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Theoretical Basis and System Establishment of China Food Safety Intelligent Supervision in the Perspective of Internet of Things

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ABSTRACT In order to improve the current food safety supervision system in China, this paper suggested utilizing the Internet of Things (IoT). This paper analyzed current food supply models first, then established a model of food supply chain including the four major processes of food supply: planting/culture, processing, transporting, and catering/marketing, which helps the full supervision of “from farm to table”; next, according to the characteristics and requirements of food transporting, this paper summarized predicaments and difficulties of food transporting and logistics platforms, and pointed out the major problems of current food transportations. In the end, combining with advantages of the IoT, this paper demonstrated the importance of constructing an IoT-based logistics platform of food; through analyzing each demand for main functions of the platform, this paper established a general framework model of food logistics platform based on the IoT 3-tier architecture, and focused on the subjects and processes of food logistics. The results of this paper showed great significance in the fields of providing a guarantee for food safety, promoting social harmony and stability, as well as contributing to the long-term stability of the country. Therefore, this paper corresponded with hot issues of the government, citizens, and the society, which is practically significant to food safety management in new eras and periods.

INDEX TERMS IOT, food safety, food supervision.

I. INTRODUCTION

Food is regarded as the first necessity, which is the foundation of human survival and development. Food is closely bounded up to the daily lives of people, and significantly affects the economic and social developments of a country [1]. Recently, major food safety accidents continue to happen in China, including “Poisonous Baby Formula Incident”, “Clenbuterol Incident”, “Sewer Oil Incident”, “Stained Pun Incident”, “Poisonous Rice Incident”, “Industrial Vinegar Incident”, and “Diseased and Dead Livestock and Poultry Product Incident”; these malignant food safety accidents have covered all kinds of food. Causes of food safety accidents are various. From the perspective of government, the non-critical law enforcement, the weak administrative accountability, the unclear division of responsibilities of supervision departments, the lagged laws and regulations, and the behindhand inspection methods would all lead to food

safety accidents; from the perspective of food enterprises, the causes include the dishonest entrepreneurs with little legal awareness, the pollutants or illegal chemicals involved in the entire supply chain of food from the production to the sale, and the emergence of new raw material; from the perspective of consumers, the information asymmetry between consumers and producers, as well as the deficiency of food safety knowledge of consumers, etc. would also lead to the food safety accidents. In addition, other causes may include the polluted production environment, the vandalism, and the spread of poison deliberately. All of these causes indicate that the food safety supervision system in China still needs improving.

In terms of food problems, the Chinese government has adopted various policies and measures to strengthen and push forward food safety supervision. However, the overall practical effects indicate that food problems are still unsolved; on the contrary, these problems have even become increasingly fierce. Actually, the Chinese government is extremely concerned about food safety and spares no effort to promote

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food safety supervision; however, given such circumstance, Chinese food enterprises still dare to commit crimes and release the unqualified even poisonous food to the market repeatedly, while the supervisory authorities cannot find any problems. Thus, it is clearly indicated that the occurrence of food safety accidents is not entirely due to the inappropriate supervision policies or measures; it is also related to the facts that these policies and measures have been barely adopted in the process of implementation, the implementation of policies has been hindered, and the enforcement is insufficient, which are all related to the traditional methods of supervision and implementation of food safety in China. The emergence and development of the Internet of Things (IOT) technology have helped food safety supervisors. IOT technology would realize information interaction, information sharing, and item tracking within a certain scope. The application of IOT technology would help the realization of real-time supervision of the government's implementation of quantifiable policies; it could integrate the information of food supply chain, establish a food safety traceability system, and conduct full-process monitoring and dynamic supervision of food production, which would not only prevent the occurrence of food safety problems but also trace the source of food safety problems, quickly find the cause of the problems, and effectively solve the problems; IOT has made it easier for consumers to obtain food information within a certain scope of authority, thereby eliminating the food safety problems caused by information asymmetry; it also helps realize the effective information communications among supervision departments of government and reduce regulatory crossovers based on the integration of supervision departments.

Thus, the emphasis of the paper is to improve the current Chinese food safety supervision system through IOT technology, achieve smart and intelligent supervision, and solve the problems of food safety supervision. In addition, based on analyzing the disadvantages of existing applications, the paper also proposes improvement measures, establishes an IoT-based framework of food safety supervision system, and proposes the relevant recommendations to guarantee the successful implementation of the system.

II. LITERATURE REVIEW

As an emerging network for identifying item information, the Internet of Things provides a foundation for automated tracking and tracing of item information in the supply chain. With the development of the IOT, its technology has also been widely applied to various aspects such as food production, distribution, supervision, testing, and backtracking, etc. At present, governments all around the world have used radio frequency identification (RFID) technology to establish the food safety traceability systems for the monitoring of the entire process of "from the farm to the table". Once an emergency occurs, the problem would be quickly identified by the food safety traceability system. Many foreign scholars have also studied the application of IOT technology

in the field of food. In 2016, Yi *et al.* used RFID technology to improve the pork traceability system and conducted an empirical study on the feasibility of the system [2]. In 2016, Verdouw *et al.* believed that the installation of RFID tags embedded with temperature sensors in food refrigerated packages could obtain and record the actual temperature of food in real time and ensure the safety of food during transportation [3]. In 2018, Zhang *et al.* analyzed the mechanism of RFID embedded with temperature sensor recording the food refrigeration environments; in addition, through empirical analysis, they also proposed that at least one measurement point should be placed in the refrigerator to accurately detect the maximum temperature of the refrigerator [4]. In 2016, from the perspective of agricultural industrialization, Blair *et al.* used the evolutionary prototype method and the tracking case study method to analyze the functional and technical requirements of the traceability system, and proposed that the maintenance of the dynamic properties of the traceability system was the key to the effectiveness of the traceability system [5]. In 2016, Jayaraman *et al.* designed the traceability system for precision agriculture, collected the data of links on the chain including production, transportation, packaging, distribution, etc., and achieved full traceability [6]. In 2017, Kshetri designed the food quality supervision platform framework based on the analysis of food quality supervision requirements by using the IOT technology [7]. In 2016, Bo *et al.* combined the characteristics of the food supply chain, established the data organization structure of the food safety traceability system based on the principle of RFID technology and HACCP and analyzed the shared data by using the EPCIS framework [8]. In 2016, Seo *et al.* established a new management model by analyzing the relations among the Internet, the IOT, and the IOT of agricultural products to realize the visualization and traceability of agricultural product quality, ensure the safety of food for consumers, and promote the sustainable development of modern agriculture [9]. In 2017, Nascimento and Lucena analyzed the problems including data collection and data storage under complex environments in response to the urgent needs of food safety; they designed and proposed a solution to integrate the food industry chain data and establish a traceability system by using IOT technology [10]. In 2018, Wen *et al.* analyzed the application of IOT technology to food production, which indicated that the sensor layer of the IOT could record and monitor the production factor data of the production process, providing comprehensive and accurate data information for the next link on the chain [11].

Most foreign studies on food safety supervision focused on food safety-related technologies, policies, and methods to solve food safety problems. In terms of food safety supervision technology, scholars mainly researched on HACCP control system and risk analysis. In 2017, Allata *et al.* proposed the full implementation of the HACCP system in the production and distribution of meat products [12]. In 2016, Wengle researched and pointed out that the HACCP could achieve the control on pollutions and hazards generated in the process

of food production, distribution, storage, and sales to ensure the safety of food [13]. In 2016, Galstyan and Harutyunyan studied the meat and milk sectors of Italy, Netherlands, and the United Kingdom, and conducted an empirical study by using the HACCP control system to qualitatively evaluate the effect of the application of HACCP system [14]. In 2016, Casolani and Signore pointed out that the HACCP control system could effectively control the spread of food-borne diseases, which was an important supervision technology to ensure food safety [15]. In 2016, Tomašević *et al.* analyzed the relations between food safety and supply chain management structures in the supply chain [16]. In 2016, Soman and Raman analyzed the cooperative relations among various companies in the food supply chain from both theoretical and empirical aspects [17]. In 2017, Vanderroost *et al.* studied the application of HACCP monitoring system in the food supply chain from the perspectives of theoretical research and case approach [18]. In 2016, Kim and Yim analyzed that food safety was the shared responsibility of various participants on the food supply chain, which required the completion of different participants in the production activities [19]. In 2018, from the perspective of establishing a food safety control system, Pexara and Govaris proposed that food safety supervision must abide by the principles of “standardization of operations, internationalization of standards, transparency of management and control, and de-administration of supervision” [20].

III. METHODOLOGY

With the continuous development of technology and scale of the food industry, the quantity of processed food in China is growing; however, it is unsuitable for the fact that most food production enterprises in China are small-scaled with behindhand management. According to the “Analysis Report”, the number of food production enterprises in China has exceeded 400,000; however, more than 90% of them are non-scale enterprises, whose processing equipment is rough and the sanitation guarantee ability is weak, and the produced food is inevitably vulnerable to safety hazards. The frequent accidents of food safety supervision in China are the results of a combination of multiple factors. According to various supervisory theories, the causes of food safety supervision failure in China are analyzed from three major aspects, i.e. the market, the government, and the society, as shown in Figure 1.

IOT technology is another technological revolution in the information industry, representing the future development trend of computers and communications, as well as affecting the future social and economic development. The IOT is a fusion of technologies that are active in various fields, and these technologies have already had some applications. The paper has selected some of the applications of IOT technology to the field of food safety supervision for detailed analysis. According to its characteristics of comprehensive sensing, reliable transmission, and intelligent processing, the IOT is composed of three layers in general: the sensing layer for intelligently collecting external information, the network

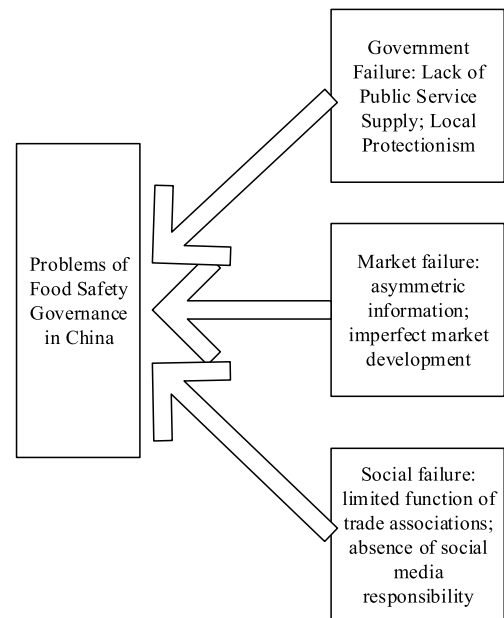


FIGURE 1. Problems and reasons of food safety governance in China.

layer for forwarding and transmitting information, and the processing layer for processing data and application. Therefore, the IOT technology can be divided into the perception layer technology, the network layer technology, the processing layer technology, and public technology.

The application of IOT technology to the food field shows that the IOT technology can make the complex production process and cumbersome supervision of food be more strict, transparent, and efficient. The introduction of IOT technology to food production and circulation links can fundamentally control the occurrence of food safety problems and ensure the safety of food. The IOT technology has been gradually introduced to the food field; in addition, some staged results have been achieved in the application, with various experiences and practices being worthy of promotion and reference. However, in general, the promotion and application of IOT technology in the food field have started relatively late, which are still in the early stages of developments with certain technical limitations, such as that the traceability system is imperfect, the source control needs improving, the sustainable facilities are insufficient, etc.; these limitations still need researching and improving. Therefore, in China, it still has a lot of room for the development and improvement of the IOT technology application in the food field.

IOT technology can integrate the information of the food supply chain; however, a unified information platform and a traceability system throughout the whole food chain are needed. IOT technology can eliminate food information asymmetry among government, enterprises, consumers, etc.; however, the guarantee of the authenticity of information and the unimpeded transmission of information is still unsolved. In addition, IOT technology can enable the supervision authorities to achieve a certain degree of informational supervision; however, the supervision platform and the

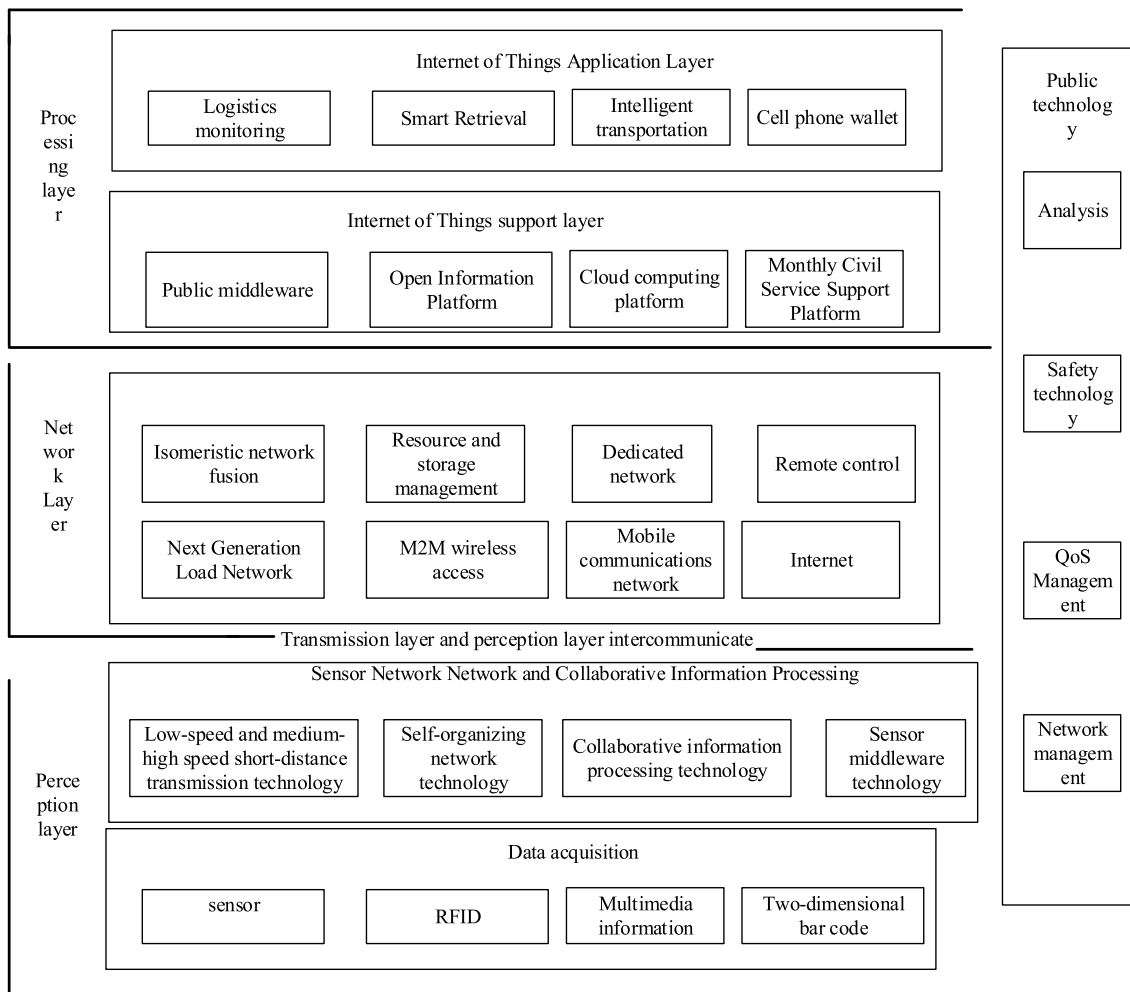


FIGURE 2. Internet of things technical framework.

communication mechanism between the parallel supervision departments, the superior and subordinate supervision departments, and the supervisory departments and enterprises are yet unformed and unestablished. In order to further realize the informationization of food safety supervision in China by using the emerging technology of IOT, it is necessary to solve the problems analyzed above.

In the process of food safety supervision, the application of IOT technology should realize visual monitoring without limitations of region and time. In terms of enterprises, the application of IOT technology is the information management of the production and transportation processes of their own products, i.e. according to the standardized production process to apply various sensors and communication networks, realize intelligent monitoring, intelligent diagnosis, and intelligent maintenance of production and transportation processes, record the detailed key information of production, and upload real-time data to the database which would be provided to consumers and downstream manufacturers as the public information to meet the demands of consumers for the production process, environment and circulation information food, thereby meeting the information tracking needs

of downstream manufacturers. In terms of the supervision departments, it is necessary to use the IOT technology to realize on-site inspection and information sharing; thus, the information sampling, storage, and processing in the food inspection and testing process would be informationized, intelligent, and structured, which improves the efficiency of inspection and testing and realizes on-site real-time sharing of information resources. The real-time visual supervision ensures the authenticity of the food information, and the entire production process of the enterprise is under the control of the supervision departments. If the food-related enterprises conceal food safety accidents, the food safety supervision departments can quickly locate the enterprises responsible for the accidents.

IV. THE DESIGN OF IOT-BASED FOOD SAFETY SUPERVISION PLATFORM

A. DESIGN OF THE SUPERVISION PLATFORM

The intelligent food safety operation database platform based on IOT technology and Internet technology helps realize the integration of information flow, workflow, and logistics in the production processes of food enterprises through the

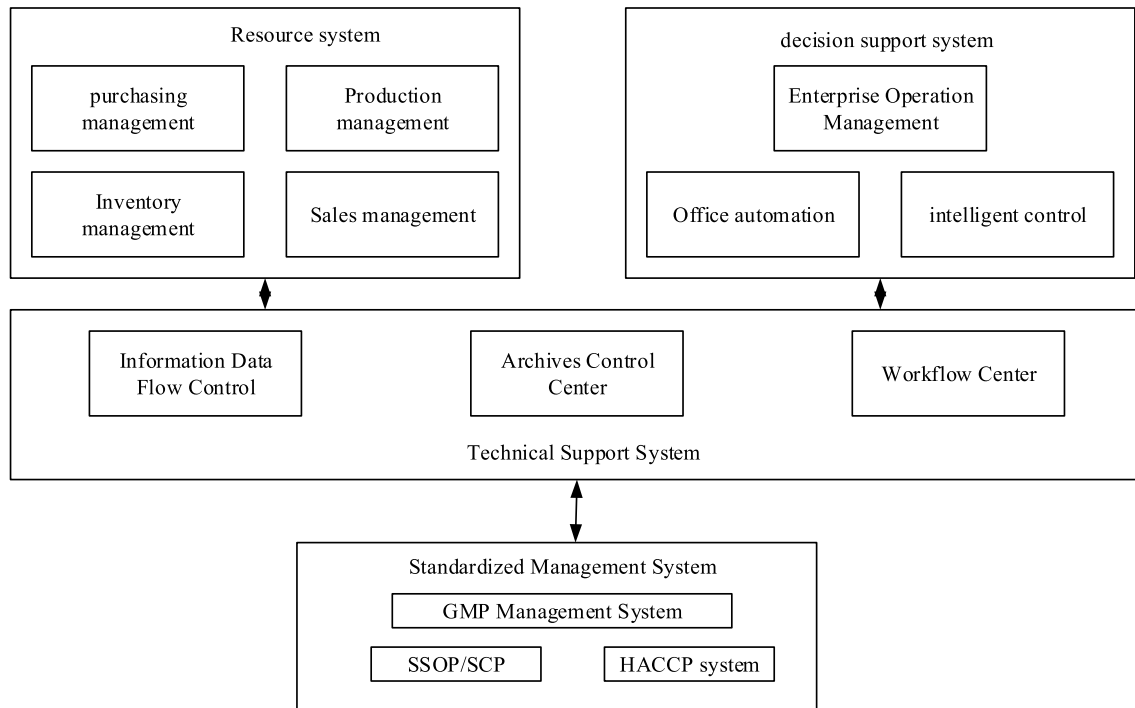


FIGURE 3. Data platform for food enterprises.

integration of enterprise management, production, sales, and quality control in order to better understand the real-time productive and business situations of the enterprises, change the control concepts based on the final product inspection, introduce the standardized management systems such as HACCP, the Good Practices for Food Enterprises (GMP), the Sanitation Standard Operating Procedures (SSOP), and the Health Control Program (SCP) to control the factors that may cause hazards, establish and improve monitoring procedures and monitoring standards, and reduce the probability of food problems through monitoring each step of processing.

The constructed intelligent food safety operation data platform is shown in Figure 3. Taking the standardized management system as the guideline, the RFID of IOT technology and the wireless network of Internet technology as the supports, the informationized managements of the decision system and resource system are achieved; in addition, the decision-making system intelligently controls the procurement, production, storage, and sales of monitored resources, and strictly controls the flow of resource information and data to prevent and control the food safety accidents in advance. The focus of the food safety operation database is on the control of the construction of the resource system. Therefore, the following sections would focus on the introduction of IOT technology to the procurement, production, storage, and sales of food raw materials or semi-finished products, thereby achieving the collection and control of data from various links on the chain.

In the procurement management module, the quality of food is controlled fundamentally. The enterprises read the

information on the RFID tags of the raw materials or the semi-finished products of the upstream manufacturers through the readers, transmit the information to their food databases, and timely learn the producing place and time of the raw materials or semi-finished products of the food; in addition, in terms of the agricultural products of livestock, fruit, and vegetable, data and information such as the cultivation and breeding environments, the application of pesticides, the situations of feeding, etc. would also be acquired; the inspection of raw materials or semi-finished products could effectively reduce the uncertainty of procurement, as well as reducing the food safety problems caused by raw material pollution. In the production and processing module, the quality of food from the processing procedures, processing methods, and processing environment are controlled. Based on the inspection of raw materials, the food information or remark information recorded in the RFID tags are used to accurately understand the current status of the raw materials, and the requirements for processing the raw materials in the current process are obtained from the database to ensure that the food production follows the requirements of HACCP system, thereby avoiding the safety problems caused by improper processing methods and non-standard processing environments. In the food storage module, the food quality is controlled from the storage environment and storage state. By introducing RFID tags, readers, wireless networks, etc., information such as the quantity, type, location, and status of food in the warehouse are accurately obtained and transmitted to the database in real time, thereby the abreast of the food storage situation is kept and the secondary pollution of qualified

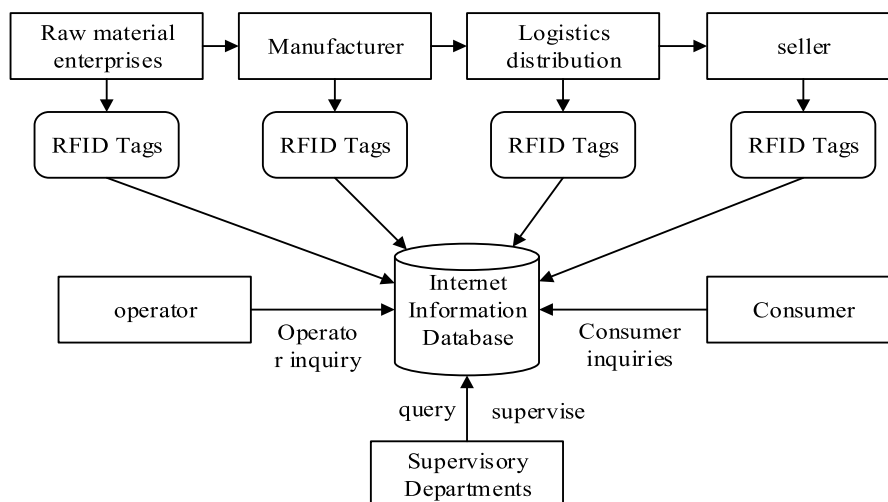


FIGURE 4. Information system for the whole process of food industry chain.

products in storage, which may become unqualified or even corrupted due to the pollution, is avoided. In addition, in the processing process, it is necessary to collect some of the key food data or information that could indicate the safety of the food, and automatically generate batch production and processing records, upload them to the business database, and provide basic data for the operation of the enterprises, which also provides data references for downstream producers. The introduction of the IOT technology to the whole process of food storage and delivery can also easily and quickly obtain the information of food shelf and cargo space, etc., which can greatly reduce the workload of warehouse management and improve the security of storage.

The whole process information system of the food industry chain is a collection of information at each point on the food supply chain. The identity of the food is uniquely identified by RFID technology, and the food information and environmental information are comprehensively collected. The integrity of the information in the system depends on each operator on the supply chain. The operators at each point on the food supply chain are required to collect not only the information of the entire production process but also the relevant raw materials or the semi-finished products purchased in the previous links. The information is all loaded to the RFID tags and provided to the processors of the next links. Therefore, in the whole process information system of the food industry chain, the production and processing links are included in the key supervision scopes while the supervision of each link is strengthened. The specific design scheme is shown in Figure 4.

B. THE NATIONAL FOOD SAFETY SUPERVISION INFORMATION PLATFORM

The National Food Safety Supervision Information Platform is the core of the operation of the entire supervision framework system; it is the service target of various food

information data and also the “gatekeeper” of the food industry. The “entry qualification” of food, the origin, and the development, or the emergency operations of food safety accidents are all inseparable from the control of the food safety supervision departments. The establishment of the National Food Safety Supervision Information Platform is mainly used to solve the following two problems; from the vertical perspective, the interconnection and information sharing between the supervision departments would compensate for the delays in policy directives caused by the imperfect supervision system; from the horizontal perspective, the informationized and intelligent operation process of the food safety accidents would make up for the supervision gap brought by the sub-sector supervision, as well as avoiding the responsibility shirking, breaking the self-enclosed supervising situations, and improving the efficiency and quality of supervision.

In addition, the National Food Safety Supervision Information Platform consists of the national, provincial, municipal, and prefectural systems and the subsystems of each food supervision department. The main systems and their related subsystems also share inseparable horizontal links (Figure 5).

The national platform and the subsystems of each national supervisory departments have the highest supervisory authority, enabling them to obtain the supervisory information and dynamic situations of the subordinate platform at any time, timely communicate new policies and instructions to the subordinate departments, and issue the supervisory priorities, which helps ensure the timeliness of the news and avoid errors and mistakes in supervision caused by communication delays. The subordinate supervision platforms also have certain authority to inquire some key information of the superior platform from the supervision platform, including the rating of the enterprise and the supervisory requirements for various types of food; in addition, they adjust the supervision methods according to the requirements of the

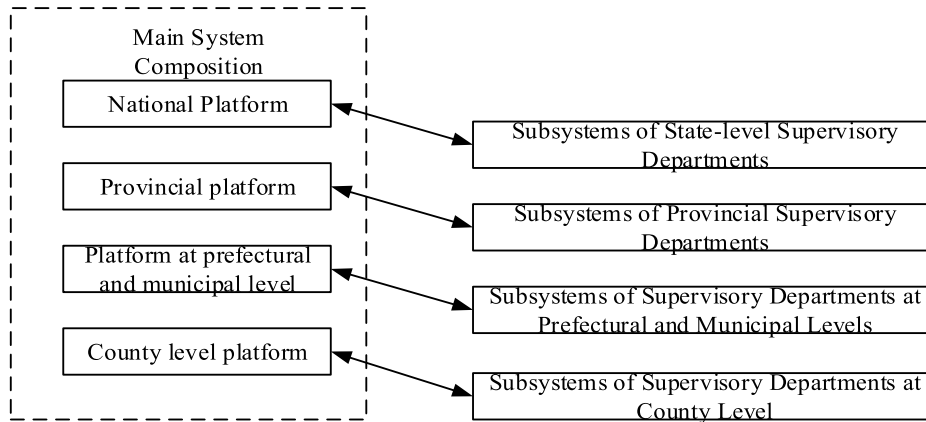


FIGURE 5. National food safety information platform.

superior platforms. Through the IOT technology, inter-regional convergence could be achieved, which could avoid the problems of food quality inconsistency due to the regional differences and the urban-rural development differences to a certain extent; in addition, it could also suppress the corruption of local supervision departments and food enterprises, thereby ensuring the transparency and fairness of food safety supervision. Besides, through the docking between the National Food Safety Information Platform and the business platforms of food business operators, the production status and the key information of food could be obtained and the visualized online monitoring could be achieved, which not only restricts the food enterprises to a certain extent but also saves the supervision costs and resources, making up for the waste of raw materials and damage to consumers caused by post-regulation.

From a horizontal perspective, an information sharing platform between governmental supervision departments including agriculture, industry and commerce, quality inspection, food and drug administration, commerce, and environmental protection is needed to realize online transfer of cases, online processing, dynamic communications of law enforcement situations, and case information process tracking and monitoring, as well as establishing a collaborative mechanism for online convergence, information sharing, convenient communication, and timely investigation is established. Under the existing supervision system, it can alleviate the problem of supervision gap to a certain extent, eliminate the phenomenon of “kicking the ball” between the supervision departments and strengthen the communications between these departments. Through the law enforcement information platform, the dynamic monitoring situations are timely understood, thereby the mutual supervision is achieved. As an intelligent and information-based security event processing platform, the law enforcement information sharing platform must have the following four core functions. The first is the custom configuration and deployment of processes; the second is the case processing flow management; the third is the information query, statistics, and analysis; the fourth is an information

sharing management. The specific design scheme is shown in Figure 6.

According to the above four core functions, the various supervision departments in China should follow the following steps when dealing with food safety incidents and accidents. Once a food safety incident occurs, the event analysis platform intercepts the incident and makes an assessment and analysis in the existing evaluation and analysis system; through event analysis, combined with the supervision scopes of the supervision departments, the platform communicates the evaluation and analysis reports to each supervision department, provides the processing flow and the responsible department; each supervision department handles the case according to the processing flow, hands over the case to other departments as needed, and timely uploads processing information to the law enforcement information platform; therefore, other departments can obtain the processing information in time to decide whether the response is needed. Both the vertical food safety regulatory information platform and the horizontal law enforcement information sharing platform could authorize consumers, media, and food companies be informed of some supervision penalties and policies on these platforms.

C. THE FOOD SAFETY CREDIT SYSTEM PLATFORM

In recent years, the frequently happened food safety incidents, including “Melamine Baby Formula” incident, “Ractopamine” incident, industrial gelatin incident and “Fake Mutton” incident, have not only frustrated domestic consumers of food industry, but also rung the alarm bell for food safety supervision in China. The occurrences of such incidents are not because of the poor manufacturing technologies; these incidents are the results of food manufacturers subjectively ignoring standards, lowering costs and pursuing the maximization of profits. Severe food safety situation indicates an urgent need of establishing the food safety credit system.

The major objectives for the establishment of the food safety credit system platform consist of two aspects. One is

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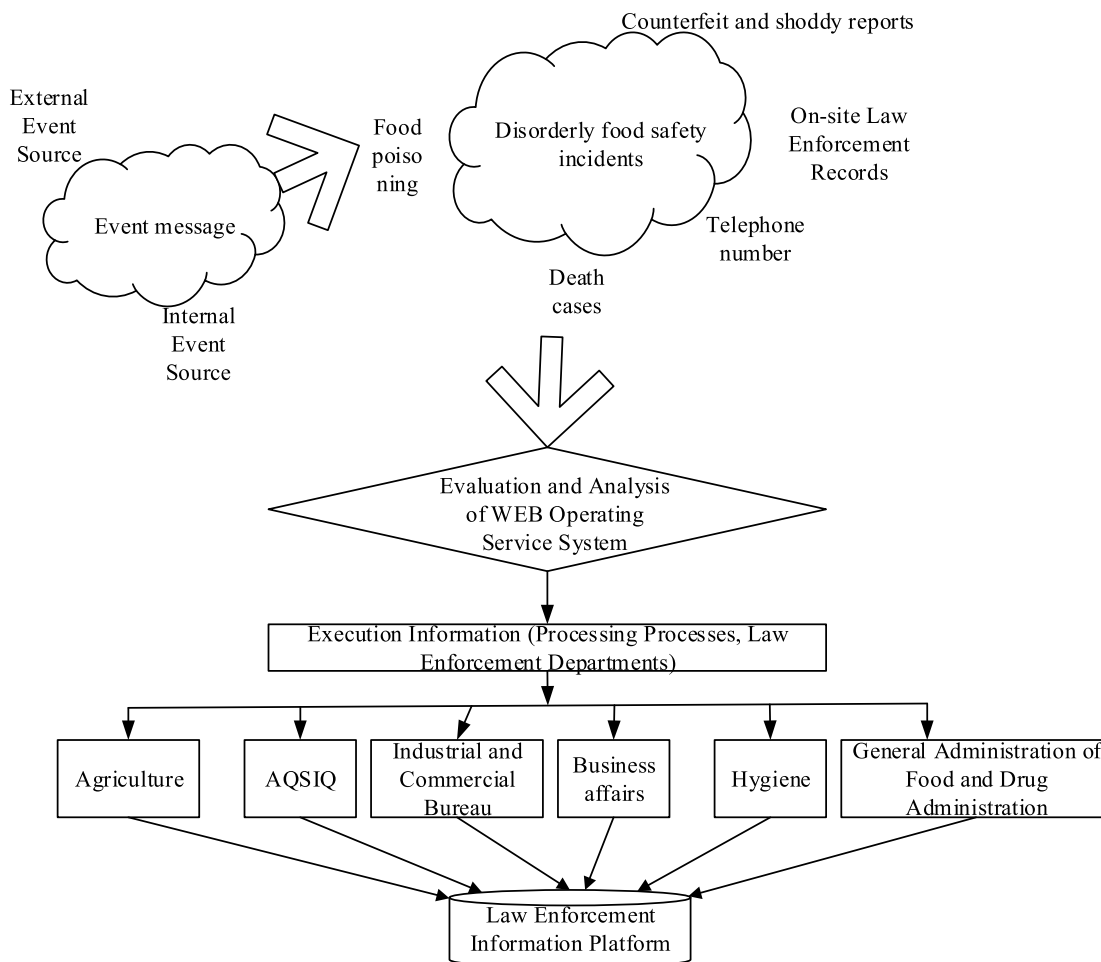


FIGURE 6. Law enforcement information sharing platform.

to establish the dynamic food safety credit files that cover all kinds of food production operators under the unified credit evaluation system; the supervision departments are able to track and record the credit situations of food enterprises in a timely manner, master the dynamic situations of implementing food safety laws and regulations, increase the illegal production costs of enterprises to promote the self-discipline operation under the “blacklist” dishonesty mechanism. The other aspect is to utilize Internet technology to realize the electronication and national networking of the credit files to achieve information sharing among various departments; therefore, consumers can understand the credit status of enterprises in a timely manner, which would reduce the damages to consumers caused by information asymmetry and have consumers participate in improving food safety management; the enterprises would respond to the feedback of consumers to enhance the confidence of consumers for their products.

The paper takes the experiences of European Union in terms of publishing food information, and establishes food

safety credit system through following three steps: (1) Establishing a fast and accurate information communication and reporting system to accelerate the information propagation speed and raise the information accuracy. (2) Establishing an objective and fair food safety credit disclosing system, disclosing food safety credit information to public on a regular basis, and having consumers and media able to query food safety credit status of corporations at any time. (3) As the most recognized and trusted information resource by consumers, governments shall take the responsibility of publishing the information, and take necessary actions to rectify the inordinate phenomenon such as “information isolated island”, blocked information transmission and information asymmetry, etc. Besides, governments and supervising departments shall provide consumers and corporations with free information services on the platform, which include not only the latest policy information such as laws, regulations, policies and standards, etc., but also the supervision information and credit records of corporations.

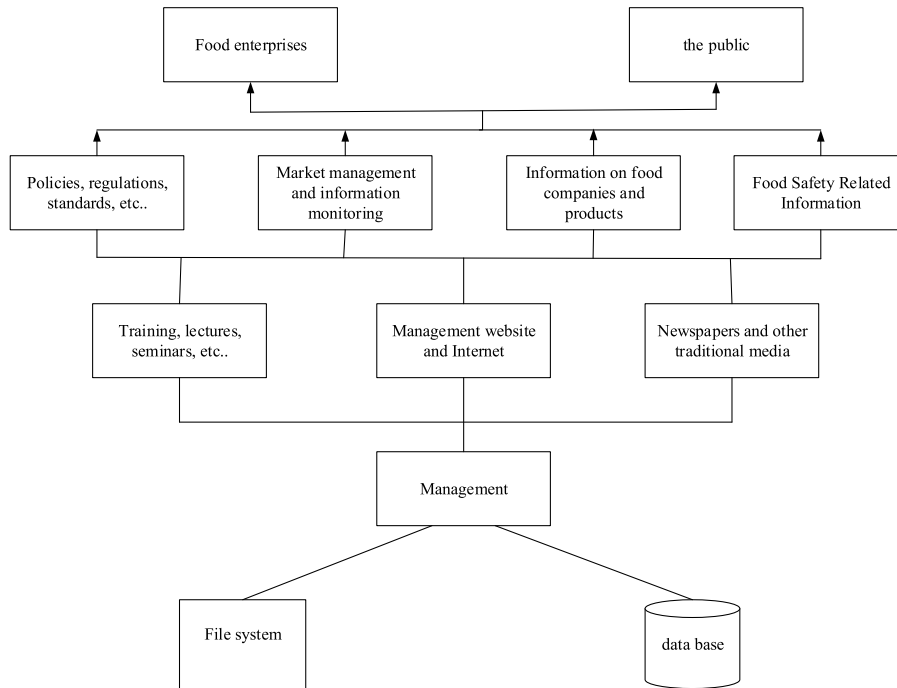


FIGURE 7. Food safety credit system platform.

The food safety emergency response platform mainly uses database management technology and cloud computing technology to mine and analyze food information and identify and judge the current food situation; in addition, based on the existing information in the database, combined with current security event information, the platform analyzes the accident and offers scientific and effective preparations and arrangements in advance; besides, the platform also provides corresponding arrangements and decisions to minimize the risk of food safety accidents. The food safety operation database is the data foundation for achieving precautionary supervision, and the food safety emergency response platform is the strong backing of precautionary supervision. The food safety operation database provides a possibility for the traditional post-event supervision mode to change to the prevention type of supervision. The food safety emergency response platform provides a quick and efficient response to sudden and unpredictable food safety incidents, avoiding emergencies and the subsequent states of hectic.

First, through the regulatory platform and the food supply chain information platform, the information security reports and the sample data of problem food are obtained; then, through various terminal systems, the data, pictures, sounds, and other information of the problem food are collected and uploaded to the food safety incident emergency communication system. Next, the data analysis results of the database laboratory, as well as the integrated field data and image information of the accident are analyzed by the food safety accident processing model; consequently, the evaluation and tendency analysis of the accident are output and the corresponding emergency commands and decision supports are

provided; each supervision department responds according to the emergency commands within its scope of responsibility, and publishes the respective response measures on the food safety emergency response platform for other supervision departments to inquire and avoiding duplication of work or conflicts.

The major response process of emergency response can still adopt the current emergency response system of China. The emergency platform mainly increases the communications among various departments during the process of emergency operations of food safety accidents, making the emergency response of food safety accidents timelier, as well as reducing the damages and loss caused by delayed responses.

V. CONCLUSION

The establishment of food safety supervision system based on IOT technology is a long-term and complex project, which is the basis for realizing the informationization of food safety supervision. Promoting the establishment of IOT-based food safety supervision system would not only improve the efficiency of food safety supervision and reduce the occurrence of food safety accidents but also improve the production management level of the entire food industry, reduce the waste of resources, and improve the satisfaction of the public to the society. The research contents and results are as follows: (1) The current status of domestic and foreign food safety supervision and food safety information management are studied; the deficiencies of food safety supervision in China and the necessity of reforming it are pointed out; the application of IOT technology to food safety supervision is

analyzed; the cases of application and the deficiencies of the current applications are analyzed to provide a certain reference for the introduction of the IOT technology in the subsequent sections; and (2) Based on the system analysis of the functions of the comprehensive supervision system, the food safety operation database, the food industry chain process information system, the law enforcement information platform, the food safety credit system platform, and the early warning emergency platform are designed in detail; the operation of the comprehensive supervision system is guaranteed, and the recommendations and countermeasures for implementing and operating the food safety supervision system based on the IOT technology are proposed.

The introduction of IOT technology to improve the food safety supervision has been analyzed, the food safety supervision informationization has been explored, and a comprehensive food safety supervision framework system based on IOT technology has been proposed. The food safety operation database, the whole process information system of the food industry chain, law enforcement. Information platform, the food safety credit system platform and the early warning emergency platform have been designed to ensure the operation of the comprehensive supervision system. However, due to the wide range of food safety supervision, which involves supervisory systems, supervisory technologies, laws, policies, standards, etc., the supervisory framework proposed would inevitably have certain disadvantages; therefore, further exploration and research, as well as the constant improvement and innovation are needed.

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