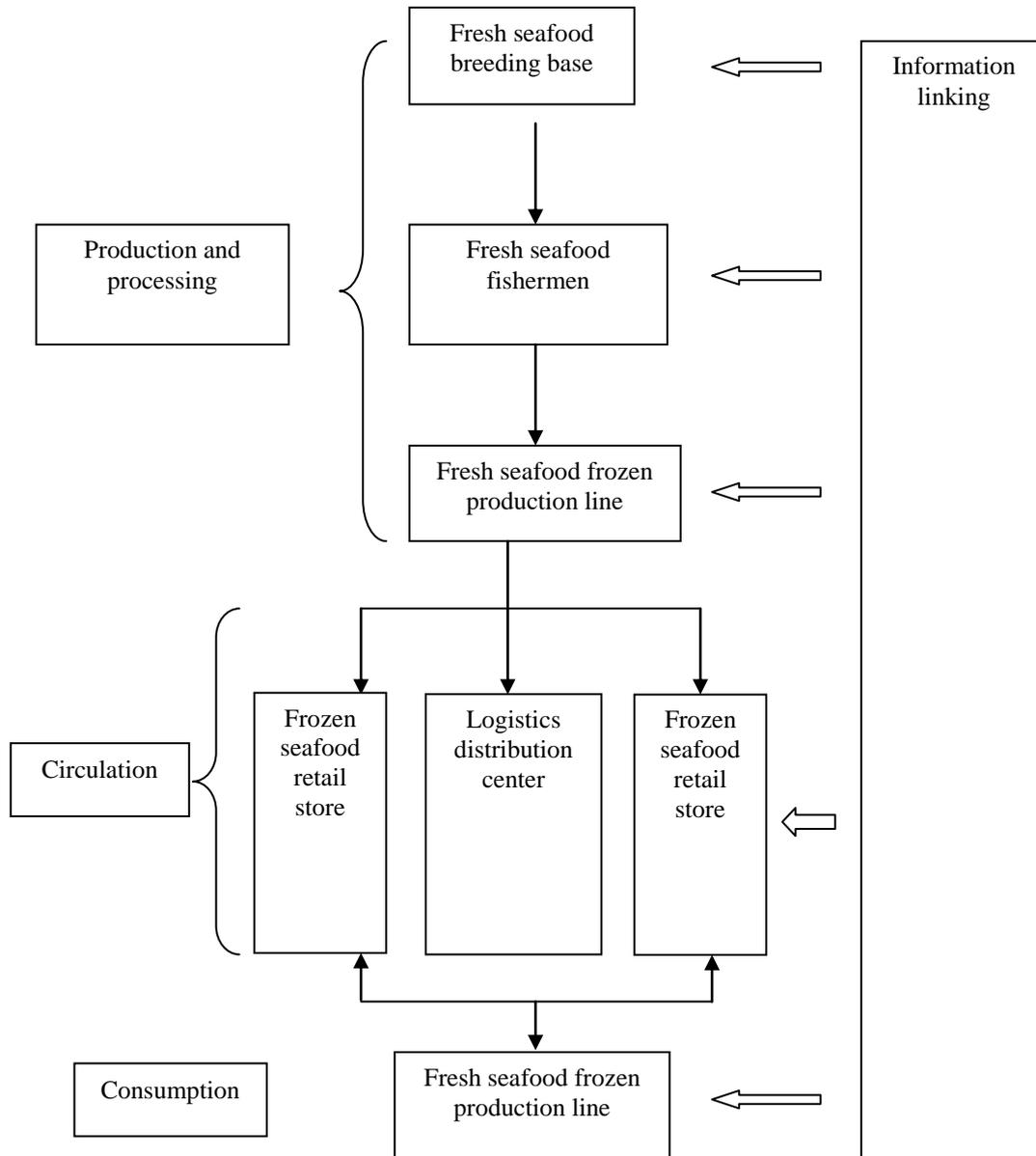


Figure 1 Flow chart of the frozen seafood ERP system

At 120 °C, as the increase of the concentration of HPAM, both the gelation rate and the gelling viscosity of the system increase, but the gelation time becomes shorter. When HPAM was over 2000 mg/L, the trend of viscosity increasing slowed down, so 2000 mg/L is the optimal concentration for HPAM.

2) Optimal concentration of crosslinking agent

The concentration of crosslinking agent not only determines whether the system can gel or not, but

also greatly influences the gelation speed, the gel strength and the thermal stability of the system [3]. With the concentrations at HPAM 2000 mg/L, heat stabilizer 0.1 g/L and delayed crosslinker 0.1 g/L, the crosslinking agent was varied in the range of 0.1% to 0.3% by volume. The relationship between the crosslinking agent volume fraction and the gel strength and gelation time is shown in figure 2.

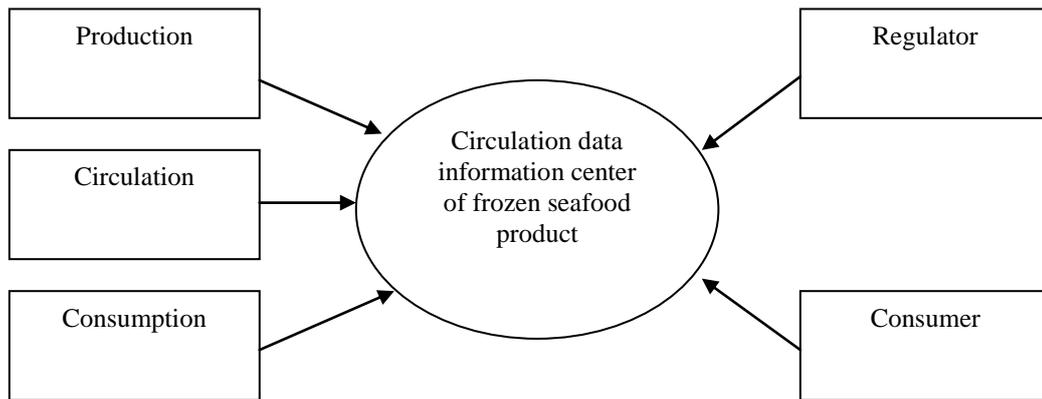


Figure 2 Data flow of diagram frozen product ERP management system

## RESULTS AND DISCUSSION

The frozen seafood ERP management system based on food safety construction of contained ERP Technology (such as information tags, transmission facilities and information access facilities), the cooperation between every enterprise of supply chain links with each other, application of the ERP in the frozen seafood supply chain and corresponding product information can be inquired by consumer in the end of the link. The following is mainly the safety supervision procedure of frozen seafood ERP management system based on food safety:

### Production and processing

The related information of the whole frozen seafood in the processes of production and processing was tracked and recorded. First of all, raw materials for fresh food need be identified to ensure rationalization and safety of raw materials for fresh food; secondly, production cultivation enterprises need conduct quarantine for fresh seafood, and the electronic tags for individual frozen seafood were identified, and the relevant information of quarantine was collected; furthermore, in the specialization cultivation stage of fresh product the relevant information of the cultivation process need to be timely input to the Internet database; finally, in the processing stage of frozen seafood the tag need to be retained and the reader loaded in the processing link recorded the real-time relevant information, and related information in every link of production must be tracked and recorded to ensure that the information of each link can be grasped. The data record and information identification can not be ignored because of the cumbersome processes, and at last the processed products are labeled with electronic tags which were considered as the carrier of the information data collection of frozen seafood products.

### Circulation

The speed, efficiency and accuracy were improved by means of ERP management system in the process of frozen seafood circulation.

First of all, in the logistics distribution center, the identification information of frozen seafood in the warehouse were scanned and read, and the transportation and distribution information was input in the database to query timely the logistics situation of frozen seafood for the purchaser; secondly, frozen seafood retail company and other trade places could query to the frozen seafood stock status with the help of ERP management system and determine timely the ordering or replenishment policy reference delivery situation; moreover, the frozen seafood retail enterprises and trade places packaged the fresh products for sale, meanwhile, the electronic identification was attached and the identification contained all the information in production, processing and circulation segments.

### Consumption

In the trading process of frozen seafood, retailers need to record the purchase and sales information timely and enter the database, and the inventory information was arranged to facilitate enterprises to formulate ordering information.

### Supervision and management

The information of frozen seafood in the entire process from production to sale was gathered together into the frozen seafood circulation data center. After the frozen seafood enter the market, the security problems can be traced refer to the information of frozen seafood data center to ensure the safety of frozen seafood. The retail stores and other terminals also carried out information records after frozen seafood sold out, and the consumers can understand the production place of fresh goods and quarantine information through online inquiries. The construction of frozen seafood ERP management system can not only ensure the safety of seafood, but also be used to monitor and manage the production process and circulation process of frozen seafood according to the information in data center.

## CONCLUSION

ERP is an information technology system which is integrated with many information technologies, such as sensor technology, network technology, high

performance computing and large-scale data processing. As a new information network, ERP provides a basic platform for realizing automatic tracking and tracing in supply chain. In the logistics supply chain, the tracking and tracing of goods is very important for the realization of efficient supply chain management and business operation, and the analysis of the goods' related information is helpful to ensure the effective decision-making, inventory management and sales plan of the production control. In the idea of ERP, the commodity producers located around the world can acquire the production, logistics and sales of their products in real time, so as to adjust their production and supply plan in time. If the idea can be realized, the entire process and key points of the whole processes will be changed, and the efficiency of the global supply chain will be greatly improved. Therefore, the application of ERP technology in food safety traceability possesses strong technological advantages, it can not only collect various goods information quickly, automatically and accurately, and it can also integrate information through the centralized database and network technology to achieve unified planning, efficient management, coordination and operation, so as to ensure the validity and possibility of supervision for all the process of frozen food processing.

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