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Article

The characteristics, challenges, and opportunities of China's food safety inspection supervision in the distribution sector

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Abstract: Concerns about public food safety are comparatively common in the Chinese food distribution industry. A dearth of expertise and scarce resources lead to frequent instances of incapacity and inadequate oversight, which negatively affect stakeholders in the circulation industry. The main challenges to food supervision are the need for more alignment between the technical specifications, comprehensiveness, and continuity of the existing food safety supervision legislation and the real circumstances facing the regulatory agencies. Despite the circulation field's critical position in food safety regulation, its complex and variable characteristics make it challenging to implement and manage. There exist notable concerns over inadequate food safety standards and supervisory frameworks, vagueness in enforcing rules, and insufficient workforce and technical know-how in food safety supervision. The opportunities for regulating the food business with the government's focus and attention considerably outweigh the obstacles that lie ahead. The growth of the food business needs to be viewed in the larger framework of the country's economic development. Professional involvement and collaboration with technical departments can help regulatory bodies tackle non-compliant actions in the market circulation process in a timely way, resulting in a more evidence-based and responsive regulatory approach. Establishing a healthy equilibrium and elucidating the relationship between oversight and the food business will be crucial in the future.

Keywords: characteristics; challenges; opportunities; food safety; circulation

1. Introduction

Food is an integral part of Chinese culture, as suggested by the Chinese saying, "People regard food as God" (Wu and Chen, 2013). Food is a unique commodity, and its circulation belongs to a specific category of commodity circulation (Song, 2011). Food supply issues have been fundamental to social stability (Lam et al., 2013). Currently, there are food safety issues throughout the entire industrial chain, from the production of raw materials to circulation and sales. Food circulation is generally seen as the effective and efficient flow of food, services, and related information from production to consumer terminals.

According to the food supply chain, food procurement, storage, transportation, sales, and other related processes are crucial (Gwenzi et al., 2023; Lan et al., 2008; Tang et al., 2015). Food distribution is a critical aspect of supervision and an essential link in the production and circulation process, where food safety issues often arise (Mol, 2014). Contamination incidents involving raw materials occur frequently due to the illegal use of pesticides, prohibited drugs, and other unauthorized additives (Guan et al., 2009; Pei et al., 2011). Lagging companies may have ineffective manufacturing

procedures and inadequate quality control systems, which can result in increased expenses, waste, incorrect handling, and a delayed reaction to market needs. When firms in the food processing chain are being behind, it can lead to a number of issues that affect product quality and consumer confidence (Lord et al., 2017). The situation is chaotic, and dealers who deliberately sell expired or spoiled food for personal gain have repeatedly not been banned from the food distribution industry. In the context of China's food import trade, where food fraud constitutes 30.35% of rejected imported foods (Li et al., 2022). Food fraud, which includes activities such as mislabeling, tampering, counterfeiting, and the use of unauthorized substances, is a significant issue that undermines the integrity of the food supply chain, it represents a considerable concern that needs to be addressed. The related data is also publicly available on the State Administration for Market Regulation website (Food and Drug Administration, 2019).

In 2011, food safety was identified as the most concerning safety issue, with 85.2% of the votes, followed by social security (57.2%) and traffic safety (38.5%), according to a survey on the top safety issues among Chinese people (Haiyan, 2011; Song et al., 2014). China's food safety is under threat due to its shoddy institutions and regulatory framework. Some manufacturers take risks because they are motivated by financial gain, while some buyers and sellers need to better their notions and product quality. To date, these concerns still persist. Food can be contaminated by various harmful factors from the farm to the table at any stage of the process (COTEC, 2000; Frank et al., 2011; Zhen et al., 2008). Moreover, food safety issues often lead to food safety incidents after purchase and consumption (Mao et al., 2011; Xu and Meng 2011; Xinhua News Agency, 2013). Therefore, the circulation field will inevitably become a crucial line of defense for food safety control, and it can also respond to the production process to enhance food safety supervision (Martinez et al., 2007).

2. China's framework for supervision of food safety

2.1. The development of regulatory responsibilities

Since the establishment of the People's Republic of China, the regulatory authorities have undergone five periods of reform. In the past, food quality and safety supervision were divided into multiple sectors due to the dispersed nature of farming (Zhang et al., 2010). **Table 1** indicates that a single health administrative department was the primary authority during the planned economy period (1949–1979). A basic health system, focusing on prevention and launching large-scale mass health publicity, and establishing a wide-coverage basic medical insurance system for urban and rural areas, was been established this time. During the early years of reform and opening up (1979–1995), there were continuous improvements in food safety supervision laws and regulations, leading to a gradual increase in the types and scope of supervision. During the period of extensive economic reform (1995–2015), the food safety management system, characterized by "segmented supervision and supplemented by multi-variety supervision", began to take shape. While the professionalization of supervision has improved, it has also led to the decentralization of functions. During the period of modernizing governance (2015–now), the unified supervision model of

the "large department system" and "big market" continues to this day, and market supervision remains relatively concentrated.

Table 1. The attribution and scope of regulatory responsibilities in China from 1949 to now.

Food hygiene management			**Food safety governance**	
1949–1979	1979–1995	1995–2009	2009–2015	2015–now
Centralized Management	Multi-sector Management	Matrix Management	Process Management	Integrated Management
Ministry of Health, Departments of five ministries involved	Departments of agriculture, forestry, animal husbandry, aquaculture, grain, supply and marketing, business, light industry, and trade.	Institutions of the Ministry of Health at all levels over the country, Departments of local government in the jurisdiction.	Food Safety Committee for overall guidance; Relevant Ministries for process management	Food Safety Committee for overall guidance; CFDA (SAMR, 2018) for safety supervision; NHFPC (NHC, 2018) for risk monitoring, risk assessment, and safety standard.
Regulations on the Management of Food Hygiene (Trial Implementation) 1964	Food Hygiene Law (Trial Implementation) 1982	Food Hygiene Law 1996	Food Safety Law 2009	Food Safety Law (Amended) 2015

In March 2018, the new State Administration for Market Regulation was established to standardize the organizational structure and enhance administrative efficiency, in line with the reform plan of the State Council. This administration replaced the previous departments responsible for market supervision and management functions. The specific details of the different departments are illustrated in **Figure 1**. With the enactment of the "Food Safety Law of the People's Republic of China" in 2009 (FSL, 2009), the various departments clarified their specific regulatory responsibilities in food circulation, as well as the division of labor and regulatory functions (see **Table 2**). Food safety supervision has been under the jurisdiction of the State Administration for Market Regulation (SAMR) since 2018. Administrative regulatory agencies play a crucial role in overseeing food safety, but they are not the only individuals that have that responsibility (Jiang, 2022). To ensure a safe food supply, businesses and food vendors, customers, and other stakeholders all have a role to perform (China Food and Drug Administration, 2016).

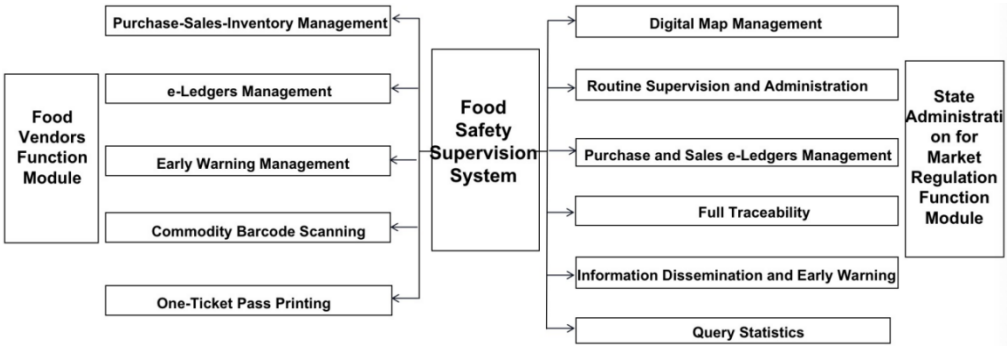

Figure 1. Schematic diagram of the food safety supervision system in the circulation field.

Table 2. Supervisory responsibilities of various functional departments in the food circulation field.

Institutions	**Abbreviation**	**Policies and programs**
Ministry of Agriculture and Rural Affairs of the People's Republic of China	MOA	Responsible for crop production, animal husbandry, and regulating and overseeing the quality of agricultural products.

Table 2. (*Continued*).

Institutions	Abbreviation	Policies and programs
State Administration for Market Regulation	SAMR	Responsible for comprehensive market supervision and management. Including organizing and guiding comprehensive law enforcement of market supervision, supervising and managing market order, product quality and safety supervision and management, and comprehensive coordination of food safety supervision and management. It also includes unified management of inspection and detection work.
National Health Commission of the People's Republic of China	NHC	Organizing the drafting of food safety standards; carrying out monitoring, evaluation and exchanges of food safety risks; undertaking the safety review of new food ingredients, food additives and other food-related products.
National Development and Reform Commission	NDRC	Responsible for strategic planning, price guidance, and macroeconomic regulation, among other functions.
Ministry of Industry and Information Technology of the People's Republic of China	MIIT	Responsible for formulating and organizing the implementation of industry planning, plans, and industrial policies for the food sector, as well as overseeing food enterprises and related functions.
Ministry of Commerce of the People's Republic of China	MOFCOM	Responsible for coordinating and regulating the market economy, monitoring and analyzing market operations and controls, and overseeing the food market, among other functions.

2.2. The primary subjects of food safety supervision

The primary focus of the circulation field is the relationship between supervisors and supervisees, who operate within the framework of regulatory instruments (administrative, economic, legal, etc.) in China. Supervisors are primarily state agencies and administrative departments (Li, 2022), while supervisees are individuals involved in the entire process of food production and operation, responsible for managing food safety issues. Failure to prioritize business ethics in food production companies can erode consumer trust in the brand. Opaque product information, failure to fulfill promises to consumers, and mishandling of consumer complaints can result in negative consequences. Both supervisors and supervisees must adhere to strict laws and regulations regarding food safety to ensure that the food meets consumer needs.

2.3. The dispersion of supervision responsibilities

It is difficult for limited enforcement resources to target a sizable number of goods and supermarkets given the dire circumstances (Li, 2019). Therefore, the assignment of supervisory duties is critical (Martinez et al., 2007). The government establishes a legal framework, including regulatory agencies, food businesses, and individuals. Specific government agencies are designated as the official bodies responsible for food safety supervision (Liang et al., 2012; Wang et al., 2019). Supervisory personnel, who owned clear job descriptions and roles, such as food safety inspectors, compliance officers, and policy developers, are assigned specific jurisdictions or sectors within the food industry to oversee. Personnel are trained and certified to perform their supervisory duties, based on geographical regions, type of food products, or stages of production.

2.4. The public participation and oversight

The involvement of individuals and relevant organizations in food safety oversight should be fully mobilized within society, establishing a comprehensive supervision network and constructing a food safety prevention social system suitable for current social development (Martinez 2007; Mendonca and Maluf, 2014). The government is responsible for creating and enforcing legislation based on laws and

regulations (FSL, 2009; Feng et al., 2022; Jia and Jukes, 2013). The establishment of a food safety management system can facilitate smooth cooperation in food safety oversight between relevant departments and firms. Moreover, there should be an emphasis on enhancing media transparency and promoting increased communication between the government and citizens. This will enable the public to access accurate information about food safety incidents (Franceschini, 2016; Song et al., 2014). More crucially, in order to guarantee food safety, Chinese food industries should put social duty and food safety ahead of financial gain.

3. Experience in developed countries and regions supervising food safety

3.1. The regulatory frameworks for food safety in the developed nations

Developed countries have implemented more comprehensive and strict regulatory frameworks for food safety, including a greater range of safety features and placing higher demands on those attributes. In developed nations, there are four primary categories of food safety regulatory frameworks. The United States exemplifies the first, primarily regulating based on food categories and having a single department to oversee both foreign and domestic issues (Wang, 2020; Yang, 2008). Japan is a representative of the second, which collaborates and assigns tasks based on risk. The European Union and its member states embody the third paradigm, which primarily operates on a variety of regulatory frameworks with a tiered regulatory structure involving the EU, member states, and businesses. The fourth is the other developed countries' regulatory model, which Canada represents. There are further notable customs in Taiwan (Ma et al., 2020).

3.1.1. United States

The legal framework in the US for regulating food safety is comparatively strong. In terms of supervision, the US food safety regulatory agencies are organized to carried out vertical management from top to bottom. In terms of horizontal supervision, they are primarily overseen by departments based on food categories; that is, departments handle different food categories under different departments' management. President oversees the Food Safety Committee and reviews policy suggestions regarding the efficacy of security systems (Gu, 2015; Song, 2014). Regulatory bodies' functions and responsibilities are clearly delineated.

Centers for Disease Control and Prevention (CDC) affiliated to DHHS (Department of Health and Human Services), which is mainly responsible for the investigation and prevention of foodborne diseases. The three most significant organizations in charge of overseeing food safety in the US are the DHHS-affiliated U.S. Food and Drug Administration (FDA), the Animal and Plant Health Inspection Service (APHIS) and the Food Safety and Inspection Service (FSIS) in the USDA (U.S. Department of Agriculture). Among these, the FDA is in charge of overseeing the food industry's whole supply chain, which includes over 80% of the country's food, from manufacturing to sales. Monitoring, standard establishing, recollection, and other tasks are the principal tasks completed (Burkett, 2012). Between 2009 and 2011, the US passed the Food Safety Modernization Act (FSMA) and the Food Safety

Enhancement Act of 2009 (FSEA) to add yet another layer of improvement to its food safety regulatory system. It has a huge impact on nations that export food to the United States in addition to having revolutionary relevance for food safety oversight in the United States (Du et al., 2013). While APHIS is mostly in charge of overseeing fruits, vegetables, and other plants to avoid animal and plant pests as well as foodborne illnesses, FSIS is primarily in service of monitoring and developing laws and regulations for meat, poultry, and egg products (Nganje et al., 1999).

3.1.2. Japan

Japanese food industries are well-known internationally for their stringent implementation of food safety oversight procedures and their adoption of comprehensive quality management systems (Fung et al., 2009). The Food Safety Committee, the highest independent body in charge of overseeing food safety and possessing the most decision-making authority on matters pertaining to food safety, is in charge of the food safety management system in Japan. It gathers a lot of data from social groups and customers and provides easy ways for the public to participate and provide feedback views held by the general public.

3.1.3. European Union

The European Food Safety Authority (EFSA), founded in 2002, is the EU's food safety management organization. Its duties include conducting risk assessments related to food safety issues, setting up a quick warning system for food safety, informing consumers about issues pertaining to food safety and health, and serving as the foundation for EU food safety laws and regulations.

The Food and Veterinary Office (FVO) is the executive body overseeing EU legislation pertaining to food. Its duties include monitoring member state compliance with EU regulations and ensuring the safety of food imported into the EU from outside. The European Union has developed over 20 food safety legislation, such as the "EU Food Safety and Hygiene System", "Food Hygiene Law", and "White Paper on Food Safety", in an effort to standardize and harmonize domestic food safety regulations (Shi et al., 2017). A number of other food safety regulations and standards have also been developed by the EU, including measures to prevent drug residues, food production hygiene standards, animal and plant disease control, official veterinary certificate regulations of exporting countries, good laboratory inspections, and official food monitoring.

3.1.4. Canada

The food safety supervision model in Canada is a national regulatory resource that is unified, coordinated, and integrated across several sectors. Regulatory agencies are further subdivided into various levels to facilitate coordination with local governments. The quality of Canadian food safety supervision is efficiently ensured by the relatively uniform and centralized regulatory framework (Ball et al., 2009). The Ministry of Agriculture and the Ministry of Health are the principal agencies in charge of managing food safety. Provincial food processing, sales, and related food service businesses fall under the purview of the federal, provincial, and municipal authorities' hierarchical management of food safety monitoring within the overall governance framework (Pagotto and Farber, 2009).

3.1.5. Taiwan

In Taiwan, management agencies and rigorous oversight are used to oversee every facet of food production and distribution (Ching-Chuan and Da-Chen, 2015). The "Food Hygiene Administration Act" makes it very plain that food containing additives cannot be made or sold, and it also sets up a system of penalties for practices in the food market that go against the law. The "Healthy Food Control Act" defines "healthy food" precisely, the term "health food" shall denote food with health care effects, having been labeled or advertised with such effects. That is to say, an effect that has been scientifically proven to be capable of improving people's health, and decreasing the harms and risks of diseases. A person must apply for and receive permission for a health food license. According to the "Agricultural Products Production and Verification Administration Act", superior agricultural products cannot be marketed until they satisfy the necessary management and testing procedures and verification system. The "Commodity Inspection Preparation Act" outlines the parameters and the steps involved. Taiwan has put in place a system for tracking processed food products. Under this system, each relationship between the production and distribution of food can be efficiently supervised (Lien et al., 2019). Customers can quickly assess the location and level of risk associated with food safety.

3.2. The barriers of successful models from developed countries adopted in China

China's particular cultural and social context might not always line up with those created in the West. It can be difficult to modify these models to conform to Chinese cultural norms and values. Foreign models may face challenges in China's regulatory environment if they are incompatible with current rules or if the framework is not receptive to novel ideas. Another obstacle that may prevent an organization from implementing new models is internal opposition brought on by a comfort level with current procedures or a lack of faith in the advantages of change. China prioritizes homegrown innovation while incorporating patterns from developed nations. It might be challenging to strike a balance between local innovation and the acceptance of foreign models.

4. The characteristics of food supervision in the field of circulation

The features of food supervision in the field of circulation China are an agricultural nation that has seen a number of food safety-related issues and occurrences that have drawn attention from the public both domestically and abroad (Hu et al., 2013). The food distribution industry has had a number of safety concerns in recent years (**Table 3**). According to the responsible party, if producers use non-food additives and sellers sell spoiled or expired food, there will be a number of food safety issues. Examples of these issues include the "Melamine" incident and the unauthorized addition of chloramphenicol to aquatic products, among other things (Jia and Jukes, 2013; Luo et al., 2021). Generally speaking, the circulation field is a crucial component in the food supply chain that gets food into the palms of consumers. Sustaining food safety requires complicated oversight that must be detailed and trustworthy. Furthermore, there is a large range of food available in China, and the

primary issues with circulation are related to Pre-Packaged Food, Bulk Products, and Naked Products. The first category includes foods in sealed containers, which may have labeling and storage challenges. Issues can arise from incorrect labeling, tampering, or spoilage due to improper storage. Foods sold in bulk, such as grains, nuts, can be contaminated during handling or storage. They may also be more susceptible to fraud, such as mislabeling of origin or quality. The last category are products with no packaging, like fresh fruits and vegetables, which are exposed and can be easily contaminated. They also lack immediate information about their origin or handling history. These items' complexity and diversity make monitoring more challenging and lead to a host of issues (Yang, 2021).

Table 3. Selected incidents of food safety incidents in China that were extensively covered by the media from 2008 to 2022.

Year	Incident	Details	Consequence or Punishment	Supporting references or link
2008	"Melamine" incident	The chemical melamine was found in infant milk powder and common diary products.	Triggered a crisis of trust in Chinese milk powder from then on, 39,965 infants and toddlers were treated on an outpatient basis after consuming the infant formula, and 6 deaths	Pei et al. (2011)
2009	"Leather milk" incident found in "Chenyuan Dairy" of Jinhua City	Three 20-kilogram packages of white leather hydrolyzed protein powder, and 1300 boxes of contaminated milk products.	The corporate legal person was detained.	FOX News (2011) Feng and Sommer (2011)
2010	"Counterfeit protein powder" was produced and sold by Hubei Xiaogan Longyun Protein Co., Ltd.	Industrial-grade liquid alkali and hydrochloric acid were used as catalysts to extract plant protein from soybeans and made into protein powder for sale.	The total value of the goods reached more than $9.59 million. The case was opened for investigation.	China News (2011)
2011	"Dyed" steamed bun incident in Shanghai	The sweetener sodium cyclamate and preservative potassium sorbate were added to steamed buns that were expired and then the buns were repackaged.	Harming public health.	CHINA DAILY (2011)
2012	Lipton "poisoned tea" incident	The tea contained a variety of harmful pesticides.	Harming consumer health.	FINANCIAL TIMES (2012)
2013	1. Kung Fu Restaurant "ice cube" incident 2. Hui Yuan "Rotten Fruit" incident	1. The microbial colony count on ice cubes at the Kung Fu Restaurant exceeded the limit value. 2. The factory used rotten fruits to make juice.	1. Loss of consumer trust. 2. Massive drop in company stock.	Shanghai Daily (2013) Made-in-China (2013)
2014	Shanghai Husi Food Co., Ltd. supplies expired ingredients to McDonald's and KFC	The expired raw materials were suspected to produce and process food	A total of 6 senior executives of the company involved were arrested by Shanghai Municipal People's Procuratorate on suspicion of producing and selling counterfeit and inferior products.	The Paper News (2014)
2015	The abused food additives to produce meat products by Zhejiang Jinhua Chuanchuanxiang Food Co., Ltd.	Allura red was detected in their meat products.	Harming health risks to consumers, and a public prosecution was launched.	Chinese Government Network. (2016)

Table 3. (*Continued*).

Year	Incident	Details	Consequence or Punishment	Supporting references or link
2016	Industrial gelatin processed food in Yingkou, Liaoning Province	7 dens were seized for the production and sale of toxic and harmful food, most industrial gelatin is made into toxic and harmful foods, and the total amount involved is nearly $15 million.	Triggered the public picnic, 10 suspects arrested	Wang and Wu (2016)
2017	The mold in Three Squirrels pistachios.	The mold detection value of pistachios was 70 CFU/g, which was 1.8 times higher than standard limit value.	Endangering consumer health.	Stepin (2021)
2018	"Fake organic vegetables" by China Organic Green Food Industrial Co., Ltd.	The pesticide residues in organic vegetables exceed the standard limit.	Impact on the credibility of Chinese organic vegetable brands	Doctor Farrah (2023)
2019	Sanquan Food (dumplings) tested nucleic acid positive for swine fever virus	Three samples of "Sanquan Soup Dumplings" (batch:20190113H) produced by Henan Sanquan Food Co., Ltd. were positive for African swine fever virus nucleic acid.	A total of 24,127 pieces of soup-filled dumplings were sealed. worth ¥2,171,430.	Dictall News (2019)
2020	"Case of the use of recycled oil" used by Chengdu Shuyanmen Catering Service Department	Collecting the hot pot base ingredients consumed by customers, filtering to remove impurities. The recycled waste oil was heated and separated to obtain "Old oil" and made into new hot pot base.	Four defendants including the legal representative of the hot pot restaurant were sentenced to 2 to 5 years in prison and fined. And prohibited from engaging in food production, operation and management for life.	CHINA NEWS (2022)
2021	Jinan City counterfeited "Fresh duck blood"	The fake "fresh duck blood" in hot pot restaurants.	Two criminal suspects and 15 employees of catering service units were held legally responsible.	The Paper News (2021)
2022	"Maiqule" propylene glycol incident	Propylene glycol was detected in pure milk produced by Maiquer, which constituted excessive use of food additives in food production.	Maiqule company was fined $10 million. The performance forecast shows that Maiquer will lose $17.81 million to $26.72 million in the first half of 2022.	China/Politics (2022)

4.1. Complexity

Food safety concerns in the circulation field are fragmented and different due to unsafe variables present in food raw materials, production, and sales (Qiu, 2023), resulting in the complexity of supervision and increasing the difficulty of supervision simultaneously. The supervision system itself is the primary cause of supervision's complexity. Furthermore, food circulation forms including online shopping, online supermarkets, and live commerce (Chiou et al., 2017; Ren et al., 2022) are becoming more and more common in China as a result of the Internet's oddly rapid growth (Kim and Wang, 2021; Liu and Lin, 2020; Yan et al., 2015). Live commerce is the most characteristic aspect of a live-stream economy, and online food buying has emerged as the primary conduit for consumers' access to food resources (Alaimo et al., 2020; Liu, 2023a; Wang and Wang, 2023). Unfortunately, the low market entry threshold will increase the hazards to food safety when some unqualified merchants enter the market. Because online transactions are hidden, customers may find it challenging to discern between what is genuine and what is false when buying food, and it may be challenging to comprehend the true facts about food, which raises the possibility of a

violation of their rights (De La Rosa and Tully, 2022; Yang, 2021). It is difficult and difficult to pursue accountability and protect rights once food safety problems occur due to the anonymity of online food transactions, the virtuality and cross-regional nature of the online market, and the liquidity. It is also simple to have issues like unlicensed operation, trademark infringement, and false propaganda, which led to a worsening of the problems with online food safety. Both the regulatory procedure and the subject matter have grown increasingly complicated and challenging.

4.2. Uncertainty

Since there are many different food varieties available in China and a large number of operators in the market, the hazardous factors (Gong et al., 2012; Tang et al., 2022) associated with them are unlikely to be concentrated in one area of a distributed market, creating numerous challenges for effective supervision. Furthermore, global and intricate supply chains make it difficult to track food products from source to consumer, rapidly changing food trends and new products can introduce new pathogens or allergens into the food supply, mislabeling of ingredients or origin can mislead consumers and create safety concerns. While technology offers solutions like block chain for traceability, not all operators may have access or the ability to implement such technologies (Li et al., 2023). As a result, all these factors will raise the ambiguity surrounding food safety concerns and complicate food safety oversight.

4.3. Invisibility

One significant aspect of food safety concerns is its unsightliness. As industry has grown, a wide range of chemical food additives can now be employed sensibly in food. While the use of food additives can create the appearance of high-quality food to the consumer, there is a risk of chemical and biological contamination, particularly with excessive additions that are easy to overlook. Consuming excessively sodium benzoate in stewed meat products—which frequently happens in daily supervision—and substituting sodium saccharin for part of the refined sugar in sweet steamed buns.

Food safety issues are currently going through a transition from “visible” to “invisible”. In order to properly detect food safety issues, sophisticated scientific equipment must be used before tables (Tian et al., 2021; Yang, 2021). Advancements in technology play a pivotal role in enhancing food safety testing and addressing “invisible” concerns such as microorganisms, chemical contaminants, and allergens that are not immediately apparent to the naked eye. For instance, Mass Spectrometry and Spectral Imaging, the former is used for the identification and quantification of chemical contaminants, including pesticides, toxins, and residues of veterinary drugs. The later is combines imaging with spectral analysis to detect abnormalities and contaminants in food products that are not visible to the naked eye. This will help to uncover food safety issues early on.

5. The challenges in supervising food safety in the sector of circulation

Food safety issues are frequently the consequence of cooperation between several parties rather than being the product of a single producer or operator. According to Chiou et al. (2017), the majority of consumers now view food safety issues as having "zero risk" rather than acceptable risk. This implies that monitoring food safety will become a more demanding undertaking. Addressing the present consumer demand for food safety would be challenging without comprehensive, ongoing supervision and improved safety.

5.1. The discrepancy between reality and institutional design

The foundation upon which market monitoring departments are built is the belief that all agencies and personnel with the authority to oversee food safety are obedient, selfless public servants who will work together effectively to serve the interests of the general public. Individualism, collectivism, and departmental interests are not taken into consideration (Fung et al., 2018). Nevertheless, local governments are not merely the "public servants" that the public expects; rather, they are the ultimate decision-makers when it comes to controlling and managing significant local policy resources. Because of the government's hierarchical structure, officials are obligated to serve the public while advancing their careers, guaranteeing a higher level of stability and security than would be possible outside the system. Departments often compete for limited government resources, which can lead to a reluctance to collaborate. For instance, if the health department and the agriculture department both require funding for food safety initiatives, they might each pursue their own agenda instead of working together to maximize the impact of their combined resources. However, regulatory leaders were held accountable one after another when food safety violations occurred, which had an adverse effect on internal departmental cooperation (Li, 2019).

5.2. Regulation ambiguity on the overlap of departmental duties

The production, distribution, consumption, oversight, and research are all part of the lengthy and intricate food chain. Various government departments, including agricultural affairs, development and reform commission, health commission, commerce, animal husbandry, customs, and others, will become engaged when food safety issues arise. Overlapping departmental responsibilities can quickly develop to a situation where "everyone is in charge, but none is charged well" when communication routes between departments are closed and information is difficult to communicate.

5.3. Less harsh punishment in terms of severity

It is inevitable that some companies will turn to unlawful tactics in order to take advantage of market opportunities, hence it is challenging to ensure food safety. While there are penalties in the FSL for corporations that are dishonest, they are not harsh enough, and the cost of violating is tolerable (Jia and Jukes, 2013). When food safety issues arise, businesses are subject to varying penalties, and many sellers also rely on serendipity. As a result, numerous traders have altered their legal identities, re-

registered their trademarks, and returned after being looked at. Even while food laws often focus more on food safety than on illegal activity, it is nevertheless imperative to have effective and efficient control mechanisms and countermeasures. The goal of food safety supervision is to stop food safety accidents before they happen, not to hold people responsible for food safety mishaps after they happen. Instead than emphasizing penalties, the focus is on prevention.

5.4. Reduced availability of experts and technologies in the field of circulation

As technology advances and more risky substances are added for financial gain, regulatory bodies are forced to depend on the strength of outside technical institutions to help them carry out their oversight responsibilities. There should be more professional detail in the way routine work is assigned and the supervisors themselves may not be as skilled, which would lead to less supervision of the work. Transparent supply chains depend on scientific testing's ability to quickly confirm food safety, identify food fraud, and validate the legitimacy of produce that is labeled (Lindley, 2022). Technical staff monitoring is also necessary for popular online food (DiMaggio et al., 2019). A shortage of experts qualified to manage big, complicated, and highly fragmented businesses limits the effectiveness and capacities of central governments in real regulation.

Local governments lack the necessary resources to handle the majority of the specific management and inspection duties. Some livestock and agricultural goods enter the market uninspected due to a lack of equipment and capacity, which poses concealed risks to food safety (Li et al., 2023). Thus, the two main issues facing food safety supervision today are the development of technology and the deployment of specialists (Jiang, 2022; Wei, 2022). According to Liang et al. (2012) and Wang et al. (2019), using third-party testing agencies is a great approach to help relevant departments with their backlog of technical issues and to ensure that they have enough technical assistance for their oversight work in the circulation domains.

5.5. Weaker ability to implement of food safety policies

Regulatory agencies are faced with a multitude of food varieties, distinct manufacturing processes, and varying legal and regulatory needs. As a result, they are required to oversee individual food types or all food types. The difficult task cannot be completed due to a shortage of labor and materials. These days, random product inspections are the primary focus of food safety supervision (Pizzuti et al., 2014). Employees in sales and production may have a higher probability, and problems are difficult to identify immediately. The core issue of food safety still has to be resolved.

The manner of supervision is merely a formality. In order to comprehend food safety concerns in the market, many supervisors may also employ a variety of techniques, including undercover investigations and surprise inspections. However, the real impact differs from what was anticipated (Li, 2019).

5.6. Incompetence in managing small workshops

Food safety guarantees are made more difficult by tiny workshops' carelessness. In the food manufacturing and assembly process, the term "small workshops" refers to units that have separate, fixed production and processing locations and typically do not engage in large-scale manufacturing (Qiu, 2023; Zhou, 2011). The key features of tiny workshops are their large quantity and strong liquidity. Customers will eventually come to distrust any distribution company, and it will take time for food safety inspection efforts to become effective.

5.7. The circulatory field's insecurity factors

5.7.1. Overuse and inappropriate application of additives

Driven by profits, an increasing number of food production companies, including international food brands, are founded and competing in the Chinese market. Some of these companies substitute low-quality, low-cost materials for standard ones in order to save money (Esteki et al., 2019).

The 2008 "melamine" contamination incident, also known as the China milk powder contamination scandal, was a major food safety incident. It is noteworthy to add that food safety in the dairy business has consistently garnered significant attention globally since then (Pei et al., 2011). In this incident, in order to increase the false protein content of the test, some unscrupulous dairy farmers and dairy companies illegally added industrial chemicals melamine to raw milk or dairy products. This resulted in the death of at least 6 infants and nearly 300,000 infants suffering from diseases such as kidney stones. This incident not only caused a huge shock in China, but also spread to the world, as some contaminated products have been exported to other countries. Customers will become extremely alarmed if there is even the slightest negative report about milk powder. This is also the pinnacle of China's "trust crisis" over food safety.

5.7.2. Sporadic incidents involving parasites, viruses, and bacteria

There are two possible sources of bacteria, viruses, and parasites in food, endogenous and external contamination. Food containing an excessive amount of bacteria or pathogens is different from rotten and spoiled food in that it is more likely to cause acute or chronic food poisoning and is harder to identify when consumed (Borraz et al., 2020; Drimie and Ruysenaar, 2010). They are crucial markers for assessing the level of food hygiene and the reason behind food spoilage occurs frequently in the distribution and manufacturing of food (Ahmad et al., 2021).

When *Pseudomonas cocovenenans* food poisoning incidents were recorded in China between 2002 and 2016, fermented rice flour items accounted for up to 68% of the cases (Geng et al., 2020). On 5 October 2020, a family took "Suan-tang-zi" during a family meal in Jixi City, Heilongjiang province, which resulted in food illness. Every one of the nine diners perished (Yang, 2021). The Centers for Disease Control and Prevention conducted an epidemiological investigation, sampling, and testing, and found that *Pseudomonas cerebroventis* contamination produced fumonisin, which was the cause of this incidence. "Suan-tang-zi" is a dish made using fermented rice flour. The food poisoning-causing sour corn dough was kept in the refrigerator for a year before being removed and placed in a cool, damp spot. *Pseudomonas cerebroventis*

bred, multiplied, and metabolized in the sour dough due to the extended storage period and inappropriate storage circumstances, which ultimately resulted in the disaster.

6. The chances for food safety supervision in the Chinese distribution sector

Bright prospects for the growth of the food sector have been created by the national plan of "Healthy China" (Chen et al., 2019; Tan et al., 2017; World Health Organization, 2019). The government can employ experts, apply legal tools, and work to build a virtuous cycle of food markets in order to address the issues and dilemmas pertaining to food safety oversight and the circulation field. Future dietary patterns will be impacted by the COVID-19 pandemic, and taste orientation will give way to health orientation. People's food choices, consumption patterns, and dietary preferences will shift (Fang et al., 2020). In general, people prioritize their food above everything else. However, there are significantly more potential in the food industry's circulation field than there are obstacles going forward.

6.1. There will undoubtedly be tighter food supervision

The government defines the division of labor, equitably distributes regulatory powers among food safety regulatory authorities, and encourages regulatory authorities to set distribution standards, increase the threshold for entry into the circulation field, and standardize inspection protocols. The government will focus more on food safety throughout the whole supply chain and industry chain in the post-epidemic era (Chen et al., 2019). This covers both regular food and specialty foods (health goods, baby food, and food specifically designed for medical formulas). A number of national food safety standards have been developed and updated by the government to guarantee the security of food processing and production. From farm to table, the government has tightened oversight over procurement of raw materials, production and processing, storage and transportation, market sales, and other related activities. Laws and regulations pertaining to food safety carry severe consequences, such as steep fines, license suspension, and criminal culpability. In the future, immune-boosting special foods will emerge as a new area of growth for the food business (Fang et al., 2020; Li et al., 2018). Since seniors have the highest fatality rate from COVID-19, we should be mindful of the food they are offered. China is almost unexplored in this area, thus there is a vast market (Zuo et al., 2022). Comparing the market share with that of the US, Europe, and Japan, the total is roughly 600 million.

6.2. Enterprises are empowered by intelligent internet and information technology

Recently, there has been a widespread adoption of the food traceability system (FTS) to lower the risk of food safety issues (Duan et al., 2017; Tang et al., 2015). Food safety incidents may be decreased, product quality can be efficiently controlled (Liu et al., 2012), and food safety management can be greatly improved with the use of FTS (Hu et al., 2013; Pizzuti et al., 2014). The China Food (Product) Safety Traceability Platform works with the Ministry of Commerce, the State Administration for Market Regulation, and other organizations to advance the Global Standards One

(GS1) traceability standard′s broad implementation. The cost per unit for general commodities traceability is 80 yuan. Sichuan Tianfu New District Management Committee has integrated an automated rapid testing to try every batch of dishes access mechanism. Artificial intelligence has been pushed in the food business, which has resulted in a "fewer but better" approach to work. These days, e-commerce, online consumption, intelligent manufacturing, warehousing, and unmanned delivery are all quite intelligent (Polacsek et al., 2019; Zuo et al., 2022).

The integration of block-chain and Internet of Things (IoT) can offer a comprehensive solution for traceability in food supply chains, present the potential to enhance transparency, security, and efficiency within the industry. IoT devices can provide real-time data that is then recorded on a block-chain, creating an indisputable record of the food′s journey. This dual technology approach can significantly improve the efficiency of traceability systems and enhance the ability to respond to food safety incidents. With increasing consumer demand for transparency regarding the origin and quality of food products, block-chain and IoT technologies can provide the information needed to build trust. Consumers can access detailed information about the food they purchase, including its origin, ingredients, and how it was produced.

6.3. The growth of the market for agricultural products and small workshops

Due to their decentralized operations, minuscule processing workshops known as street-free markets and rural bazaars (Zhou, 2011) have historically been the center of attention for concerns regarding food safety (Wang et al., 2019). It's critical to combine farmers' market management with small workshop supervision to solve some of the problems small workshops face and to entice clients to visit centralized business sites (Yang, 2008). The management of small workshops can be integrated by the relevant departments into the broader supervision of the market economy and the circulation field. This way, the management of small workshops can progressively move to relatively concentrated hypermarkets, supermarkets, and so on. In the future, there will be an increased focus on premium agricultural products, well-known, unique, and fresh agricultural products, agricultural products with regional specialization, and locally produced specialty agricultural products (Wu and Liu, 2015; Liu, 2023b).

7. Conclusion

As food circulation is more open and centralized than the field of food production, it will be easier to cause food safety issues to arise and less difficult to simultaneously analyze and address food safety issues. There are no fast cuts to fixing this issue, considering the size and complexity of the Chinese food business.

7.1. Government oversight

There is an expectation that the government will enhance its regulatory role and set higher standards for food safety. This could involve stricter regulations, more frequent inspections, and harsher penalties for non-compliance.

7.2. Collaborative effort

The statement emphasizes the need for a collaborative approach involving the government, the food industry, and consumers. This multi-stakeholder approach is essential for a holistic solution to food safety issues.

7.3. System improvement and supervision

Improvements to the systems that govern food safety are necessary, from legislation and standards to the actual supervisory and enforcement mechanisms. This includes the use of information technology to enhance traceability and monitoring. Technology can provide transparency and facilitate rapid response in case of issues.

7.4. Allocation of responsibility

Clear allocation of responsibility is crucial. Everyone from producers to distributors to retailers must be aware of and accountable for their role in the food safety chain.

7.5. Mechanisms for assurance

A fully functional mechanism is required to ensure food safety. This includes not only regulatory frameworks but also industry self-regulation, third-party auditing, and consumer education.

7.6. Consumer empowerment

Educating consumers about food safety, their rights, and how to make informed choices can lead to increased demand for safe food and encourage industry compliance.

Given that food safety issues are constantly changing, maintaining food safety in China—or in any other vast, complex food system—requires a multifaceted strategy that involves effective use of technology, industry compliance, strong government leadership, and consumer awareness. It's about cultivating a culture of food safety in which all parties involved contribute to preventing problems through continuous strategy and technology adaptation and improvement, as well as prompt problem-solving.

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References

Ahmad, S., & Guo, M. R. (2021). Infant formula quality control. In: Human Milk Biochemistry and Infant Formula Manufacturing Technology. Woodhead Publishing. pp. 255–280. https://doi.org/10.1016/b978-0-08-102898-8.00010-6

Alaimo, L. S., Fiore, M., Galati, A. (2020). How the Covid-19 pandemic is changing online food shopping human behaviour in Italy. Sustainability, 12, 9594. https://doi.org/10.3390/su12229594

Ball, B., Wilcock, A., & Aung, M. (2009). Factors influencing workers to follow food safety management systems in meat plants in Ontario, Canada. International Journal of Environmental Health Research, 19(3), 201–218. https://doi.org/10.1080/09603120802527646

Borraz, O., Beaussier, A., Wesseling, M., et al. (2020). Why regulators assess risk differently: Regulatory style, business organization, and the varied practice of risk-based food safety inspections across the EU. Regulation & Governance, 16(1), 274–292. https://doi.org/10.1111/rego.12320

Burkett, A. (2012). Food Safety in the United States: Is the Food Safety Modernization Act Enough to Lead Us Out of the Jungle? Alabama Law Revier, 63.

Caswell, J. A. (2003). Trends in food safety standards and regulation: implications for developing countries. International Food Policy Research Institute.

CFS. (2010). Proposal for an international food security and nutrition Civil Society Mechanism for relations with CFS. In: Committee on World Food Security CFS 36th Session Rome; 11-14,16 October 2010.

Chen, P., Li, F., Harmer, P. (2019). Healthy China 2030: moving from blueprint to action with a new focus on public health. The Lancet Public Health, 4(9), e447. https://doi.org/10.1016/S2468-2667(19)30160-4

CHINA DAILY (2011). 4 Shanghai officials punished in dyed bun scandal. Available online: https://www.chinadaily.com.cn/china/2011-04/30/content_12425249.htm (accessed on 30 November 2023).

China Food and Drug Administration. (2016). Notice on issuing the graded management of risks in food production and operations from China Food and Drug Administration (Trial Implementation). China Food and Drug Administration.

China News (2011). The Ministry of Public Security announced the top 10 typical cases of food safety crimes in China in 2010. Available online: https://www.gov.cn/jrzg/2011-03/22/content_1829610.htm (accessed on 30 March 2024).

CHINA NEWS (2012). Sixty nationwide “ditch oil” crime networks were smashed. Available online: https://www.chinanews.com/gn/2011/12-13/3526590.shtml (accessed on 12 December 2023).

China/Politics (2022). The McGuire propylene glycol incident was fined two years of net profit, and the results of the investigation were “slapped in the face” before mixed into the statement. Available online: https://www.scmp.com/news/china/politics/article/3183964/chinese-food-firm-maiquer-under-investigation-over-milk (accessed on 13 October 2023).

CHINA NEWS (2022). The hot pot restaurant was sentenced to 10 years in prison and fined 10 times of income for using gutter oil, which made people applaud. Available online: https://www.chinanews.com.cn/sh/2022/04-08/9722997.shtml (accessed on 8 November 2023).

Chinese Government Network (2016). The Food and Drug Administration announced the top ten typical cases of food safety. Available online: https://www.gov.cn/xinwen/2016-03/14/content_5053394.htm (accessed on 18 November 2023).

Ching-Chuan, S., Da-Chen, C. (2015). Ensuring Food Safety: An Important Challenge Today: Food safety management in Taiwan. JMAJ, 58(4), 209.

Chiou, J.-S., Chou, S.-Y., & Shen, G. C.-C. (2017). Consumer choice of multichannel shopping. Internet Research, 27(1), 2–20. https://doi.org/10.1108/intr-08-2013-0173

COTEC. (2000). Commission of the European Communities: White paper on food safety. COTEC.

De La Rosa, W., & Tully, S. M. (2022). The Impact of Payment Frequency on Consumer Spending and Subjective Wealth Perceptions. Journal of Consumer Research, 48(6), 991–1009. https://doi.org/10.1093/jcr/ucab052

Dictall News (2019). Sanquan Foods moves to contain African swine fever fallout. Available online: http://dictall.com/dictall/newsInfo.jsp?id=93723 (accessed on 11 November 2023).

DiMaggio, D. M., Du, N., Scherer, C., et al. (2019). Comparison of Imported European and US Infant Formulas. Journal of Pediatric Gastroenterology and Nutrition, 69(4), 480–486. https://doi.org/10.1097/mpg.0000000000002395

Doctor Farrah (2023). Fake Organic Food From China is FLOODING U.S. Store Shelves — What You Need to Know. Available online: https://doctorfarrah.com/2024/05/02/fake-organic-food-from-china-is-flooding-u-s-store-shelves-what-you-need-to-know-2/ (accessed on 9 May 2024).

Drimie, S., & Ruysenaar, S. (2010). The Integrated Food Security Strategy of South Africa: An institutional analysis. Agrekon, 49(3), 316–337. https://doi.org/10.1080/03031853.2010.503377

Du, Y. Y., Guo, B. M., Yu, W. Z. (2013). Food Safety Supervision System in Developed Countries and Its Implications for China. Global Science, Technology and Economy Outlook, 28(5), 71-76.

Duan, Y., Miao, M., Wang, R., et al. (2017). A framework for the successful implementation of food traceability systems in China. The Information Society, 33(4), 226–242. https://doi.org/10.1080/01972243.2017.1318325

Esteki, M., Regueiro, J., & Simal-Gándara, J. (2019). Tackling Fraudsters with Global Strategies to Expose Fraud in the Food Chain. Comprehensive Reviews in Food Science and Food Safety, 18(2), 425–440. https://doi.org/10.1111/1541-4337.12419

Fang, E. F., Xie, C., Schenkel, J. A., et al. (2020). A research agenda for ageing in China in the 21st century (2nd edition): Focusing on basic and translational research, long-term care, policy and social networks. Ageing Research Reviews, 64, 101174. https://doi.org/10.1016/j.arr.2020.101174

Feng, T. T., Wang, C., Zhang, Y., et al. (2022). Literature metrology and visual analysis of food safety supervision research in China. Journal of Food Safety and Quality, 13(02), 641-649. https://doi.org/10.19812/j.cnki.jfsq11-5956/ts.2022.02.017

Feng, Y., & Sommer, G. (2011). Leather Milk Surfaces Again in China. Available online: https://alaskandreams.net/ekklesia/Leather%20Milk%20Surfaces%20Again%20in%20China.htm (accessed on 19 April 2024).

FINANCIAL TIMES (2012). Lipton tea faces safety scandal in China. Available online: https://www.globaltimes.cn/content/706516.shtml (accessed on 12 November 2023).

Food and Drug Administration. (2019). Regulations of inspection of imported foods and related products. Available online: https://consumer.fda.gov.tw/Law/Detail.aspx?nodeID=518&lang=1&lawid=145 (accessed on1 November 2023).

FOX News (2011). China on alert for leather protein in milk supply. Available online: https://www.foxnews.com/world/china-on-alert-for-leather-protein-in-milk-supply (accessed on 21 February 2024).

Franceschini, T. (2016). The Guarani and Kaiowá Peoples' Human right to adequate food and nutrition: a holistic approach - executive summary. Food Information Action Network - FIAN Brazil, Brasília.

Frank, C., Werber, D., Cramer, J. P., et al. (2011). Epidemic Profile of Shiga-Toxin–ProducingEscherichia coliO104: H4 Outbreak in Germany. New England Journal of Medicine, 365(19), 1771–1780. https://doi.org/10.1056/nejmoa1106483

FSL. (2009). The Food Safety Law of the People's Republic of China (FSL). Beijing: National People's Congress.

Fung, F., Wang, H.-S., & Menon, S. (2018). Food safety in the 21st century. Biomedical Journal, 41(2), 88–95. https://doi.org/10.1016/j.bj.2018.03.003

Garcia Martinez, M., Fearne, A., Caswell, J. A., et al. (2007). Co-regulation as a possible model for food safety governance: Opportunities for public–private partnerships. Food Policy, 32(3), 299–314. https://doi.org/10.1016/j.foodpol.2006.07.005

Geng, X. F., Zhang, J., Zhuang, Z. Y. (2020). Epidemiological analysis of reported Pseudomonas cocovenenans food poisoning incidents in China from 2002 to 2016. Journal of Hygiene Research, 49(4), 648-650.

Gong, P., Liang, S., Carlton, E. J., et al. (2012). Urbanisation and health in China. Lancet, 379(9818), 843-852. https://doi.org/10.1016/S0140-6736(11)61878-3

Gu, G. Q. (2015). Experience and enlightenment of food safety supervision in United States and the European union. Food and Machinery, 31(1), 272–274. https://doi.org/10.13652/j.issn.1003-5788.2015.01.063

Guan, N., Fan, Q., Ding, J., et al. (2009). Melamine-Contaminated Powdered Formula and Urolithiasis in Young Children. New England Journal of Medicine, 360(11), 1067–1074. https://doi.org/10.1056/nejmoa0809550

Gwenzi, W., Makuvara, Z., Marumure, J., et al. (2023). Chicanery in the food supply chain! Food fraud, mitigation, and research needs in low-income countries. Trends in Food Science & Technology, 136, 194–223. https://doi.org/10.1016/j.tifs.2023.03.027

Haiyan, O. Y. (2011). Five top safety issues of Chinese in 2011. Insight China, 7, 50–54.

Hu, J., Zhang, X., Moga, L. M., et al. (2013). Modeling and implementation of the vegetable supply chain traceability system. Food Control, 30(1), 341–353. https://doi.org/10.1016/j.foodcont.2012.06.037

Ji, G. N., Wu, J. S., Gao, W. M. (2001). Singapore food hygiene management features. China Public Health, 19, 863–864.

Jia, C., & Jukes, D. (2013). The national food safety control system of China – A systematic review. Food Control, 32(1), 236–245. https://doi.org/10.1016/j.foodcont.2012.11.042

Jiang, Q. L. (2022). The research on problems and countermeasures of food and drug safety supervision in S city [Master's thesis]. Hunan University. https://doi.org/10.27135/d.cnki.ghudu.2020.001226

Kepple, A. W., & Segall-Corrêa, A. M. (2017). Food security monitoring in Brazil and other Latin American countries: Support for governance with the participation of civil society. Global Food Security, 14, 79–86. https://doi.org/10.1016/j.gfs.2017.05.006

Kim, W., & Wang, X. (2021). To be online or in-store: Analysis of retail, grocery, and food shopping in New York city. Transportation Research Part C: Emerging Technologies, 126, 103052. https://doi.org/10.1016/j.trc.2021.103052

Lam, H. M., Remais, J., Fung, M. C., et al. (2013). Food supply and food safety issues in China. Lancet, 381(9882), 2044–2053. https://doi.org/10.1016/S0140-6736(13)60776-X

Lan, H. J., Huang, F. Q., Lin, Z. K. (2008). The design of a food traceability system for 2008 Beijing Olympic Games. China Storage & Transport, 5, 86–89.

Li, D., Zang, M., Wang, S., et al. (2022). Food fraud of rejected imported foods in China in 2009–2019. Food Control, 133, 108619. https://doi.org/10.1016/j.foodcont.2021.108619

Li, X. J. (2019). Research on Food Safety Supervision System from the Perspective of Holistic Governance—A Case Study of X City. JiangXi University of Finance and Economics.

Li, X. Y. (2022). Study on the current situation of food safety supervision and Guarantee System. Modern Food, 28(03), 46–48. https://doi.org/10.16736/j.cnki.cn41-1434/ts.2022.03.011

Li, X., Jiang, X., Sun, J., et al. (2018). Recent advances of medical foods in China: The opportunities and challenges under standardization. Food and Chemical Toxicology, 119, 342–354. https://doi.org/10.1016/j.fct.2018.02.024

Li, X., Zang, M., Li, D., et al. (2023). Meat food fraud risk in Chinese markets 2012–2021. Npj Science of Food, 7(1). https://doi.org/10.1038/s41538-023-00189-z

Liang, K., Thomasson, J. A., Lee, K.-M., et al. (2012). Printing data matrix code on food-grade tracers for grain traceability. Biosystems Engineering, 113(4), 395–401. https://doi.org/10.1016/j.biosystemseng.2012.09.012

Lien, K.-W., Chen, S.-Y., Pan, M.-H., et al. (2019). Inspections of imported foods to Taiwan: an overview. Journal of Consumer Protection and Food Safety, 14(2), 183–191. https://doi.org/10.1007/s00003-018-1204-7

Lindley, J. (2022). Food regulation and policing: innovative technology to close the regulatory gap in Australia. Journal of Consumer Protection and Food Safety, 17(2), 127–136. https://doi.org/10.1007/s00003-022-01372-2

Liu, C. F., Lin, C. H. (2020). Online food shopping: a conceptual analysis for research propositions. Front Psychol, 11, 583768. https://doi.org/10.3389/fpsyg.2020.583768

Liu, L. M., Qian, H., Gao, Y. C., et al. (2011). Analysis and Assessment of Food Traceability Status in China. Advanced Materials Research, 396–398, 1353–1357. https://doi.org/10.4028/www.scientific.net/amr.396-398.1353

Liu, Q. X. (2023a). A study on the influence of consumer emotions on purchase intentions and consumption amounts in live streaming of food sold by internet celebrity [Master's thesis]. Jilin University.

Liu, T. (2023b). Problems and countermeasures in the supervision of small food workshops. China Food Industry, 1, 43–45,48.

Lord, N., Flores Elizondo, C. J., & Spencer, J. (2017). The dynamics of food fraud: The interactions between criminal opportunity and market (dys)functionality in legitimate business. Criminology & Criminal Justice, 17(5), 605–623. https://doi.org/10.1177/1748895816684539

Luo, L., Lu, S., Huang, C., et al. (2021). A survey of chloramphenicol residues in aquatic products of Shenzhen, South China. Food Additives & Contaminants: Part A, 38(6), 914–921. https://doi.org/10.1080/19440049.2021.1898680

Ma, C.-C., Chen, H.-S., & Chang, H.-P. (2020). Crisis Response and Supervision System for Food Security: A Comparative Analysis between Mainland China and Taiwan. Sustainability, 12(7), 3045. https://doi.org/10.3390/su12073045

Made-in-China (2013). Chinese Juice Products Were Being Made From Rotten Fruit. Available online: https://resources.made-in-china.com/article/industry-view/SJTnZhqYIEHx/Juice-Makers-to-Be-Probed-Over-Rotten-Fruit-Juice/ (accessed on 24 September 2013).

Mao, X., Hu, J., Liu, X. (2011). Epidemiological burden of bacterial foodborne diseases in China-preliminary study. Chin J Food Hyg, 23(2), 132–136.

Mendonca Leao, M., Maluf, R. S. (2014). Effective public policies and active citizenship: Brazil's experience of building a food and nutrition security system. Oxfam International.

Mol, A. P. J. (2014). Governing China's food quality through transparency: A review. Food Control, 43, 49–56. https://doi.org/10.1016/j.foodcont.2014.02.034

Nganje, W. E., Mazzocco, M. A., McKeith, F. K. (1999). Food safety regulation, product pricing, and profitability: The case of HACCP. North Dakota State University.

Pagotto, F. J., & Farber, J. M. (2009). Cronobacter spp. (Enterobacter sakazakii): Advice, policy and research in Canada. International Journal of Food Microbiology, 136(2), 238–245. https://doi.org/10.1016/j.ijfoodmicro.2009.05.010

Pei, X., Tandon, A., Alldrick, A., et al. (2011). The China melamine milk scandal and its implications for food safety regulation. Food Policy, 36(3), 412–420. https://doi.org/10.1016/j.foodpol.2011.03.008

Pizzuti, T., Mirabelli, G., Sanz-Bobi, M. A., et al. (2014). Food Track & Trace ontology for helping the food traceability control. Journal of Food Engineering, 120, 17–30. https://doi.org/10.1016/j.jfoodeng.2013.07.017

Polacsek, M., Boninger, F., Molnar, A., et al. (2019). Digital Food and Beverage Marketing Environments in a National Sample of Middle Schools: Implications for Policy and Practice. Journal of School Health, 89(9), 739–751. https://doi.org/10.1111/josh.12813

Qiu, S. X. (2023). Problems and countermeasures of food and drug safety supervision. Journal of Project Management, 4, 39–41. https://doi.org/10.12238/jpm.v4i3.5712

Ren, Y., He, Z., & Luning, P. A. (2022). Performance of food safety management systems of Chinese food business operators in Tianjin. Food Control, 138, 108980. https://doi.org/10.1016/j.foodcont.2022.108980

Shanghai Daily (2013). Fast-food ice dirtier than their toilets. Available online: http://www.china.org.cn/business/2013-07/22/content_29488434.htm (accessed on 23 December 2023).

Shi, N., Chen, Y., Huang, H., et al. (2017). Characteristics of food safety supervision system in foreign countries and its implications for China. Science and Technology of Food Industry, (16), 239–241. https://doi.org/10.13386/j.issn1002-0306.2017.16.045

Song, H. (2011). A study on food safety standard law in China. J Public Admin, 2, 30–50.

Song, Y. L. (2014). The experience of the US legal system of food safety supervision. World Agric, 421(5), 82–85.

Song, Y., Li, X. M., Zhang, L. S. (2014). Food safety issues in China. Iranian J Publ Health, 43(9), 1299–1300.

Stepin (2021). Three Squirrels' nuts test positive for hazardous substances. Available online: https://www.cmgm.net/three-squirrels-nuts-hazardous-substances/ (accessed on 12 December 2023).

Tan, X., Liu, X., & Shao, H. (2017). Healthy China 2030: A Vision for Health Care. Value in Health Regional Issues, 12, 112–114. https://doi.org/10.1016/j.vhri.2017.04.001

Tang, Q., Li, J., Sun, M., et al. (2015). Food traceability systems in China: The current status of and future perspectives on food supply chain databases, legal support, and technological research and support for food safety regulation. BioScience Trends, 9(1), 7–15. https://doi.org/10.5582/bst.2015.01004

Tang, Y. Q., Dai, J. H., Fu, M., et al. (2022). Recommendations on microbiological monitoring in catering service food. China Food Safety Magazine, (14), 29–32. https://doi.org/10.16043/j.cnki.cfs.2022.14.018

The Paper News (2014). Regulators seized Shanghai OSI Foods overnight and ordered McDonald's KFC to remove the problematic meat from the shelves. Available online: https://www.forbes.com/sites/russellflannery/2014/07/21/queasy-reading-shanghai-govt-shuts-down-mcdonalds-kfc-meat-supplier/?sh=670f5e0b6b19 (accessed on 30 January 2024).

The Paper News (2021). Xiaolongkan hot pot restaurant and other businesses have exposed food safety problems and have been investigated and punished. Available online: https://www.thepaper.cn/newsDetail_forward_14174157 (accessed on 8 November 2023).

Tian, D. Y., Zhao, J., Liu, T. T. (2021). Application of food rapid detection in food safety supervision and the solutions. China Food Safty Magazine, 35, 25-27. https://doi.org/10.16043/j.cnki.cfs.2021.35.029

Wang, J. H., Wang, K. F. (2023). Four-party evolutionary game of food quality supervision for live-streaming e-commerce supply chain. Logistics Technology, 85–92,112.

Wang, W. (2020). Comparative Analysis and Enlightenment of Food Safety Supervision System in Advanced Countries. IOP Conference Series: Earth and Environmental Science, 512(1), 012064. https://doi.org/10.1088/1755-1315/512/1/012064

Wang, W. T., Tian, H. Y., Wang, G. Q., et al. (2019). Discussion and countermeasures on quality and safety status of catering food in Shandong province in 2018. Journal of Food Safety and Quality, 10(18), 6389–6397. https://doi.org/10.19812/j.cnki.jfsq11-5956/ts.2019.18.069

Wang, X. D., & Wu, Y. (2016). Industrial gelatin poisons food; police crackring. Available online: https://global.chinadaily.com.cn/kindle/2016-07/30/content_26278565.htm (accessed on 18 November 2023).

Wei, Q. Z. (2022). Analysis of countermeasures of food and drug safety supervision. China Food Safty Magazine, 4, 38–40. https://doi.org/10.16043/j.cnki.cfs.2022.04.05

World Health Organization. (2019). Healthy China: Deepening Health Reform in China: Building High-Quality and Value-Based Service Delivery, 3rd ed. World Bank Publications. pp. 97–124.

Wu, L., Liu, J. J. (2015). Suggestion of supervision of food processing workshops and food vendors in China. Journal of Food Safety and Quality, 6(09), 3764–3770. https://doi.org/10.19812/j.cnki.jfsq11-5956/ts.2015.09.083

Wu, Y., & Chen, Y. (2013). Food safety in China. Journal of Epidemiology and Community Health, 67(6), 478–479. https://doi.org/10.1136/jech-2012-201767

Xu, L., Meng, F. (2011). Report on China food safety studies. Beijing: Science Press.

Yan, T., Choi, T. Y., Kim, Y., et al. (2015). A Theory of the Nexus Supplier: A Critical Supplier From A Network Perspective. Journal of Supply Chain Management, 51(1), 52–66. https://doi.org/10.1111/jscm.12070

Yang, H. (2021). Discussion on the Causes and Prevention Measures of Food Poisoning Caused by Pseudomonas Cocovenenans-Taking the "Suan-tang-zi" Food Poisoning in Jixi City, Heilongjiang Province As an Example. Modern Food, (16), 168–170,175.

Yang, Y. (2008). Implication of vendor center from Singapore to street food hygiene management in China. Chin J Health Inspect, 15(5), 352–355.

Yang, Y. Z. (2021). Challenges and countermeasures of food safety supervision in China. China Food Safty Magazine, (36), 39–41. https://doi.org/10.16043/j.cnki.cfs.2021.36.006

Young, D. (2003). FDA launches new initiative to battle counterfeit drugs. American Journal of Health-System Pharmacy, 60(17), 1712–1712. https://doi.org/10.1093/ajhp/60.17.1712

Zhang, X., Zhang, J., Liu, F., et al. (2010). Strengths and limitations on the operating mechanisms of traceability system in agro food, China. Food Control, 21(6), 825–829. https://doi.org/10.1016/j.foodcont.2009.10.015

Zhen, Y. H., Cheng, Y. J., Pan, G. X., Li, L. Q. (2008). Cd, Zn and Se content of the polished rice samples from some Chinese open markets and their relevance to food safety. J Safety Environ, 8, 119–122.

Zhou, Z. Y. (2011). The discussion of the small workshops of food production definition. Jiangxi Food Ind, 6, 14–17.

Zuo, E., Aysa, A., Muhammat, M., et al. (2022). A food safety prescreening method with domain-specific information using online reviews. Journal of Consumer Protection and Food Safety, 17(2), 163–175. https://doi.org/10.1007/s00003-022-01367-z