The food safety regulation on online catering services in China： from the perspective of the co-governance concept

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Abstract

Online catering services, as part of the disruptive digital economy run by technology intermediaries, have challenged traditional food safety regulation with the food safety issues of such new market due to its integrated supply chain isolated from traditional regulatory framework. Hence, this research aims at how co-governance, as a new governance concept, tests the change of regulation on the change of market through the case of food safety regulation on online catering services in China. This thesis adopts the qualitative approaches in identifying key actors involved in the change of market, their identification of the problems from this new market and their interaction in the change of regulation on these problems. Methods including recording interviews, checking documents of laws, policies, standards and reports and observation had been applied to this research to interpret the activities of participants. The data analysis revealed that the central government of China had changed food safety regulation by sharing responsibilities among key actors related to food safety. Such action ensured online catering platforms had been included as the critical market actors of food safety control watched over by an amalgamated regulatory authority. Prompted by this reform, key actors involved in food safety of online catering services did interact by regarding food safety as a common issue. In the view of co-governance concept, maintaining the consistency between service information supplied online and the service delivered based on such information means preventing activities of actors in the new market from forming their own close loop of activity information without oversight from formal regulators and feedback from the society. None of the key actors can cope with such problems alone but mutually depend on each other, thus key actors impacted by common issues including food safety can constantly exchange advantageous resources through interactions based on mutual dependence.

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Declaration

I declare that this thesis is a presentation of original work for examination for the Ph.D. degree from the University of York, and I am the sole author. This work has not been presented for an award at this, or any other, university. All sources are acknowledged as references.

None of the research in this thesis has been published yet.

Chapter 1: Introduction

1.1 The food safety problem of online catering services

The takeaway food market has undergone rapid changes in China due to the rapid development of online catering services, which have altered the way many people buy food. Between 2011 and 2016, to meet the growing demand for takeaway food, online platforms entered the stage of enrolling more physical catering suppliers as online merchants. In addition, the central government started to provide incentives for an increase in catering suppliers, including simplifying the market entry approval procedures of suppliers and encouraging the further participation of electronic commerce in catering businesses (MOFCOM, 2014; MOFCOM, 2016).[1] These incentives triggered the rapid marketisation of physical catering suppliers and, subsequently, of online catering services that had been enrolling physical suppliers as their online merchants. Online catering services, especially online catering platforms, enrolled traditional catering businesses as online merchants to meet the growing demand for takeaway food. Consequently, these online platforms integrated traditional catering businesses into a new, complex, and rapidly changing supply chain via intermediation services based on information technology. This new market has developed rapidly to ensure a stable supply.

Online catering services are run by web-based platforms that gathered users, both suppliers and customers, into a new supply chain. As the web-based platform corporations funded the construction of this new market, neither the consumers nor the physical suppliers had to pay for their online enrolment. This new market, in turn, grew rapidly as it kept benefiting from further funding from its investors. This

[1] The market size of catering businesses has increased immensely. For example, based on the report of MOFCOM in 2014, there were 239,900 catering suppliers in China and the operation revenue was CNY 1,816.8 billion. By 2017, the number of catering suppliers had reached 365,500 and the operation revenue was CNY 3,579.86 billion (MOFCOM, 2014; MOFCOM, 2017).

funding was based on enrolling more users and collecting a service fee, which was obtained from the revenues of the service delivery and products from a considerable number of physical suppliers enrolled as online merchants. Based on key performance indicators (KPIs), such as the number of online merchants enrolled and the increment of revenue due to the increase in the number of orders and the greater consumer numbers, investors were able to offer the new market more funding so that online platforms could keep expanding. The new market that received the funding then went on to expand by involving more suppliers and customers as users. These users constantly attracted more potential users to join this new market as consumer needs increased and diversified, and there was a low cost of entry into this market for the physical suppliers, who only had to pay a service fee.

Therefore, online catering platforms have much smaller marginal costs than those of the traditional market when acquiring new customers. It has been predicted that online catering services will continue to grow with the growth of both consumer needs and suppliers (Eisenmann et al., 2006). This prediction has been confirmed by the rapid growth of online catering services in 2017 (Trustdata, 2017). Furthermore, online catering services provide a service process so that consumers can choose their products from suppliers enrolled by online platforms as online merchants; suppliers will then process those orders and the platforms will dispatch these products to consumers through physical delivery services. Such an integrated but complex supply chain benefits from efficient online transactions and physical delivery services. In this way, online platforms can meet the increasing need for mass catering from consumers.

Whereas technology led to the constant growth of this new market based on online platforms, the absence of food safety examination, review, and management led to a new set of risks. The online platforms, positioning themselves as web-based e-commerce intermediaries in providing service information and delivering food, focused mainly on enrolling traditional physical catering suppliers as online merchants. This upgrade increased the information supply of online merchants, leading to an increase in physical service delivery. However, the information provided by online merchants, including their service and market activities, did not

reveal whether the ordered products were safe, as to meet growing consumer demand the online platforms prioritised rapid growth over food safety concerns. This priority meant that online platforms devoted little time to, and put little effort into, food safety reviews, verification, and the management of the enrolled suppliers. Thus, supply chains with little concern for food safety created a series of food safety problems for online services. For instance, there was inconsistency in food safety between the information consumers browsed online and the products the consumers received, and this inconsistency led to food safety incidents. In addition, traditional catering businesses, most of which were small and medium suppliers, developed rapidly in China to meet the growing need of consumers to spend less time cooking. However, the increasing cost of energy, rent, and human resources compressed the funding of catering suppliers, especially small and medium-sized enterprises (SMEs), for food safety practices; thus, their commitment to improving food safety was weak (MOFCOM, 2014; Hu, 2017; Feng, 2018). Consequently, traditional catering businesses still maintained inherently problematic food safety practices, which led to poor service quality. As this market has grown, so have cases of food safety incidents, such as foodborne illnesses, the insertion of foreign matter, and unqualified and illegal suppliers offering services. For instance, in the 315 Gala of 2016 for exposing quality problems nationwide, food safety incidents in online catering services were reported by the national press of China. The service information of online merchants presented on online platforms differed from the products offered by the physical suppliers. Furthermore, the hygiene conditions of those suppliers were not approved by the food safety agents of the government for market entry. It increasingly became apparent that the framework that regulated the traditional food sector did not work well in the new, emerging online market due to the complexity of its supply chain and the large number of diverse suppliers.

Before 2016, the traditional regulatory framework required platforms to manage their enrolled suppliers physically and examine and review their food safety information, such as their market entry approval issued by the regulatory authority, and their grades of food safety evaluation. Furthermore, the traditional regulatory framework did not adapt to the new market, and so it was not very effective at protecting the rights of the consumers in the complex and ever-

changing sector of online provision of takeaway food. Traditionally, food safety regulations in China were based on a hierarchical state-centred system designed to focus on physical services. Food safety in rapidly growing traditional catering businesses was inspected, supervised, and enforced by different government bodies and their local branches responsible for health, quality, commerce, agriculture, and food and drugs (The Standing Committee of National People's Congress, 2016; Yin et al., 2016; Zhang, 2018).[2] Consequently, the public resources concerned with food safety administration were overstretched. Food safety administration, including inspection, supervision, and law enforcement, could barely cover food safety issues in traditional catering businesses. Hence, such a regulatory framework that did not include online catering services failed to gather and share food safety information concerning the market actors in online catering services. This new market outran the capacity of traditional regulations before 2018 due to its rapid growth. As there was no collaboration and cooperation among the regulatory authority, the online catering platforms, catering suppliers, and consumers regarding food safety, there was a growing information asymmetry between the online platforms and the regulators. Consequently, the information gathered from the public did show genuine consumer concern about food safety, but the public could not direct the regulatory authority into action, as it lacked the capacity to deal

[2] Before the 2013 government reforms, the Ministry of Agriculture (MOA), the Ministry of Commerce (MOFCOM), the Food Safety Committee Office, the State Food and Drug Administration, the Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), and the Administration for Industry and Commerce (AIC) were responsible for food safety in catering businesses. After the 2013 reform, the Ministry of Agriculture (MOA), the National Health and Family Planning Committee (NHFPC), and the China Food and Drug Administration (CFDA) integrated the functions of food safety regulation overseen by those government bodies. However, structurally, these government bodies and their local branch agencies responsible for food safety directly controlled the food safety risks of traditional catering businesses but with gaps between each, for example the safety and quality inspection of food ingredients. Even though the CFDA controlled food safety in catering businesses, the market entry and exit function belonged to the AIC and the food safety risk surveillance, risk assessment and food safety standard-making belonged to the NHFPC and its local HFPC agencies.

with the information. Consumers often tolerated food safety issues rather than reporting them to regulators, and they were reluctant to put much time and effort into dealing with these issues. Traditional food safety regulations were slow to adapt to new online catering services, and there was no system for improving such regulations in the emerging market. These factors resulted in increased food safety risks to consumers in online catering services and, eventually, they led to the widespread food safety incidents reported in 2016.[3]

The food safety incidents of online catering tested the limits of traditional regulation in coping with quality problems in the complex and rapidly changing market of the digital economy. Thus, this thesis examines the ways in which the Chinese government has attempted to adapt to the challenges of the new market. While traditional regulation tends to be hierarchal, the suggestion is that the horizontal and expanding nature of the digital economy means that regulation needs to be more horizontal and flexible, and involve greater participation from companies and citizens. Hence, the notion of regulatory co-governance was developed as a framework for understanding more participatory forms of regulation. This concept looks at how a network of those involved in the digital economy can become part of the regulatory process. Consequently, regulation can, in principle, occur through participation rather than through hierarchy. It recognises that regulation cannot be effective in a complex market where there are too many actors and too much information for hierarchical regulators to effectively process. For effective regulation, digital platforms require the involvement of a plurality of

[3] On 15 March of each year, the China Central Television (CCTV) holds a 315 Gala to report product quality incidents that have violated consumer rights. In the 315 Gala of 2016, CCTV reported more than ten unqualified and illegal suppliers registering as online merchants and providing services. As early as 2015, the food safety agencies in the Tongzhou district of Beijing had shut down 1,281 restaurants which were unqualified and illegal (CCTV-2, 2016). One of the main online catering platforms, Ele.me, stated that 25,761 catering suppliers had been taken offline (Ele.me, 2016a). The economic incentives from the government had led to economic growth and the prior unnecessary regulations had been relaxed, but the regulatory bodies had not adapted to the change and the risks brought by this growth.

state and non-state actors in the regulatory process. The concept of co-governance is a central analytical framework in this thesis. It is a way of understanding how regulation has been changed to address problems that impact key actors from the state, the market, and society amid a complex and rapidly changing market. The co-governance concept developed in this thesis suggests that the structure of regulation should be horizontal and that the new market is too complex for traditional regulation that follows a hierarchical design to function well in a purely state-led regulatory process. Hence, through the analytical framework of co-governance developed in this thesis, the thesis has found that the change of regulation acknowledges the roles of the state, the market, and the society in a more horizontal structure to address problems in the changing market, but the state continues to have a leading role in designing and overseeing change, influenced by the market and the society.

Through depicting the development and food safety incidents in online catering services in China, the development of the digital economy hinges on meeting a constantly growing need from consumers for services. Gaining as many suppliers and consumers as possible to bring in investment is the short-term goal of digital platform corporations, but society's need for product or service quality has been growing, affecting the further development of the digital economy. To ensure this further development, quality control, especially traceable and transparent quality control, turns out to be a prerequisite for a well-functioning new web-based market (Shapiro and Varian, 1999; Eisenmann et al., 2006; Shang, Shari, and Yanga, 2015; Johnson and Moazed, 2016; Law Research Society of Beijing Food and Drug Safety, 2019; Ducci, 2020; Montero and Finger, 2021). Hence, in return, the growth of consumption based on recognising transparent and traceable quality control as a requirement can be a positive incentive for improving the services of digital platforms. In addition, physical suppliers from SMEs still have inherent quality issues, and the size of the market means that the regulatory authority cannot directly control, but must guide the market actors as the sources of problems back to quality control. Such control accepts the oversight of formal regulators and the feedback of other key actors, including consumers.

In the context of a rapid change in the food market, this thesis examines,

through the lens of co-governance, how regulation has changed to address quality problems in a complex and fast-changing market due to the digital economy, thus reducing food safety risks. This thesis examines how the traditional regulatory framework failed to cope with the new market and explains the fundamental problems of the traditional regulations and the reasons leading to their change. It also examines whether key actors working together are a way of improving the regulatory framework, and analyses this in the context of food safety regulation in China. From the standpoint of the co-governance concept, then, the regulatory framework has been reformed to implement quality control that is transparent and traceable, allowing formal regulators, market actors, and consumers to be involved in order to discover, disclose, and manage problems and give feedback for further improvement. This reform has changed the prior role of formal regulators that attempted to gain total control of product or service quality; instead, it sets boundaries of responsibilities for online platforms and other key actors. In this control, formal regulators are capable of overseeing quality control and enforcing regulation, prompting the participation of market actors and consumers as well as giving them leadership status. Such a capacity means that formal regulators ensure that physical suppliers are qualified for market activities and capable of quality control, but they need information on market activities to find problematic market actors. Market actors in the digital economy, especially digital platforms, have interconnected parts of supply chains for the sake of efficiency; thus, they can possess, process, and manage the market activities of physical suppliers. Such information about market activities is what formal regulators need, and digital platforms need the expertise of formal regulators to build management on the quality control of physical suppliers. Physical suppliers need both the expertise of formal regulators and the management of digital platforms to ensure their direct quality control. These activities require feedback from societal actors, especially consumers who receive products or services. The interconnections in these key actors are the basis of a reformed regulatory framework to ensure that the actors can fulfil the responsibilities that they should have undertaken for quality control. This new regulatory framework, then, will ensure that quality control is the essence that prompts key actors to work together. Such an interpretation of the change of regulation is based on the co-governance concept, which involves key actors addressing problems that impact them all in a new web-based market. The change

of regulation is analysed based on the analytical framework of the concept of co-governance, developed by discussing the literature on regulation and regulatory governance. This analysis has three stages: the comprehension of the problems that impact key actors involved in a complex and fast-changing market, and the factors that lead to such problems; the change of the regulatory framework, including new rules and a new structure that interconnect key actors and guide their activities; and the practice of the new regulation achieved through the interactions of key actors.

1.2 The problem of the traditional regulatory framework

The incentives provided by the state have led to the rapid growth of physical suppliers. Consequently, to meet growing consumer needs, digital platforms prioritise the growth of market scale, which depends on increasing the costs of enrolling more physical suppliers as online merchants and hiring more delivery staff. Such behaviour has enlarged the scale of service information supply and service delivery. Consequently, the space left for digital platforms to examine, review, and manage the enrolment and quality control of these suppliers has been limited because of the focus on the short-term need to increase the supply for the increasingly heterogeneous needs of consumption (Ducci, 2020; Montero and Finger, 2021). This situation means that unqualified or illegal suppliers have opportunities to enter this new market without any official approval or safety examination/review, or suppliers can illegally increase their production with less direct quality control. Hence, there are problems with consistency between the quality-of-service information provided by the physical suppliers enrolled by digital platforms as online merchants and the quality of the physical service delivered by the online merchants of these platforms. This inconsistency has harmed consumer demand and impeded the development of this new market, as consumers are losing their trust in it. In addition, as digital platforms have increased the service information supply, consumers have been swamped with information, making the search for the required services more difficult. Thus, a report on consumer rights in online catering services in 2018, based on the data gathered from the public, stated that food safety issues in online catering services had brought trouble to consumers and that the latter could not protect their rights in these issues (Shapiro and Varian, 1999; Eisenmann et al., 2006; Shang, Shari, and

Yanga, 2015; Johnson and Moazed, 2016; Law Research Society of Beijing Food and Drug Safety, 2019). However, as the government has offered incentives for the growth of the number of physical suppliers and their transformation through e-commerce, traditional regulation persists in its hierarchical structure designed for the traditional physical economy. In the process of addressing the new problems emerging from the explosive increase in the evolving digital economy merely via formal provision, traditional regulation has been overstretched. Formal regulators are thus limited in their comprehension of the problems brought about by such markets. Moreover, besides the lack of direct quality control from physical suppliers and the management of such control from digital platforms, consumers have not been able to provide effective feedback about food safety incidents to physical suppliers, digital platforms, and formal regulators. Simply put, the traditional regulatory framework has not been able to adapt itself to such rapid changes in the evolving market. The extent to which a traditional regulatory process functions in this new market is questionable, and a new, more participatory approach may be more appropriate.

Conceptually, there has been very limited research on how regulation has changed to address quality problems in the rapid growth of a new market. Regulation models include enforced self-regulation, meta-regulation, co-regulation, and regulatory enrolment; these concepts of regulation have focused on relationships of power between market actors and formal regulators. Such relationships are embodied through the making and enacting of fixed complex rules to restrict unacceptable economic behaviour, interrupting the good functioning of the market. This situation shows how the regulatory capacity lags behind when the new markets have gained their dynamic of growth from technology (e.g., web-based e-commerce), increasing the product supply and triggering an unprecedented increase in needs. Often, the problems of evolving market activities have diminished the capacity of traditional hierarchical regulation, which mainly focuses on the traditional economy (Lodge and Wegrich, 2014). In addition, the growth of new markets can lead to the emergence of new monopolies, which are interested solely in growth without concern for the examination and review of quality control brought about by their behaviour, for example, food safety problems in online catering services (Johnson and Moazed, 2016). Thus, the study of

traditional regulation has not focused enough on developing governance, going beyond the focus on models of restricting behaviours.

The co-governance framework in this thesis may provide a way of understanding the change that regulation should aim at, the direction it should steer to, the actors involved in this change, and the outcome of the steering, besides an analysis of controlling regulated firms. This thesis will use the literature on polycentric governance to create an analytical co-governance framework exploring and explaining the working process of co-governance in the practice of changing food safety regulations in online catering services as a new market (Ostrom, 1961; Rhodes, 1997; Rhodes, 1998a; Ackerman, 2003; Ostrom, 2010; Rhodes, 2013). The co-governance concept refers to a process or an open arena in which key actors involved in the change of market activities address the problems that impact them. The question, then, is whether the co-governance concept can explain how key actors, including formal regulators, market actors, and social actors, especially consumers, change regulations to address quality problems resulting from a complex and ever-changing market created by the digital economy.

1.3 New regulations to adapt to the new market

Co-governance as a concept aims at explaining how key actors gather to change regulations to mitigate the quality problems brought about by the digital economy. According to the co-governance concept, formal regulators design an arena or a process for changing the regulation by gathering key actors to address problems brought about by changes in economic or social behaviours. The purpose of such an arena or a process is to ensure that key actors share their capacities, including knowledge, resources, and information concerning quality control, to discover, disclose, and manage the problems that impact them, and to provide feedback on this problem-solving process. This has the potential to enhance actors' clarity about their roles and to guide activities in the regulation of this new market. Through sharing and deploying the capacities of key actors in the change of regulation, the market actors of the digital economy, including digital platforms and physical suppliers, can comprehend what quality problems are and build control over them. Such control accepts oversight from formal regulators and the feedback given by society, especially consumers.

1.4 The research question on the importance of co-governance in food safety regulation of online catering services

Thus, based on the process of changing the regulation through the participation of key actors impacted by quality problems resulting from the digital economy, the core research question of this thesis is:

How has food safety regulation changed to adapt itself to the food safety problems of online catering services in China?

Sub-questions are as follows:

1. Why did the regulation change in a new market, and why is traditional hierarchical regulation incompatible with the new market?

2. How do key actors in the new regulatory framework comprehend shared problems such as food safety breaches or crimes?

3. Why is participation from the state and societal organisations necessary in the new regulatory framework on the new market? What new relationships are created between these actors?

4. Through the analytical framework of the co-governance concept, how does the regulation accepting a horizontal and open structure address the complexity of the new market?

5. How do the key actors, especially private market actors and social actors, interact in the new regulatory framework by building a control system that accepts oversight and feedback?

There are five chapters in addition to this introduction to this thesis and the conclusion chapter.

Chapter 2 is a literature review that critiques the evolution of regulation studies, from enforced self-regulation, meta-regulation, and co-regulation to regulatory enrolment. In the literature review, the chapter will argue that the regulatory framework needs a co-governance concept to comprehend how to regulate a new market, such as the food safety regulation of online catering services in China. In

this chapter, the literature review will explain the necessity of a co-governance concept to supplement regulation research by explaining the concept of a digital economy that impacts regulation.

Chapter 3 outlines the methodology of this thesis, focusing on research design, methods of data collection, and data analysis.

Chapter 4 empirically analyses the quality problems in the digital economy that integrate traditional industry and the factors that lead to these problems. This chapter argues that fragmented traditional hierarchical regulation already has a limited capacity for quality control in the activities of the complex and fast-changing digital economy, especially in SMEs.

Chapter 5 explains the changes in the regulatory framework as a response to the quality problems and the factors that lead to them in the digital economy. This chapter argues that key actors impacted by quality problems interconnect their capacities in a more horizontal structure designed by formal regulators grounded on a single authority to address any problems.

Chapter 6 analyses how key actors interact based on the new regulatory framework by deploying their interconnected capacities in a more horizontal structure. This chapter argues that key actors choose strategies of interaction to share what they need and to improve their capacities for addressing quality problems in the complex and fast-changing digital economy.

Chapter 7 is the conclusion.

Chapter 2: Regulation and the Digital Economy

2.1 Introduction: The food safety problems of online catering services

The rise of online food ordering and delivery has led to a challenge for food regulation in China. The traditional formal regulatory process for food safety in China used to rely on a hierarchical structure of multiple regulatory bodies led by the central government. However, the complexity and fluidity of the new web-based market, including the online-to-offline (O2O) business, is a challenge to traditional regulation. It is difficult to regulate what is in effect an evolving target of changing suppliers and platforms. Online platforms review and verify suppliers' information and enrol them as online merchants. The supply chain of this new market provides services in three stages. The first allows for online transactions for customers to order food from those enrolled online merchants through mobile devices. The second is the physical processing of orders from customers. Catering suppliers are enrolled by online platforms, as online merchants receive and process these orders. When the physical processing is finished, the couriers hired by online platforms pick up the food from suppliers and transport it to customers. Consequently, online catering services have become a complex supply chain in which online platforms supply service information for customers to choose and pay for, and then physical suppliers deliver the service ordered and paid for by customers. Consequently, online catering services have created a complex situation for food safety regulation, as this market has interconnected users in a network.

Basically, food safety regulation of online catering services in China deals with catering SMEs enrolled in web-based platforms, such as online merchants and web-based platforms that provide service information, transaction processes, and service delivery. The catering SMEs are the producers and proprietors responsible for the purchase and storage of ingredients, processing orders, and retailing. The market structure for catering SMEs is dispersed, and they attempt to reduce costs to ensure profits. Catering SMEs are independent and scattered market actors that produce large numbers of products. Moreover, web-based platforms have tended to provide little oversight of suppliers. Suppliers are reluctant to develop internal quality control because of the high costs involved in a competitive market (Fairman

and Yapp, 2005; Fairman and Yapp, 2006; Martinez et al., 2007; Chen, Jiang, and Luo, 2010; Qu, 2013). Thus, catering SMEs do not have much incentive for active compliance with food safety regulation, and where they do comply, it is passively by paying fines or fixing food safety issues temporarily when forced to do so.

Food safety incidents in 2016 involving online catering services exposed unhygienic restaurants, fake operation licences, food business permits as market entry approval of restaurants, and dark kitchens. These proprietors were enrolled in online catering services as online merchants, but the information displayed online misguided consumers, and the service quality was unsatisfactory. Such incidents highlight that, with online catering services as a web-based and heterogeneous market, traditional food safety regulation is increasingly ineffective. The traditional formal regulatory process of food safety practices in online catering services is imprecise, food safety information from catering SMEs as online merchants is insufficient, and the status of online platforms is unclear. Consequently, based on such incidents, this chapter discusses the challenges of the digital economy to traditional regulation concepts, the limitations of traditional regulation concepts based on the relevant regulatory literature compared with the concept of the digital economy, and then discusses which alternative concept for the regulation of complex new technology-based markets the regulatory literature offers.

This chapter shows that the literature on traditional regulation focuses on regulation in relatively simple markets and that, in many ways, this regulatory framework is inadequate for a new, complex, and dynamic market of millions of market actors of physical suppliers concentrated by digital platforms. Digital platforms are new market actors and are a central part of the digital economy. They have been matchmaking market actors of physical suppliers and consumers by integrating them as users. The greater value gained by users from a service or product depends on a larger number of users on both sides of demand and supply. This phenomenon is called the network effect (Shapiro and Varian, 1999; Rochet and Tirole, 2003; Montero and Finger, 2021). The rapid growth of the digital economy has surpassed the development of regulations. In a relationship restricted to regulators and the market actors regulated, traditional approaches to regulation

have difficulty dealing with the dynamism and complexity of the new market. However, the study of how to change regulation, also known as regulatory governance, has not been explored further in the structure of regulation.

Next, the chapter argues that the existing traditional regulation concepts cannot explain the evolving economy and provide solutions because their discourse is based on a hierarchical structure that cannot adapt to the rapid development of digitalised traditional industries due to the network effect of digital platforms and the antithetical relationship between regulators and the market actors regulated. New regulatory governance for the shift from a hierarchical structure of traditional regulation to a more horizontal and participatory one is needed to address the emerging common issues in a new web-based market. In this thesis, food safety problems created by online catering services in China are analysed through an analytical framework of co-governance. Hence, building on the concept of polycentric governance, the chapter suggests that co-governance, defined as a shared arena in which key actors impacted by shared problems amid the change in social or economic activities can interact in addressing such problems, is an alternative to traditional regulation. Multiple concepts of co-governance have been discussed in relevant literature from power sharing, mutual agreements, the involvement of actors from sectors besides the state and the market, shared systems for the formulation of policies, and service planning and delivery. These concepts, based on diverse focuses, require the participation of multiple groups of actors.

This thesis suggests that the concept of co-governance, whereby regulation occurs through a more horizontal and cooperative process, is a better framework for developing regulation in a complex and dynamic digital market. The chapter begins by presenting the concept and the characteristics of the digital economy, discusses the conceptual issues of traditional regulation compared with the evolving new market run by the digital economy, and then introduces an alternative regulation study. By examining traditional regulation concepts, this chapter highlights the limits of these concepts compared with the digital economy literature, especially digitalised traditional industries, and then presents co-governance as an alternative framework for studying changes in regulation in a complex and changing market.

2.2 Challenges from the complexity of the digital economy: the role of digital platforms and SMEs

To understand the increasing number of food safety incidents in online catering services in China, it is critical to explore the concept of the digital economy in regulatory studies. The digital economy is one of the phenomena that are changing the economy or society via a new web-based market, which is completely different from the traditional market that integrates market actors into simple supply chains. Hence, before explaining the limits of traditional regulation concepts, it is necessary to explain why the digital economy, especially digital intermediation services, challenges traditional regulation. In a traditional economy, intermediaries can place information in one place to make it much easier for customers to choose between competing suppliers. Platforms, which are the carriers that enrol both the supply side and the demand side as users to provide intermediation services, have become matchmakers. Platforms provide interaction and coordination between supply and demand to efficiently find what both sides need. This is a process of matchmaking in which platforms ensure that supply meets demand efficiently. This process of matchmaking is an intermediation service. In the digital economy, digital platforms, such as digital matchmakers, provide digital intermediation services between business suppliers and consumers as users.

The complex supply chain of the new web-based market is largely based on physical suppliers of products or services and consumers as users, and digital platforms as matchmaking marketplaces. Digital platforms build algorithms to matchmake suppliers to customers and then matchmake the closest delivery services to customers. Such an approach ensures that customers can find the products or services they need and receive such products or services more efficiently than when purchasing products or services with less information from the traditional industry. The supply chain of certain products or services becomes more efficient and accessible to customers; such improvement attracts more customers and suppliers and then leads to a larger network effect. Online catering services, for example, are one of the web-based markets of the digital economy run by online catering platforms that enrol catering suppliers and consumers as users. Online intermediation services, then, are the services that allow suppliers to

provide products or services by facilitating direct transactions between these users. Such direct transactions go beyond the physical locations of transactions. Instead of supply and demand searching for each other on their own, based on limited information in the traditional economy, the online intermediation of digital platforms is built with users' data to facilitate and coordinate their online interactions directly with algorithms between the supply side and the demand side.

However, such reciprocal activities for both suppliers and buyers do not mean that digital platform corporations, as intermediaries, are free of regulation. On the contrary, due to intermediation services, digital platforms need to nudge consumers to specific services provided by specific suppliers. To ensure service quality, digital platforms pool the information of users and algorithms; thus, they are obliged to discover and disclose problems in intermediation (Montero and Finger, 2021). In addition, to ensure the network effect of such intermediation, digital platforms need a massive scale, which they achieve by relying on large numbers of suppliers. This situation means that digital platforms are not completely neutral, and they are prone to conflicts of interest and abuses, which can lead to incidents in the industries. Such an inclination may lead to a potential inconsistency between the information consumers receive and the quality of the products they are supplied with.

Furthermore, the new web-based market is intended to meet customer needs by increasing the number of SMEs, because they can enrol additional suppliers with little marginal cost to attract more customers (Shapiro and Varian, 1999; Eisenmann et al., 2006; Shang, Shari, and Yanga, 2015; Johnson and Moazed, 2016; Ducci, 2020). The online platforms frequently possesses more service information than formal regulators. They have information from both suppliers and customer feedback (and data on what is bought and when). Consequently, driven by increasing need, online platforms also have little incentive to properly accredit SMEs because they need more suppliers. The system seems to encourage the platforms to overlook the poor quality of the suppliers. For example, in the food safety regulation of online catering services in China, since March, 2016, the Food and Drug Administration (FDA) of Beijing has required online catering platforms to release information about catering suppliers enrolled online until mid-July. However, the released information given to the Beijing FDA was not consistent

with the information possessed by the platforms. The reason was that platforms did not prefer to disclose unqualified suppliers enrolled online. When Beijing FDA asked platforms for supplier information when they identified unqualified suppliers on platforms, the platforms started to take those suppliers offline. This shows that the platforms were aware of the existence of these suppliers, and they had been enrolling such suppliers online (He and Zhang, 2016). Digital platforms, therefore, increase access to suppliers of variable quality, with little incentive to improve quality and safety. As technology intermediaries, they provide new suppliers if customers find service quality poor (Ji, 2016).

With limited resources and funding, SMEs likewise have little incentive to abide by regulations. Often, the service information given to online platforms by these suppliers is not fully credible. For example, according to one of the largest online catering platforms named Ele.me, SME catering suppliers in online catering services frequently changed their names and addresses and transferred their ownerships, since it is difficult for platforms to review and verify such information from suppliers. In addition, in the field inspection by local FDAs in Shanghai and Chengdu, the photographs of stores provided by catering suppliers showed bright and hygienic environments and plenty of space, but the real stores of these suppliers were small and unhygienic (Ji, 2016; Yin and Wang, 2016). Hence, SMEs are unlikely to actively design their own compliance procedures without pressure from formal regulators. Even in the process of building compliance procedures, SMEs aim to document rather than adopt and implement the systematic management of food safety. SMEs tend to do what formal regulators have told them to do to fulfil legal requirements, and frequently contest the degree of compliance with regulators (Fairman and Yapp, 2005; Baldwin et al., 2012; Su, 2017). The new web-based market itself is evolving operations to meet the increasing needs of customers by enrolling more suppliers, but the evolving market tends to overlook the emerging problems of the poor quality of information and the delivery of services. If online platforms do not examine and verify physical catering suppliers prudently and display their service information, the service delivered to consumers may be risky.

2.3 The limitations of concepts in regulation studies are reflected by the effect of SMEs enrolled in the digital economy

Before discussing the limitations of regulation concepts compared with SMEs integrated into the digital economy, it is inevitable to discuss the definition of regulation. The definition of regulation itself has experienced a process of change. Regulation has been conceptualised narrowly as rulemaking by authorities and direct or indirect intervention through state agencies to achieve policy objectives (Baldwin et al., 1998; Koop and Lodge, 2017). Broadly, regulation has been regarded as a variety of tools, or a different form of governance, to control the behaviours of market actors or targets (Stigler, 1971; Mitnick, 1980; Baldwin et al., 1998; Koop and Lodge, 2017). In addition, regulation was viewed as fostering interference in the behaviours of the market actors regulated, as regulators intentionally ensure that the activities of targets are subject to interference (Mitnick, 1980). Regulation, then, was identified as intentional control, which was sustainably and focally imposed by regulators on the activities of targets (Selznick, 1985).

Based on the criteria of intentionality, scope, and distinctiveness, the nature of the regulator, the nature of the regulated activity and the separation between regulators and the market actors regulated, the conceptualisation of regulation has distinguished between regulation as the intentional intervention in activities of the target population and how this regulation is exercised directly or indirectly on the market actors regulated by the regulators. Koop and Lodge (2017) gathered and analysed these conceptions and concluded that regulation is a concept that could be shared as an intentional intervention in the activities of the targets. Hence, traditional regulation works via instruments that can steer the activities of targets, such as making and enacting certain rules and imposing them on market actors directly or indirectly, providing incentives, and cooperating with targets. These instruments ensure a well-functioning market hierarchically.

However, in the study of Chinese online catering services as part of the study on the digital economy, two factors of the changing market challenge traditional regulation. The first is the complexity brought about by the rapid growth of web-based digital platforms, which are technology intermediaries. In the beginning,

digital platforms obtain information about SME suppliers that they have enrolled. This information is used to tell customers what these suppliers are, where these suppliers are located, which category of products or services they can provide, what prices they charge for such products or services, and any discounts for customers. However, because of the massive scale that these platforms need, they enrol large numbers of suppliers, so in this process of enrolment, digital platforms cannot properly review the quality and the level of accreditation of these suppliers. Consequently, suppliers with poor service quality may have been enrolled, as in the example of online catering platforms in China accepting no direct control of suppliers and taking unqualified suppliers offline before the local FDA gathered evidence online (He and Zhang, 2016; Ji, 2016; Yin and Wang, 2016). Hence, digital platforms do have more information about unqualified suppliers than regulators, but have limited control over the suppliers in their early development.

Second, SME suppliers are often small and thus have little knowledge of compliance with quality standards, such as food safety. The size and scale of the market, and the fact that suppliers enter and exit rapidly and often work in the semi-formal economy, means that traditional regulation can exert little control over the quality of the product (Ji, 2016; Su, 2017). Amid rapid changes in the market, market actors have issues with unstable quality control and rapid entry and exit. Hierarchical regulation cannot deal with market growth, where there is little incentive for internal control. Indeed, price and competition mean that the desire of market actors is to limit control as much as possible. Hence, traditional regulation is viewed as conducted hierarchically without adaptation to market changes.

This section suggests that in a relationship of a top-down or bottom-up hierarchical structure between regulators and the market actors regulated, traditional regulation cannot follow market changes. The literature on regulation demonstrates that traditional regulators have difficulty in perceiving complex, fast-evolving markets as they view regulation in a hierarchical structure. Under such circumstances, studies of regulation focus on what models of regulation have been deduced and what regulatory instruments have been created and deployed in a context in which the market is evolving and growing rapidly. However, even where

research has slightly changed the hierarchical view in regulatory governance and started to consider the roles of the market and society in decision-making, there are few studies of key actors interacting to change regulation via governance with a more horizontal structure.

Regulation theory sees regulations developing from direct command and control (C&C) regimes to self-regulation regimes. For example, Sinclair (1997) criticised the narrow choice between strict C&C and pure self-regulation and suggested that such an approach was a false dichotomy. Policymakers viewing regulation as variables compiled from regulatory instruments such as incentives could apply combined regulations to issues of economic or social activities. Hence, neither a single regulatory strategy nor its alternative could solve regulation issues; instead, to deliver optimal outcomes, regulatory strategies were meant to be combined (Sinclair, 1997). Moreover, in the study of new markets, such as web-based markets in early, complex, and often chaotic development, traditional regulation concepts did not adapt to the changes in such markets. The next section demonstrates that an alternative regulatory approach, particularly for the quality of SME services in the digital economy, is needed.

2.3.1 Problems of regulatory instruments compared with new markets: Stifling competitiveness and innovation of SMEs

Multiple regulatory instruments, such as C&C, incentives, harnessing markets, rights and liabilities in the law, and public compensation or social insurance, have been discussed in the literature on regulation. C&C is the main one of these instruments, and it is the central one combined by regulators with other instruments to fulfil regulatory objectives. However, when applied to new markets created by the digital economy, these instruments have limitations. C&C, as the central instrument, needs to be discussed in the context of these new markets.

C&C, characterised by inflexibility in prescriptive standard setting and implementing processes, has suppressed the competitiveness of SMEs because the proliferation of unnecessary complex and inflexible rules may raise barriers to market entry and discriminate against new entrants (Liu, 2011b). Such an approach will push market actors to develop a new market with which regulation may not be

able to cope.

In the traditional regulatory regime, formal regulators of government bodies, such as public actors, are responsible for setting up regulatory processes as a critical component of the regime. There are several stages in the regulatory process, including making statutory policies and standards, implementation, enforcement, and monitoring (Martinez et al., 2007). To set up this regulatory process, the regulatory regime needs strategies to build a framework to implement this process, including C&C, incentives, market harnessing control, disclosure, direct action and rights, and liability protection (Baldwin et al., 2012; Fairman and Yapp, 2005; Fairman and Yapp, 2006). In addition, the regulatory regime can choose strategies based on changes in the industry.

C&C is one of the regulatory instruments that formal regulators use to impose legitimate rules to influence market actors, and this strategy is supported by legal sanctions. This strategy is characterised by its prescriptive laws, fixed standards stating a minimum level of acceptable economic or social behaviours and prohibition of unqualified practitioners on certain regulatory objectives. This, then, is essentially a state-based strategy where the state sets up the rules, often through a regulatory agency that imposes a regulatory framework on the industry. To a large degree, the framework is often negotiated with the industry, creating the danger of regulatory capture. Nonetheless, authority formally remains with the state (Wilson, 1984; Baldwin et al., 2012).

In the C&C strategy, formal regulators avoid discretion when deciding on rules and standards, and they design rules and standards for precise regulatory targets. To reduce the discretion of regulatory processes, such regulatory processes are governed by rules that are often criticised for being burdensome on the industries being regulated. Furthermore, formal regulators are not inclined to revise rules frequently, but rather face new problems, as new rules are often layered on existing regulatory frameworks. This accumulation of layered rules can lead to redundancy in the regulatory process, making it imprecise and complex instead of specific in solving problems (Bardach and Kagan, 1982; Baldwin, 1995; Baldwin et al., 2012). To make standards appropriate for specific areas, formal regulators need abundant information from certain industries. However, it is difficult to design a precise

regulatory process without being over-inclusive. In addition, this strategy has been criticised due to its proneness to capture by large enterprises, or for creating regulation with insufficiently precise information from actors involved in market activities, legalism, difficulty in setting standards and enforcement with uncertain compliance from SMEs (Sinclair, 1997; Baldwin, Cave, and Lodge, 2012).

However, the public resources of formal regulators are limited compared with the increasing number of firms to be regulated; thus, it is difficult to collect enough information, which is still increasing due to the increasing suppliers. Consequently, the standard setting may retain its impractical redundancy and lead to contention and anti-competitiveness. Market actors, especially SMEs, will face the rising costs of meeting standards, and such standard setting, furthermore, is easily challenged by the development of technology, emerging risks, and so on (Breyer, 1982; Ogus, 1994). Under these circumstances, it is very difficult for formal regulators to design precise rules for specific targets.

Apart from the restrictive C&C bound to rules, incentives are also provided by a regulatory instrument through which the formal regulators release policies to impose positive or negative taxes on targets, or provide grants and subsidies from public funding to support the behaviours of targets according to the public interest (Baldwin, Cave, and Lodge, 2012). This approach coexists with the C&C regime because it reduces the discretion of regulators by setting a mechanical system of penalties to ensure that regulators are not involved too closely in interactions with the market actors regulated. Such an approach is also flexible and less costly, as the market actors regulated are more responsible for their own behaviours without excessive intervention from regulators. However, the disadvantages of incentives are also obvious. To ensure that the mechanical system of penalties and the market actors regulated manage themselves flexibly, a highly complex system of rules is in place, but putting these rules on the ground still needs inspection and enforcement to ensure that the market actors regulated take care of it themselves. Another issue with incentive instruments is that it is hard to evaluate the level of taxation or funding that can achieve the goal of regulation. This approach may work on small issues with incremental adjustments, but it may not work on gigantic problems. Less discretion also undermines flexibility in enforcing regulations due

to its mechanical operation.

The next instrument of regulation is market harnessing control. This instrument focuses more on regulation driven by markets, which is embodied through competition, franchising, contracts with regulated firms, and tradable permits. This instrument, then, shows less expertise when problems occur in the market because, as formal regulators intervene less in the market, the regulated firms may lack active motivation and have less transparency. Such an instrument also shows the difficulty of enforcing regulation due to the lack of a rapid response to the problems of regulated firms, and affected consumers may ask for compensation, increasing costs. Furthermore, this instrument can create barriers to market entry and subsequent activities.

Another instrument is called disclosure. This instrument ensures that consumers are allowed to make decisions, and formal regulators will not be easily captured by regulated firms. However, actors affected by service problems may abuse their use of information in disclosure, and such information may be costly to produce. There are also risks of false information if the quality of information is not policed, and standards for providing accurate information are needed. Other instruments, such as rights and liabilities in laws, public compensation, or social insurance, also have their own strengths and weaknesses, and these instruments depend on C&C as the central instrument. Thus, how regulators combine and utilise these instruments depends on their design of regulation models, or more specifically, the structure of regulation models.

Compared with the web-based market of the digital economy, including digital platforms and SMEs enrolled by these platforms as online merchants, there are inherent problems with traditional instruments or strategies. The first problem with these strategies is that they make regulation cumbersome when responding to new markets. These strategies, clinging to complex, inflexible, but over-inclusive rules, have limited the flexibility of regulation to include web-based markets, especially digital platforms, as the new target. In addition, C&C cannot adapt to SMEs that enter and exit the market frequently and are still increasing in number. Thus, the reaction of regulators to their market activities is slow and imprecise. Traditional strategies, in turn, cannot provide a precise design of regulatory processes for

dealing with these critical market actors.

The second problem with traditional regulatory instruments or strategies in web-based markets is their own information inadequacies. As mentioned in this section, to ensure the application of C&C to precise targets in regulation, formal regulators need adequate information on certain regulatory objectives, but in fact, market actors possess more information than formal regulators, even though such information may be fragmented (Scott, 2001). Digital platforms, as the critical market actors in a new web-based market, can receive and present service information on the SME suppliers quickly, as they have simplified the process of review and verification. Moreover, digital platforms integrate service information and ensure that its supply is accessible to customers. As SME suppliers are increasing rapidly in a new web-based market to increase supply, online platforms take advantage of this growing number to increase information supply at little cost. However, under such circumstances, platforms can only make simple assessments of the plethora of information. This means that there is an inconsistency between the supply of service information and the quality of the service delivered. This inconsistency leads to the inadequacies of digital platforms in the problem of disclosure of suppliers to customers, and it is the justification for regulation (Breyer, 1982; Ogus, 2004).

The formal regulators following the C&C strategy, however, do not have as much service information as market actors in web-based markets. In addition, SMEs do not comply with formal regulations until they are told to do so; thus, a web-based market with a simple review and verification process at entry approval becomes their opportunity for evading from complying formal regulation. The traditional regulatory instruments or strategies consequently lack the capacity of formal regulators to analyse information about the physical services of SMEs. Formal regulators can merely tackle particular issues according to imprecise mandates based on general but complex rules. They lack the mechanisms or capacities to disclose problems in the information supply of the market. Hence, traditional regulatory instruments or strategies are inefficient in the implementation of regulatory processes to deal with new web-based markets (Ayres and Braithwaite, 1992; Baldwin, 1995; Black, Lodge, and Thatcher, 2005; Baldwin,

Cave, and Lodge, 2012). The formal regulators following these instruments or strategies have insufficient information from web-based markets due to their focus on producer interests rather than public concern and the improvement of the specific industry (Ogus, 1995; Ogus, 2004; Feintuck, 2010). For instance, as depicted in Section 2.2, in China, part of the information about suppliers displayed by online catering platforms did not match the actual situation of these suppliers. Online catering platforms did not disclose such information to local regulatory authorities or delete it. Such a situation means that formal regulators retain their power in the regulatory process, but they do not have enough capacity to adapt to market changes. Hence, C&C, and other instruments combined with it, have difficulty adapting to new and complex markets where many suppliers are effectively out of sight. It cannot access the scale of information needed in a fragmented and changing market.

2.3.2 The limits of regulatory alternatives: Enforced self-regulation and meta-regulation

Since traditional regulatory instruments or strategies cannot regulate new web-based markets without specific and pertinent rules, it is necessary to discuss the regulation models that apply these instruments or strategies to achieve regulatory objectives. The first is enforced self-regulation. Enforced self-regulation compels corporations to make internal compliance rules based on imposed detailed government regulations, and such rules accept ratification or revision from the government and comments from other interested parties, such as citizens. Although the internal compliance group cannot enforce internal rules, government regulators, when monitoring the activities of companies, can punish companies violating internal rules. Such regulation represents a slight shift from C&C, but it has similar problems, especially as it relies on producers to act on food safety issues themselves when they have little incentive to do so (Braithwaite, 1982). In addition, developing knowledge and expertise for self-regulation is not practical when margins are low and exit from the market is easy.

With the lack of capacity of formal regulators, enforced self-regulation has received increasing attention in regulation studies. In enforced self-regulation, formal regulators impose their requirements on the business to achieve regulatory

objectives; thus, they can require the business to make and implement its own internal rules (Ayres and Braithwaite, 1992; Fairman and Yapp, 2005). In the process of making and implementing internal rules, an internal compliance system is critical for businesses to enforce internal rules and record their activities. The business, or market actors, as the risk creators, can take responsibility for reducing risks by checking internal rules and assessing the compliance system. If this compliance system fails to enforce internal rules, then the formal regulators that are monitoring the activities of the compliance system punish the market actors by law. In addition, formal regulators of government bodies do not approve the internal rules of the business if they do not meet the minimum standards enacted by legislation (Braithwaite, 1982).

This regulatory model is still based on prescriptive laws, but it puts greater emphasis on the enforcement and monitoring of the self-regulation of market actors required by formal regulators. Hence, this regulatory model works by delegating the functions of direct control of regulated firms that used to be one of the duties of the formal regulators of the regulated firms in the regulatory process. The regulated firms tailor their internal rules based on their particular needs and functions, but such rules need to be approved by formal regulators before being exercised. Due to such delegated functions, these rules can be simple, precise, and specific instead of being vast and complex, and they can be adjusted and improved in time to adapt to the evolving market. Furthermore, the regulated firms can be committed to their own rules, with formal regulators monitoring and arbitrating for them. As some regulatory functions are subcontracted to regulated firms, these firms are responsible for their own codes of conduct to find their internal problems. Such a mode reduces the cost of formal regulation when searching for the problems of regulated firms. In addition, the information about facts of firms required by formal regulators in direct control may not be complete, and this situation undermines the outcome of regulation. Thus, in enforced self-regulation, the code of conduct made by regulated firms accepts the approval and monitoring of formal agencies to reduce suspicions.

In turn, formal regulators can also innovate and redesign their regulatory processes by monitoring regulated firms. Consequently, the regulatory process can

become more comprehensive in particular areas. Enforced self-regulation can also lower the regulatory expense for enforcement agencies by transferring responsibility to regulated firms for purposes. The efficiency of enforcement and monitoring can also be improved, as both internal rules and government are comprehensive in the particular areas they cover. The available options for regulated firms in the regulatory process can be limited to compliance (Ayres and Braithwaite, 1992; Fairman and Yapp, 2005; Fairman and Yapp, 2006). In addition, such a shift also implies the decentralisation of state regulatory processes (Bevir and Rhodes, 2001). This type of self-regulation is common in private firms that build internal control regimes for industrial or competitive purposes (Marsden et al., 2010).

It is noticeable that enforced self-regulation is not pure self-regulation; it still complies with the legal requirements of the prescriptive C&C style and the same relevant enforcement and monitoring from the government. Self-regulation depends on the regulated firms voluntarily implementing self-assessment and internal control based on empowered workers, motivational market incentives, and relevant safety knowledge to improve health and safety. Both voluntary self-regulation and C&C are at the end of the regulation continuum, while the regulatory activities of enforced regulation combine elements from both concepts. Hence, enforced self-regulation differs from voluntary self-regulation (Braithwaite, 1982; Sinclair, 1997; Fairman and Yapp, 2005; Baldwin, Cave, and Lodge 2012). In an enforced self-regulation strategy, compliance with the internal control system for safety is the objective of the regulatory process by enforcing legal requirements and monitoring particular industries. The enforced self-regulation itself, hereby, can combine both legitimate state power and corporate power to impose legal force on compliance with internal rules.

However, an enforced self-regulation strategy has both pros and cons. There is still a tendency towards an accumulation of regulations. In turn, it increases the cost to regulated firms of making and renewing their own internal rules according to prescriptive laws. As these rules may not have the same status as the laws in traditional regulations, it becomes more difficult for regulated firms to comply with their own rules effectively, and they may make their internal rules to evade public

responsibilities. In addition, formal regulators cannot make the rules too complex, as this would undermine the credibility of publicly enforceable laws. As companies may place profit before safety and put pressure on their compliance groups, the independence of the compliance system for such internal rules may be influenced by corporate power. These problems may weaken the deterrence of the legal force of formal regulators and increase corporate power in enforced self-regulation (Braithwaite, 1982; Fairman and Yapp, 2005).

Another concept, called meta-regulation, is similar to enforced self-regulation. Meta-regulation is defined as the regulation by which formal regulators delegate direct control functions to regulated firms and require them to build control systems based on their specific contexts. Formal regulators oversee these systems (Osborne and Gaebler, 1992; Baldwin, Cave, and Lodge, 2012). Meta-regulation shares a similar nature as enforced self-regulation, even though formal regulators will not subcontract regulatory functions to targets but ask them to innovate with internal rules voluntarily.

In meta-regulation, regulators delegate the responsibilities of risk control to corporations so that they can build their own internal risk management systems. Under such circumstances, regulators are then responsible for auditing, monitoring, and encouraging corporations to build those systems. The advantage of meta-regulation is that it stimulates corporations to ensure that they can restrain their behaviours. Based on the proponents of meta-regulation, corporations can be given the freedom and incentives to design their own modes of operating risk management, which will be reviewed by regulatory agencies. Such internal risk management systems can be more precise, as they are designed in the specific context of corporations. In addition, corporations have designed their own rules of risk control that do not necessarily have to be approved within a certain industry (Baldwin, 1995; Baldwin, Cave, and Lodge, 2012). As a result of such a risk management design, the enforcement of those risk control rules can cover many corporations. Moreover, due to the design and enforcement of those systems, corporations can innovate and develop their own expertise to find and control incoming risks rather than relying only on public resources and external regulatory agencies.

In the context of a web-based market, enforced self-regulation and meta-regulation face new problems, mainly from digital platform corporations and SMEs. As digital platforms can enrol physical enterprises, such as online merchants, they can build a network of these merchants to increase the supply side. Both enterprises and customers would proactively participate in this network. To improve the experiences of the demand side, digital platforms concentrate on suppliers, and in turn, suppliers compete fiercely as more suppliers are enrolled. The information about suppliers, in turn, has also been concentrated on and possessed by digital platforms. Consequently, this tendency may lead to two problems. First, formal regulators may not have the regulatory process designed for a new web-based market, and the existing rules may not be enforceable in the new system. Digital platform corporations, as the critical market actors in web-based markets, are innovative technology companies that integrate multiple industries. In theory, they can create their own innovative quality control system of information; however, the focus of such platforms is to increase supply to meet the demand of buyers in the start-up stage, with little marginal cost. Thus, as discussed in Section 2.2, to compete for more market share, digital platforms need to enrol both consumers and traditional suppliers as users to build a large pool of information sources and match supply to demand.

Consequently, to maintain market share, digital platforms are liable for the discovery and disclosure of problems in the information of suppliers, which are the sources of quality problems. To do this, in enforced self-regulation and meta-regulation, general rules are designed by formal regulators beforehand to ensure regulated firms build internal control, but such rulemaking still requires massive amounts of information about enrolled suppliers on digital platforms. However, digital platforms need to retain large numbers of consumers to maintain a network effect; thus, at the start-up stage, they need more suppliers to meet the demands of consumers, and the discovery and disclosure of problematic suppliers is not a priority for them. Consequently, digital platforms may choose to maintain the scale of the market without discovering and disclosing problems. The growth of networks built by innovative digital platforms has exceeded the rulemaking of formal regulation, as the platforms possess information about problematic suppliers without a disclosure mechanism. For example, in China, online catering

platforms took problematic catering suppliers offline before local regulatory agencies were able to gather evidence against them. Consequently, these market actors may not put enough effort into designing their internal rules of disclosure. Instead, they are likely to focus on rapid growth on the supply sideby enrolling more enterprises. Regulating enterprises enrolled in digital platforms, especially SMEs, becomes more difficult for formal regulators without specific regulatory processes. SMEs may still rely on direct regulation, such as C&C, or evade such regulation.

This consequence may lead to a second problem for SMEs enrolled in web-based markets. SMEs frequently lack the systematic management necessary for either self-regulation or enforced self-regulation due to insufficient awareness of regulatory objectives and resources to construct effective internal control systems. Smaller businesses lack the capability to establish internal rules and compliance systems that can be approved by formal regulators (Taylor, 2001). Public choice theory suggests that SMEs and online platforms pursue their individual preferences (Ogus, 2004; Butler, 2012). This could lead to regulations being irrelevant because regulators concentrate on seeking compliance from numerous SMEs that have no compliance systems of internal rules, and neglect to design precise rules for this specific sector in light of the public interest (Hood, 1994; Ogus, 2004). SMEs would rather comply with legal requirements, where they are told exactly what to do by enforcement agencies (Baldwin, 1995; Fairman and Yapp, 2005).

Therefore, formal regulators have to invest considerable resources to educate SMEs and interpret the existing complex and inflexible regulatory process for them. In addition, incentives from the web-based market may stimulate a rapid rise in the number of SMEs. Due to the absence of a particular regulatory process, SMEs may enter the web-based market even before they are approved by formal regulators without a particular regulatory process. Consequently, enforced self-regulation and meta-regulation may fail in such a scenario without information about problematic suppliers discovered and disclosed by digital platforms and the information on informal market entry and exit of those suppliers. Such failure means that digital platforms and the SMEs enrolled in them need to link to formal regulation by discovering and disclosing problems. Co-regulation and regulatory enrolment as

hybrid regulatory models have provided such possibilities.

2.3.3 Co-regulation and regulatory enrolment as hybrid models of regulation

The other two hybrid regulation models, co-regulation and regulatory enrolment, attempt to improve the relationship between regulators and the market actors regulated by including regulated firms in the regulatory process. However, these models maintain the hierarchical structure, as the state or formal regulators still play the central role in promulgating rules and standards to engage market actors in regulatory processes and activities by sharing functions with them. Even though these models suggest that market actors have been involved in the process of decision-making, such models cannot cope with the market changes attributed to the digital economy. The digital economy uses algorithms to work through massive amounts of information, such as the participation of large numbers of users, especially suppliers from traditional industries, and the constant upgrading of transaction processes. Such changes in the market have overwhelmed the limited investment of public resources with information about market activities. This situation means that a more horizontal and open structure is needed to build a process to change regulation in structure, such as the concept of co-governance.

Co-regulation, unlike regulatory alternatives, is a hybrid kind of risk-based regulation model. In co-regulation, actors from both the private and public sectors need to coordinate their activities to control the risks from social or economic behaviours (Martinez et al., 2007). In other words, formal public regulators seek private actors to run a regulatory framework and delegate regulatory tasks to them, including standard setting, monitoring, and enforcement (Hood, Rothstein, and Baldwin, 2001). These tasks, ratified through legal decisions or acts, approve the activities of private regulators, and legally ensure regulated firms meet the standards set by ratified private actors. Furthermore, formal public regulators enforce the legal mandate to regulate the approved activities of private actors (Gilad, 2010). This is how the top-down model works.

In the bottom-up mode, formal public regulators attempt to provide incentives through indirect measures in laws, policies, and finance. Such a mode facilitates

private regulatory activities. When private actors are not subject to conditions and legal mandates from the public actors, both private and public objectives and interests should be aligned on overlapping issues to attain co-regulatory objectives and should also be compatible with each other on such issues. Based on such issues, the core components of such an objective were whether the private actors commit to self-regulatory activities on regulated firms and build their own capacity, and whether, furthermore, formal public regulators can monitor and oversee such commitment and capacity. Hence, proper incentives are required to ensure the compliance of firms, which can build effective and flexible internal risk management systems with lower costs. In addition, private actors need self-enforcement limited to their risk management systems, while public regulators oversee such behaviour backed by legal support adapted to the co-regulatory framework. Therefore, both public and private actors need to guarantee that they can share data and exchange information for transparency (Martinez, Verbruggen and Fearne, 2013). The co-regulation concept suggests that regulation works through the alignment of key actors on common issues, the attainable and comprehensive internal rules of businesses and organisations, and the incentives and oversight given by regulatory agencies. In addition, these incentives can ensure the participation of firms and keep the risk of accidents low by implementing their own risk management systems and gaining expertise in risk control. Such behaviours give firms the capacity to make norms and standards and monitor them on their own at a lower cost than the public sector.

Co-regulatory frameworks, however, still have problems choosing ratified private actors to regulate firms. The co-regulation concept maintains a top-down and bottom-up hierarchical model. Furthermore, SMEs still have little incentive to follow the strategy based on the co-regulation concept due to their scattered structure outside of the public–private coordination scheme beneficial for large enterprises. SMEs have limited funding and are less enthusiastic about compliance, as mentioned at the beginning of this section. As a result, it is still voluntary to implement risk control based on the accountable and legitimate standards of regulatory authorities. In turn, a co-regulatory framework under such circumstances may impair the participation of these market actors. Participating market actors, especially private actors, may find it difficult to control risks through

accountability mechanisms based on public law mandates that are more easily applicable to the government. This situation may lead to reverse capture of formal regulators from public actors and undermine the legitimacy of regulatory authorities. Although the educational approach for SMEs has been discussed in the literature on co-regulation and enforced self-regulation, it may still be risky to ensure compliance from SMEs without changing the culture of enforcement, let alone platform corporations as new market actors outside of the existing regulatory regimes (Faiman and Yapp, 2006).

The same problems were found in another hybrid regulation model. Regulatory enrolment also includes as many actors from various sectors as possible to ensure regulatory outcomes in the development of certain areas. Regulatory enrolment has changed the view of the regulatory regime. In the traditional view, a regulatory regime is a process collectively administered by state actors for the public benefit by influencing the activities of businesses from private actors and other individual organisations (Sleznick, 1985; Black, 2002). Instead, regulatory space, defined as the domain where a variety of actors publicly decide on a range of issues, is introduced to give a new understanding of regulation. Hence, regulation is understood as a polycentric or decentred regulatory space where a multitude of actors can participate in making decisions instead of being subject to predefined standards and goals merely set by state actors (Black, 2003; Verbruggen, 2015).

Regulatory enrolment as a regulatory strategy aims to cope with changes in the regulatory framework, and it provides an approach to enhance the capacity of regulation as a system by deploying regulatory capacity from different actors. However, such deployment of regulatory capacity does not consider SMEs, and it aims at the relationships among regulatory authorities, private actors of large enterprises, and professional third parties. SMEs, lacking expertise and funding, are still problematic market actors regulated in such a scene, as the resources spent on inspecting them are too much for public agencies. In the end, education is still an approach for public agencies to ensure efficiency. In regulatory enrolment, reliable data are the key condition for both public regulators and self-regulated firms to trust each other by setting up a certification scheme. In this scheme, the data about whether firms have changed their status and the change in standards

setting, licensing, and performance of certification agencies in compliance auditing need to be reliable to ensure such trust. However, regulatory enrolment still has not suggested which regulation is suitable for SMEs and digital platforms that integrate these SMEs.

In sum, regulation models such as enforced self-regulation, meta-regulation, co-regulation, and regulatory enrolment and their instruments have explained the shift of regulation from a single model to a hybrid model. One thing to note is that C&C continues to be proven as the main instrument in explaining formal regulation. In the discourses of these concepts, formal regulators still make rules and implement them through regulatory activities such as standard setting, monitoring, and enforcement, but other non-state actors have been given more space for informal regulation from the market and third parties.

Hybrid regulatory models still rely on insufficient formal oversight to ensure that self-regulation, tailored or delegated by regulatory authorities from the government, is being enforced effectively. However, these concepts have not explained the change of regulation based on the change in the market, which aims to improve the efficiency and quality of trade between suppliers and buyers. The structure of the market is a horizontal digitalised network run by digital platforms to enrol as many users as possible. The digital economy has an enormous amount of information possessed by digital platforms, rapidly increasing users, and constantly developing algorithms to mediate between supply and demand more efficiently. Discovering and disclosing the problems of suppliers, then, is the liability of digital platforms that accept regulation.

The appearance of such a network has created a gap in the literature on regulation, as traditional regulation concepts maintain the view of a hierarchical structure led by formal regulators, requiring traditional market actors integrated into vertical supply chains to establish formally approved self-regulation or innovative internal control overseen by formal regulators (see Figure 1). Consequently, the conceptualisation of regulation in the context of regulatory governance needs renewal. Instead of focusing on the hierarchical regulator to market actors regulated (or target) relationships, the study of regulation needs to be transferred from a merely risk-based framework to a behaviour-based framework.

In the case of food safety, even though food processing staff have been trained on how to practise food safety, their behaviours are still dynamic, and they may not do as told. Thus, affecting human behaviours is at the core of improving food safety (Fone, 2012; Yiannas, 2015). In the scenario of a constantly changing market, this suggests that regulation is a flexible structure for guiding and constraining disordered behaviours, which may be rogue, hazardous, or outrageous, to undermine the market, which is in constantly evolving economic or social development. In the digital economy, such disordered behaviours can be embodied as quality problems.

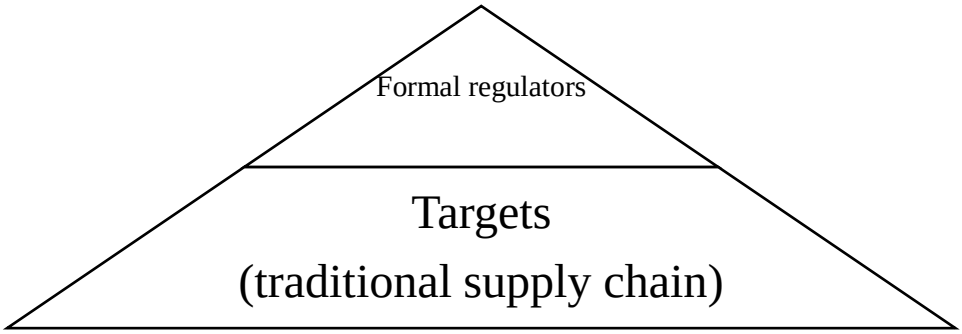

Figure 1 Hierarchical structure of traditional regulation and traditional targets compared with the hierarchical structure of traditional regulation and growing network built by digital platforms as new targets

Based on this suggestion, an alternative structural approach is needed to improve the regulatory relationship between government regulators and web-based market actors, including SMEs and online platforms.

2.4 Co-governance as an alternative to regulatory governance for the food safety of online catering services

The web-based market, as part of the digital economy, such as online catering services, is new and heterogeneous. Additionally, digital platforms possess ever-increasing information about SMEs enrolled by these platforms, enrol both consumers and these SMEs as users of web-based markets, and mediate supply and demand more efficiently through constantly upgrading algorithms. Digital platforms rely on an increasing number of suppliers to maintain the network effect driven by the demand side, which means they have little interest in discovering problems and disclosing them to regulators. The inherent problems of compliance

from catering SMEs with food safety have always existed, but such problems, exacerbated by the network effect of digital platforms, have become common and impact the key actors involved. As discussed in the last section, it is not easy to comprehend such problems through hierarchical views of regulation concepts, including enforced self-regulation, meta-regulation, co-regulation, and regulatory enrolment. Consequently, traditional regulation concepts relying on a hierarchical structure predetermined by formal regulators are facing challenges from the digital economy concept due to the vacancy created by changes in the market. Such a new market requires a new concept of regulation, as well as new governance aiming at changing and improving regulation through a more diverse, dynamic, and open path (Lobel, 2004; Dunleavy et al., 2006; Döhler, 2011; Gao, Song, and Zhu, 2013). In this thesis, the focus of new governance is on exploring the concept of co-governance.

This concept is still in development, but multiple perspectives have been discussed. One of these views is that co-governance is conceptualised as power sharing among actors involved in certain issues. Furthermore, the co-governance concept also concerns the arrangement of decision-making authority that shares power and responsibilities between the government and stakeholders in devolving power. Another concept of co-governance is the regulation mutually agreed upon among actors from sectors in public, civic, and professional areas (Johnson and Osborne, 2003; Bode, 2006; Berkes, 2009; Somerville and Haines, 2017). Such a concept also emphasises involving actors from society, who are invited by the state to participate in critical activities about development programmes and designing institutions (Ackerman, 2004). Co-governance is also referred to as a system shared and controlled by as many actors as possible for formulating policies and planning and delivering services by combining legitimate authority with democratic decision-making (Brandsen and Pestoff, 2006; O'Mahony and Ferraro, 2007; Hatch and Schultz, 2010).

Based on these perspectives, the key aim of this thesis is to examine whether the notion of regulatory co-governance can explain the changes in regulation along with the change in complex markets with a more horizontal structure in the case of regulating the food safety of online catering services in China. The change of

regulation requires the participation of actors from regulatory authorities, markets, and societies relevant to certain industries. Policymaking aimed at improving the framework of regulation at the institutional and procedural levels is called regulatory governance (OECD, 2005; Bevir, 2011; Döhler, 2011). This means that in theory, the structure of the regulatory framework may no longer be one, with a single but fragmented centre predominated by the government. Instead, it can be assumed that in a complex regulation, key actors impacted by common problems gather their preponderant capacities at a specific site. Such a site is for processing changes in the market, decision-making, and interaction. In the change of regulation, key actors need multiple sites like this to be linked to cover the changing market. These linked sites are assumed to be overseen by a unified framework of key actors and enforced by authorities when necessary. Furthermore, these sites are more interactive and less hierarchical in structure. Such characteristics have taken regulation into the era of new governance.

New theories are needed in the study of governance to explain new phenomena in development beyond the dichotomy between markets as targets and states as regulators, such as new web-based markets built through horizontal digital networks. The study of governance, then, shifts from a simple system of governance run by a hierarchical government to a complex inter-organisational system that includes actors from contemporary diverse societies (Ostrom, 2010). The theoretical framework of co-governance has been developed based on the theoretical insights of polycentric governance, collaborative governance, holistic governance, and network governance literature. In addition, the prefix in co-governance means that the people impacted by common problems caused by the change in the market can share or do things together to change regulations for addressing such problems. However, before deploying the theoretical framework of co-governance, the literature on polycentric governance, collaborative governance, holistic governance, and network governance needs to be discussed by clarifying their contribution to conceptualising co-governance, indicating their limits based on the development of the digital economy and then deducing the discourse of co-governance.

2.4.1 The development of governance concepts

Polycentric governance contributed to offering an alternative to both state-led leviathan and market-led privatisation in governance (Ostrom, 1961; Ackerman, 2004; Ostrom, 2010). Ostrom suggested that independent organisations can mutually interrelate with each other under a general system of rules for a specific goal (Ostrom, 1972 workshop paper). In this approach, multiple organisations constitute a governance system containing multiple self-organised decision-making centres, sharing perspectives and values based on market arrangements, political conditions, legal communities and constitutional rules within collective actions. Polycentric governance thus offers the prerequisite theoretical basis for co-governance at the structural level. Rhodes suggested that formal regulators can form formal and informal linkages to share interests and values for policymaking and implementation with informal actors, such as economic organisations and social organisations in policy networks (Rhodes, 1997; Rhodes, 1998a; Rhodes, 2013). Moreover, what Polanyi and Ostrom asserted was that competition and cooperation, through the constant interaction of multiple autonomous centres, provide for spontaneity and take account of each other in decision-making. In spontaneous phenomena among cases of autonomous decision-making centres, the analogy of those cases based on the conceptual framework of polycentricity may have helped the actors of those centres to realise their functions, or in turn, through analysing those cases, may help to provide insights into the development of the conceptual framework of polycentricity itself. In other words, polycentric governance and the analogies of various cases through the analytical framework of such a theory have a mutually beneficial relationship (Aligica and Tarko, 2012).

However, this means that the examination of constant interactions of multiple spontaneous nodes in governance is limited to the study of the general configuration of empirical cases based on polycentric governance, but empirical cases, which may have unique evolutionary phenomena, have not given further insights into polycentric governance. For instance, as digital platforms are expanding the market to facilitate interaction between supply and demand through horizontal networks, actors with their resources are searching for the most efficient interaction and optimal coordination with others. This change in the market has disrupted the hierarchical structure of the traditional industrial model, which is used to integrate limited suppliers to provide services (Montero and Finger, 2021).

Polycentricity means that various groups of actors gather in different decision-making centres, and these different centres interact with each other. The structure of the market has become a more holistic network in which actors from different groups gather on sites providing services. Instead of independent organisations from their own backgrounds as multiple fixed decision-making centres gathering as a general system for specific goals in polycentricity, these users seeking efficient, coordinative, and optimal service delivery via digital platforms have formed a proliferating, heterogenous, and unstable flow of services. In addition, polycentric governance focuses on behaviours of self-organisations beyond the dichotomy of state and market, but such a focus has separated the actions of multiple autonomous centres from this dichotomy, instead of integrating this concept into evolving crowd behaviours, such as service delivery from networks built by digital platforms. More concepts of governance have also appeared in the study of regulatory governance, such as collaborative governance, holistic governance, and network governance. These concepts have demonstrated a significant characteristic different from polycentric governance, which involves gathering organisations involved in social or economic behaviours in a network.

Collaborative governance is defined as a formal collective decision-making process of making public policy or managing public assets launched by public agencies, which includes other stakeholders based on consensus and deliberation. In another broader definition, collaborative governance is not just a process but also a structure of public policymaking and management, which requires the participation of actors from the public, private, and civic sectors across their boundaries to achieve a purpose constructively (Ansell and Gash, 2008; Emerson, Nabatchi, and Balogh, 2012). In addition, unlike the inclusion of implicit informal cooperation in governance models, such as policy networks, collaborative governance is distinguished for its explicit formal strategy of incorporating stakeholders into the decision-making process.

Collaborative governance aims more at the institutionalisation of the decision-making process. The model of collaborative governance contains four variables, and it starts with conditions of the exchange of power, resources, knowledge, cooperation, and conflicts. These conditions became the basis for institutional

design as the second variable. Institutional design plays the role of basic rulemaking to set how collaboration should work. To ensure the collaborative process in practice, leadership is needed to facilitate and mediate among the actors involved. In the collaborative process, the participants will enter a cycle of communication through dialogue, trust building, commitment, sharing understanding, and then intermediation of outcomes. This is the basic model of collaborative governance. In its broader definition, collaborative governance has been developed by presenting an integrative framework in which three nested dimensions have been introduced: the general system context, the collaborative governance regime (CGR), and the collaborative dynamics and actions. The system context operates through drivers, which include leadership, incentives, interdependence, and uncertainty that help launch CGR and determine its direction. Within the system context, collaborative dynamics and collaborative actions constitute the CGR.

However, the process of collaboration, from dynamics to action, is disputed due to different portrayals. Some scholars perceive the collaborative process as a linear sequence of cognitive steps, from defining a problem to setting a direction and its implementation. The collaborative process of CGR, however, is in contrast to this linear portrayal and is viewed as cyclical or iterative interaction (Gray, 1989; Selin and Chavez, 1995; Daniels and Walker, 2001; Emerson, Nabatchi, and Balogh, 2012). Collaborative dynamics require participants who can share their motivation to reach a principled engagement, and then build capacity for their joint action (Innes and Booher, 1999; Susskind, McKearnan, and Thomas-Larmer, 1999; Henton et al., 2005; O'Leary, Bingham, and Gerard, 2006; Ansell and Gash, 2008; Carlson, 2007). Each participant, in a collaboration representing their interests, joins fair and civil discourse and communicates openly and inclusively, and they should be informed by the expressed perspective and shared knowledge. In this process, participants discover interests, concerns, and values to understand problems jointly, build shared meaning, agree on a discourse system for problem solving, ensure clear and adjustable tasks and expectations, and then set criteria for assessing information and alternatives. Through such deliberation, participants make joint determinations on the basic principles that they espouse. Principal engagement gives participants in collaboration shared motivation to build the

capacity for joint action, which leads to collaborative actions. Collaborative actions include but are not limited to actions such as seeking and securing support from other participants, education for the public, enacting new policy tools, organising resources, choosing and building new facilities, monitoring, and enforcement. Collaborative actions may lead to further impacts, which may also bring innovation or new benevolence, and such impacts need to be measured, confirmed, verified, and evaluated. In addition, impacts such as collaborative outcomes need to be accountable for adaptation (Emerson, Nabatchi, and Balogh, 2012).

Such theoretical research on collaborative governance is well developed in a democratic context, but it is not limited to a liberal democratic context. Collaborative governance has been applied to analyse cases of public governance in countries following various socio-political or socio-economic ideologies. Given such a premise, scholars in China have developed the theory of collaborative governance in such a democratic context and explored it to analyse public governance in diverse areas. This development has influenced the research on governance regimes in China. In addition, it is notable that in the development of the collaborative governance concept, as merely described in a democratic context, China is featured with authoritarian state power. Thus, the development of collaborative governance in China has contributed to the research on this concept via power sharing in a strong-government culture (Jing and Hu, 2017). Even though such power remains with the state, it does not impede collaboration between the state and other non-state actors, and their relationships become more horizontal. Jing (2015) suggested that in China, the state tends to share more power and discretion with other non-state actors from multiple sectors on public issues for better performance and legitimacy (p. 2).

Collaborative governance in China, then, has been defined as the behaviours of actors from public, private, and non-profit sectors sharing their power and discretions for public purposes (Jing, 2015). Such a focus concentrates on how public actors lead the process of building collaborative relationships with non-profit and private actors. This process ensures that public agencies make, manage, and implement public policies in a collaborative approach (Mu, Je Dong, and Koppen, 2019). Subsequent research related to collaborative governance is

developed from this definition or discussed based on it. Furthermore, collaborative governance in a democratic context is further developed into a richer concept named multi-level governance (MLG), which features intergovernmental relations (IGR) and collaborative governance (CG). In addition, while CG touches on collaboration from a single government or a few governments at the same level, MLG considers the complexity of a hierarchical governmental entity. Given such differences, MLG still embraces collaboration, but it focuses on the overall situation, including non-governmental actors. The definition of MLG is, however, still contested in the criteria that measure the facets of the decision-making process between actors from the public and private sectors. Ongaro, Gong, and Jing (2019) suggested that choosing the definition of MLG and the criteria based on such definition requires deliberation when applying MLG to governance studies in China (p. 109). The definition of MLG provided by Piattoni has been chosen to explain governance in China, and it refers to MLG as the process in which both governmental and non-governmental actors at different jurisdictional levels arrange policymaking simultaneously. Through the activation of policy arrangements, these actors form interrelationships in a less hierarchical but more horizontal network (Piattoni, 2015).

MLG is applied to public governance in China via multiple levels of governments adjusting their scales to diffuse power and discretion. Such diffusion is meant to ensure that governmental actors adapt to diversifying society and interact with non-governmental actors in a more collaborative approach, such as environmental governance and "Internet + Strategy" (Ongaro, Gong, and Jing, 2019). These cases have shown that non-state actors are increasingly involved in public governance with governmental actors. The outcome of these cases in MLG gives a revisit of democracy, or more specifically, traditional liberal democracy. Traditional liberal democracy follows stringent criteria in the delegation and accountability framework, but this is questioned in the case study of public governance in China. In MLG, the democratic context of collaborative governance, which focuses on delegation and accountability frameworks, is criticised as multiple principals and agents may break down such frameworks (Curtin, 2007; Scharpf, 2009). Hence, Piattoni (2015) suggested that democracy is self-determined by citizens empowered in institutions for the purpose of changing

common life as a whole, including changing the terms of democracy itself (p.342). In addition, revisiting democracy does not mean giving up universally approved human rights, equality, and the formation of political systems by empowering and involving citizens.

By revisiting democracy in the case of public governance in China, Ongaro, Gong, and Jing (2019) suggested that legitimacy and effectiveness are the fundamental conditions in the public governance of China. Before the reform of the Chinese government, strong governmental actors could not communicate well with non-state actors to coordinate among functions and jurisdictions at multiple levels, and they were beleaguered by the rigid demarcation of powers and the asymmetry of information. Non-state actors have altered such situations in the reform by weakening and even breaking down the barriers between the public and private sectors and between governments at multiple levels in collaboration. China, as one of the fastest-growing economies in the world, prioritises the implementation of social or economic development projects while accepting public opinion. These cases show that public governance can be developed based on the performance of both governmental and non-governmental actors. Both groups of actors pursue economic growth and social development, and the performance of such pursuit gives the political system of China legitimacy. The research on collaborative governance in China has indicated that, when facing problems that may be caused by social or economic projects, state power is inclined to flatten its structure of the intergovernmental system and be collaborative and cooperative to respond to these problems. Thus, the case of public governance in China has shown that, even though categorised as an authoritarian state in the liberal democratic context, governmental actors and non-governmental actors still collaborate across levels and barriers of power. Hence, the collaborative governance concept has been well developed in terms of power sharing in China.

Based on this theoretical study, collaborative governance has been categorised into intergovernmental collaboration or interagency collaboration, local governance, service delivery, partnerships in policy and management, and multiple-level governance. These studies have been applied to analyse cases of diverse substantial areas, such as public health, local social service contracting,

climate change, infrastructure construction, environmental policy, and electronic government (also known as e-government). For example, in the area of interagency collaboration performance in China, three cases of interagency collaboration in Liaoning Province have been selected and analysed. Through analysing the interagency collaboration in China, Mu, de Jong, and Koppen (2019) developed extra insights into existing collaborative governance models, and they suggest that interagency collaboration exists through both vertical and horizontal governance (p. 598). Moreover, bureaucrats will change their ethos to ensure the performance and effectiveness of collaboration if they have compatible procedures between their agencies. The process of building collaboration can also be picked up from the point where prior collaboration fails but leaves experience. The interagency collaboration in China has its own specific pattern, which depends on the intervention from the higher level of government, the salience of problems, the bottom-up approach of collaborative initiatives, etc. Such a pattern differs from collaborative governance in a democratic context.

In the area of public health, collaborative governance has also been applied to analyse how governmental actors and non-governmental actors collaborate to manage an emergency. The case of community food supply during the COVID-19 pandemic in China suggests that restoring community food supply requires not just coordinative effort from local governments, but collaboration from the whole society while taking factors affecting the supply chain into consideration. This case has indicated that managing an emergency in public health requires strong leadership and collaboration from both governmental actors and non-governmental actors. Such strong leadership means that these actors have the same goal, which is to stop the pandemic by contributing to the process of managing such an emergency and supporting each other. Such a process indicates that both governmental actors and non-governmental actors need open-mindedness in stopping the pandemic. In the discourse of collaborative governance generated from the liberal democratic context, China has been categorised as an authoritarian regime in which open-mindedness is not assumed to be present. This case is already paradoxical to such discourse, and it has implied that strong leadership gives governmental actors legitimacy via collaboration with non-governmental actors, especially during an emergency. This collaboration provides a space of open-

mindedness for both governmental actors and non-governmental actors through accepting innovation and bottom-up feedback for effectiveness (Li et al., 2022). Hence, the categorisation of governance regimes in collaborative governance generated from a liberal democratic context has its limitations, and the case of COVID-19 in China has further proven the discourse of legitimacy and effectiveness advocated by Chinese scholars in developing collaborative governance.

Collaborative governance is also applied to local governance, or regional governance, in China. In addition, collaborative governance focuses on collaboration through a holistic approach. This approach advocates collaboration across multiple sectors and aims at a collaborative mechanism established among governmental actors and social actors at the regional level. More specifically, Cui (2020) has explored the collaborative mechanism of the metropolitan area, which is composed of the central government, local government covering the metropolitan area, cooperative organisations working across regions, non-profit organisations, and the private sector (p.48). Cases of the environmental governance of local government and the collaborative network of local governments in the Beijing–Tianjin–Hebei area have been analysed. Studies of these cases indicate that local governments initially collaborated with each other by signing agreements of intergovernmental cooperation and communication. Through these agreements, local governments were able to support each other across regions. These cases have also shown the limitations of collaborative mechanisms among local governments. In the process of implementing these agreements, the resources of the local governments are asymmetric, and the preferences of these governments are diverse. Consequently, collaboration among these local governments is restricted, as a more extensive mechanism for communication, compensation, and trust building is required. Such a limitation implies that a more holistic mechanism is needed. In a holistic approach, local governments need communication, trust, interest distribution and compensation, supervision, and evaluation. This process requires three steps: trial for communication, signing agreements for reconciling potential conflicts and contradictions, and promoting mutual trust and understanding (Cui, 2020).

In the case of the rural water environment in Jiang Su Province of China, how collaborative governance should be applied to local water environment governance has been discussed. This is a formal process led by the local government and followed by guidance on the increase of investment from market activities in water environment governance, the participation of the public, and the influence of social organisations (Qian, 2019).

In the case of ecological environment governance in the Guangdong-Hong Kong-Macao Greater Bay Area, collaborative governance has also been applied in explaining how ecological environment governance works. The local governments from Guangdong, Hong Kong, and Macao intend to collaborate on ecological environment governance, but they are limited to small projects instead of focusing on the entire Greater Bay Area. In addition, the interactions among these local governments have become stronger as more protocols have been signed. However, these protocols are limited to the protection of the environment of the atmosphere and water. Each local government has its own focus, and their systems and standards of enforcing environmental governance are different. The exchange of information and resources is not sufficient, either. Hence, such a study is limited to the discussion of plans on how to improve environmental governance (Xu and Ma, 2020).

Collaborative governance has also been applied to the study of e-government in China. Collaborative governance focuses on the formal process, in which public actors, private actors and civic actors participate to discuss a process of solving problems and agree on systems of practice. For example, e-government has been exercised in processing inquiries from the public, private, and civic sectors through a collaborative platform within local governments. Such collaboration also works in the governance of society, such as the connection between local government and nursing institutions on living devices and via the internet, the digitalised population census, and the logistics of public service delivery. The administration that needs collaboration among multiple divisions in local governments is also explained, such as the system that upgrades the procedure of market entry, the operation, and the supervision of market actors (Nie and Li, 2018; Zeng and Huang, 2021).

Apart from public governance, collaborative governance has also been applied

to regulation studies in China. In the case of a public–private partnership (PPP) in constructing and operating an expressway, the Chinese government seeks collaboration between the government and the social capital (or capital from society) to reduce the pressure on local government finances. The objectives of the government and the private sector, however, are different. The government focuses on public welfare, while the private sector aims at achieving the maximisation of profit. In addition, to pursue a social reputation, it is ideal for the private sector to prefer long-term relationships with the government to short-term relationships. Consequently, the private sector must take the quality of the expressway into account. Such inconsistency of interests means that the project requires supervision in case the project ends up being manipulated by the private sector in pricing and charging. The toll rates and the charging period are also more specific problems, as local governments may still charge after paying off their loans, or private companies may impair public interests by giving more investment returns to shareholders in the process of raising funds. Hence, PPP projects such as expressway construction and operation need regulation to restrain such behaviours in the interest of the public.

To regulate such projects, the government and other stakeholders are required to maintain information transparency, respect public interest in pricing, set standards that accept examination and verification, and have an enforceable guarantee of realising public welfare and profit. In addition, public participation from citizens via social media also becomes part of the regulatory mechanism. Hence, through the lens of collaborative governance, the regulation of PPP projects has included a multilateral network between private and public sectors with enforceable mutual restraints, while the participation of the public has also been considered to ensure the implementation of regulatory mechanisms (Jing, 2015; Xu and Wu, 2015). This regulation through the lens of collaborative governance means that state actors are breaking barriers of power, information, and communication to interact with non-state actors to ensure the outcome of the regulatory process and to maintain public interests. Collaborative governance, therefore, has been developed beyond the context of China, as it has not just been discussed as a concept beyond the relationships between state actors and non-state actors, but has also been applied to explaining what has happened in cases from multiple areas.

Moreover, based on such developments, collaborative governance has provided significant approaches in explaining how governmental and non-governmental actors share power to align their interest in public welfare. Such significance means that collaborative governance is not limited to an ideal concept in a democratic context.

Despite its wide application to multiple areas, collaborative governance prefers a discussion of how key actors build their relationships to further discussion of what the structure of interaction among key actors participating in decision-making processes should be like. The process of building these relationships is still formal; thus, it is under the control of the public agents. Hence, the structure of relationships among actors in collaborative governance remains hierarchical. Holistic governance, then, provides a tighter structure than collaborative governance.

Furthermore, holistic governance focuses more on formal strategies by government agencies to reduce the fragmentation of public service provision. This governance model portrays government agencies as seeking objectives by forming partnerships with other actors, and then making shared commitments on agreed instruments to achieve reinforced objectives (Perri 6, 2002; Gao, Song, and Zhu, 2013). Holistic governance is characterised by organisations, especially between government and enterprises, aggregating information resources across the boundaries of participants. These participants share those resources in the decision-making process, then mobilise capabilities and activate agreed-upon objectives simultaneously (Watt, 2005; Williamson, 2014; Li and Ding, 2020).

Network governance gathers characteristics from polycentric governance, policy networks, and collaborative governance in the study of governance. Network governance, or governance by network, resembles the dynamic web structure of computer networks. Such governance originates from organisations in network form (Powell, 1990). Network governance is also about inter-firm relationships, which are collectives in a non-hierarchical structure (Alter and Hage, 1993). Such a definition has been broadened to include informal inter-organisational collaborations (Kreiner and Schultz, 1993). At the social level, network governance focuses mostly on individuals who exchange resources based

on shared trustworthy norms (Liebeskind et al., 1996). Hence, scholars have offered partial definitions based on aspects including inter-firm relationships, and interactions among organisations and groups of individuals. Nonetheless, these definitions have shown two similarities: the interactions in resource exchange and relationships, and the flow of resources among organisations and individuals (Jones, Hesterly, and Borgatti, 1997). Participants do not just have relationships with each other, but also interact with each other in a network structure, which may be constructed by third parties or governments. In the context of the digital economy, third-party organisations, including private firms and non-profit organisations, are joining the government to deliver services for policy purposes. Multiple government agencies at the same level, and even at multiple levels, are also integrating public services. The digital economy has enabled organisations and individuals to collaborate, cooperate, and compete in real time. Based on such technological advancements, consumer demand is increasing for claiming customised and varied public service delivery from the government (Goldsmith and Eggers, 2004).

Among these governance concepts based on multilateral relationships, collaborative governance considers the general system context to ensure its adaptability to complex, uncertain, and evolving situations. Such governance has provided the potential to govern the change in a general context through CGR. Thus, collaborative governance has been claimed to adapt to uncertain, complex, and evolving situations, such as the digital economy, due to its cyclical process of building a governance regime in a bi-dimensional space. In the relational dimension, participants in collaborative governance are categorised into formal organisations such as food safety regulatory bodies of the government and public agencies, informal organisations such as food corporations or suppliers as the conglomerates, and food safety test agencies and consumer protection associations as the social organisations.

The development of the digital economy, however, acts through a different routine beyond the logic of building a collaborative governance regime. Logically, collaborative governance developed by an integrative linear framework has its own flaws in a collaborative process, from the driver, collaborative dynamic,

collaborative actions, and then to impacts. In the study of the digital economy in China, such a governance concept has not paid much attention to changes like the digital economy with a network structure, and it still focuses on traditional industries. In the relational dimension, the digital economy or digital platforms have expanded their network to more stakeholders, even groups of individuals such as netizens, who have been increasingly empowered in influencing the decision-making and management of certain issues and even participating in them (Zeng and Huang, 2021).

The consequence of such influence means that web-based markets and the internet have become a new public space. In this space, both individuals and organisations voice and circulate capacities such as the information, resources, and knowledge they possess to create and improve products or services. As mentioned in the description in Section 2.2 of new web-based markets as part of the digital economy, digital platforms have deconstructed traditional industries and then reconstructed them into network structures through digital technology. The increase in efficiency via developing digital intermediation services between suppliers and buyers has become the driver of developing societies and economies. In the reconstruction process, new participants, such as individual consumers, delivery staff, and new suppliers enrolled in platforms for increased service delivery, have expanded the network of new web-based markets. In logic, a networked digital economy means both driver and impact, and it forces the construction of governance into a loop in a three-dimensional space.

The networked digital economy based on digital platforms, then, has moved beyond traditional organisational relationships due to constant innovation. The relationships among the users in this network have become borderless due to digital technology. In turn, the new network has also impacted the developing economy and societies through digitalisation, which has reshaped supply chains and redivided their labour through efficiency-oriented algorithms written by digital platforms. Such an evolving loop of deconstruction and reconstruction for the efficiency of service delivery, as mentioned at the beginning of this section, has fragmented government agencies into policymaking and following regulatory activities such as implementation, monitoring, and enforcement. In other words,

the evolving and expanding digital economy is fragmenting traditional hierarchical regulation through a more horizontal network structure that is constantly expanding through user enrolment and iterating digital technology (Montero and Finger, 2021).

However, heterogeneous users enter and act in a networked digital economy without clear and standard thresholds during expansion. This network leaves the digital economy in uncertainty as new users may not be responsible for their disordered behaviours, and the roles of platforms in coping with such situations are not clear. The behaviours of organisations and individuals evolving within the new network structure due to the advent of the information age are already ahead of constructing a governance regime. Innovation as a driver is constantly applied in platforms seeking to maximise profit by improving efficiency via merging, processing, summarising, and categorising data of demands in markets. Impacted by the innovation that has created new incentives, demands in the market are also transformed, and while demands are growing, they are driving innovation to further change the market. Such a fusion of driver and impact constitutes an evolving and spiralling closed loop, which is the essence of digital platforms as intermediaries. In addition, it does not need to affect the network effect created by the platforms as intermediaries, because such an effect is the basis of the development of these platforms.

Intermediary digital platforms have a massive scale of markets, and this scale is constantly growing. The services of such platforms, then, are standard to both the demand side and supply side through algorithms that benefit the network effect. Based on these two premises, digital platforms can shape markets. To regulate such services, regulation should be built by acknowledging the reality created by such a model, as well as protecting the consumers and ensuring that platforms improve services via network effects while competing without becoming monopolies (Montero and Finger, 2021). This loop constantly affects the construction of a governance regime by creating an absence of regulation due to fragmented hierarchical regulation (see Figure 2). Thus, the network built by digital platforms that are innovating is also challenging societies and the economy, and it needs regulatory governance to redesign regulations.

Such an absence of regulation, which provides the space for disordered

behaviours among organisations and individuals, has become one of the objectives of regulatory governance aiming at changing and improving regulation to constrain disordered behaviours, such as food safety violations in online catering services. The networked digital economy needs another network or other structure of organisation for voice and circulation to report disordered behaviours among individuals and organisations. These groups of individuals and organisations possessing information, knowledge, and resources then become gathering sites of this network in the process of decision-making, follow-up activities and feedback, employing coordination, cooperation, collaboration, competition, and other potential instruments (Goldsmith and Eggers, 2004). Fragmented government agencies evidently cannot deliver such public services alone to constrain disordered behaviours and encourage or facilitate acceptable behaviours in such networks sustainably; thus, a new governance paradigm needs a structural approach.

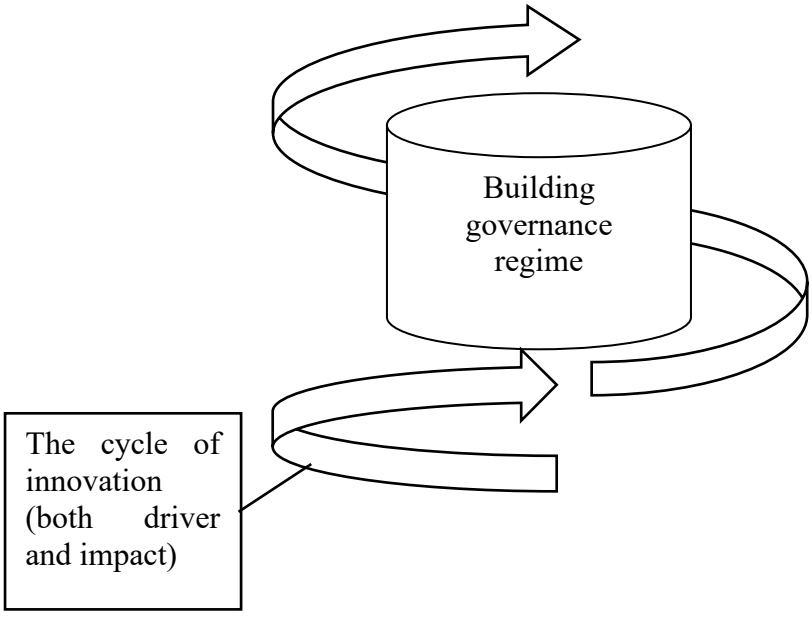

Figure 2 Building a governance regime within the cycle of innovation

Network governance has furthered research on regulatory governance at the structural level, and it has included participants, both organisations and individuals, in more horizontal networks to interact and exchange resources. Network governance has offered flexibility, accepted responses from different groups of individuals, and included informal actors to align goals among these participants

through massive interaction under oversight. Additionally, these interactions can be achieved by means such as collaboration, coordination, cooperation, and competition. Participants interact in such network management based on stable relationships, while they provide data, experience, and expertise as their capacities in real time to help build the capacity of regulation.

Even though network governance has included the digital revolution in its theoretical framework, it still has not taken the source of behavioural change, which may be the innovation for efficiency via out-of-order expansion of a networked supply chain, into consideration. The innovation of the digital economy, as depicted at the beginning of this section, aims at the possession of massive information on users, the rapid increase of users, and the constantly optimum iterative algorithm improving efficiency. The potential disorder in the innovation of the digital economy is attributed to the lack of problem discovery and disclosure of digital platforms. The variation of public governance concepts concentrates on the change in relationships among actors involved in public governance and the structure of such relationships in which actors interact with each other. However, how public governance has changed to tackle problems in public governance projects or regulations is not fully developed in public governance studies. Facets of problems in social or economic change include the sources of problems, the natures of problems, the effect of problems, the discovery and disclosure of problems, the dilemma of the traditional regulatory framework on tackling problems, the new structure of the system for regulating problems, the new relationships of parties affected by problems, and the interaction modes of these parties. The new structure of the system for regulating problems, in particular, is not thoroughly considered in research on the new problems from the digital economy, which is part of social or economic changes. As presented in Section 2.2, the growth of the digital economy naturally involves as many users as possible; this situation means state actors and non-state actors are involved. State actors and non-state actors are bothered by the challenges of the digital economy while benefiting from it. Hence, the structure between the problems in social or economic changes and the problem-solving system is considered less in governance concepts, including collaborative governance (including MLG), holistic governance, and network governance. Co-governance, then, may provide a structural alternative based on the suggested

regulation concept this thesis has offered. One of the definitions of co-governance is the arena in which multiple collectivities interact cooperatively through a process of shaping and representing each other (Kooiman, 2003; Somerville and Haines, 2008). This definition is limited to the local level of governance.

In this thesis, the co-governance concept is inspired by the participation of actors from multiple sectors in polycentric governance, the multilateral relationships among state actors and non-state actors of collaborative governance, and the structural development from holistic governance and network governance. In addition, co-governance aims to explain the change in regulation when new economic or social behaviours affect state actors and non-state actors. Such an explanation may show a new dimension of understanding regulation and offer a new perspective on how regulation is changed. Such innovation is beyond the context of China, since many countries around the world are facing familiar problems brought by social or economic changes. Hence, to set up the concept of co-governance in the context of regulatory governance, co-governance needs a new definition for solving shared problems in an evolving economy or society by changing and improving traditional regulations.

In the context of regulatory governance, co-governance aims to cope with the disorder brought about by the change of behaviours from organisations and groups of individuals, especially in the digital economy embodied by digital platforms. In addition, other governance concepts still contribute to the conceptualisation of co-governance. Collaborative governance contributes to the process of gathering actors into multilateral relationships. Collaborative governance in nature is a collective formal decision-making process launched by public agents in which actors from the public, private, and civic sectors act jointly to achieve a constructive purpose, and this process is driven by problems or other drivers. Actors are in the process of collaboration for the formal decision-making process; thus, they engage in principles they have agreed on via communication, building trust, sharing understanding, and building a system. Public actors are central in this process; thus, they need support from other participants to ensure that the joint action works. However, such a process means that this governance concept works through a system based on principles that have loose relationships among these

actors. Moreover, in structure, collaborative governance has a linear framework that happens after the change in economy or society, and it cannot iterate with the changing market, which combines the driver and impact of innovation. Holistic governance provides a tighter structure, as public actors design formal strategies to aggregate information and resources from other actors. Network governance gathers characteristics from polycentric governance, collaborative governance, and holistic governance. This concept contributes to the co-governance concept due to its flexible network structure, which is horizontal. In this network, organisations and individuals interact via collaboration, cooperation, coordination, and even competition to circulate resources. However, such a concept does not take the changes in the market, especially the rapidly growing digital economy, into consideration. The expansion of new markets breaks the network structure.

The co-governance concept is different from other regulatory governance concepts, including collaborative governance. In these governance concepts, the change of the market either revolves around formal regulators and consumers or expands to fragment the hierarchical structure of relationships among them. Thus, when problems of such change appear, they unilaterally drive formal regulators and consumers to reach agreements and act jointly after the appearance of problems in such change. As explained in summarising the variation of public governance concepts, such a loose structure of relationships among market actors, formal regulators, and consumers indicates a gap in discussing the change of structure of relationships among these key actors encountering the problems from the change of market. The co-governance concept contributes to explaining such change. The structure of the co-governance concept, in contrast, oversees and guides the change of the market by revolving around it instead. Through such a structure, formal regulators and consumers constantly oversee and guide surrounding market activities. This oversight and guidance in the co-governance concept requires the interactions of these key actors to share their information, resources, and knowledge to connect, as none of them can address problems in regulation alone. Instead of the formal process in collaborative governance and holistic governance and the informal process in network governance, interactions in the co-governance concept are both formal and informal. Hence, interactions among actors from public, private, and civic sectors in the co-governance concept accept multiple

approaches of interaction for connecting key actors in addressing problems, and such interactions are not limited to collaboration. To achieve this goal, the co-governance concept accepts a more horizontal structure surrounding market activities within which key actors address problems together. Consequently, within such a structure, to oversee and guide market activities, the formal regulators continue their roles in designing the horizontal arena within which market actors participate and endowing society, especially consumers, with the rights of feedback. In exchange, market actors during market changes accept the oversight of formal regulators that prompts them to control problems and the feedback from society.

As mentioned earlier in this section, the internet is a new public space, and the market activities of digital platforms are part of this space. To regulate this new market in the co-governance concept is to regulate the network effects of market activities created by digital platforms, and the new regulation is intended to match the problems in the network effects to the key actors who can gather and interconnect their capacities to address problems. Hence, such a concept contributes to viewing the change of regulation as the one that interconnects the diverse capacities of key actors to comprehend the shared problems from the change in the market and the factors that may lead to problems, and then deploys them within an open and horizontal structure for addressing these problems via the guiding market. The new regulation, from the perspective of co-governance, is a structure to address shared problems in the change of market rather than making and enforcing rules on regulated firms or delegating regulatory tasks or functions to ratified actors. Co-governance in the context of an evolving market is defined as a shared arena opened and hosted by regulatory authorities to gather and interconnect key actors with others to solve shared problems. The role of key actors, the sites that connect the capacities of key actors, the structure of sites, and the working mechanism need to be discussed the next three sections.

2.4.2 Roles of key actors

The co-governance concept suggests that disordered behaviours affect the outcome of economic or social development, which will impact the key actors involved and undermine their confidence in development. The report on the failure of development prompts actors impacted by such failure to achieve consensus on

regulatory objectives and gain the capacity to address problems. Hence, in the next three subsections, the theoretical framework of the co-governance concept will be presented based on the roles of key actors impacted by shared problems, the structure in which key actors are gathered, and the working mechanism of this structure. In discussing the theory of co-governance, the analytical framework will then be demonstrated to explain how regulation is changed through the lens of the co-governance paradigm.

The first critical component in the theoretical framework of co-governance is the classification of the actors involved in the regulation of the new market. This component relates to the structure of the relationships between leading actors and other participating key actors. As the structure is not hierarchical, it shares certain resources with market actors, giving them space to highlight their preferences. Two criteria should be set in the demarcation of identities for these actors. One is whether these actors have the authority to make the final decisions on policy development. The other is the degree of participation of the actors in the decision-making process and regulatory activities based on shared governing functionalities. The roles of these actors, who are formal regulators just like the regulatory authorities and informal regulators who participate in the shared arena opened by formal actors, need to be clarified. In addition, in informal regulators, social actors, including professional third parties and consumers, play critical roles in reporting signals of disordered behaviours in an evolving economy.

The authority for designing the overall regulatory framework remains with formal regulators. The regulatory authority incorporates information, resources, and knowledge of behaviours from actors involved in web-based markets into their decision-making process instead of just unilaterally adding complex rules on specific regulatory objectives or just delegating rulemaking functions to regulated firms. Information, resources, and knowledge from key actors are essential elements for regulatory authorities in policymaking and following up. These elements are heterogeneous and diverse, and regulatory authorities need them to see the full picture when addressing shared problems. As regulatory authorities specialise in decision-making and regulatory activities, following up through analysing and assessing such essential elements collected from other key actors,

their expertise is critical for ultimately designing the nature of the regulatory process. Such governing functionality is a unique identity and core competence of regulatory authorities, which take the demands of market actors and social actors carefully into account. Thus, regulatory authorities play a role as designers and enforcers of regulatory frameworks.

Such roles of regulatory authorities mean that other actors involved in web-based market activities are the participants who provide what regulatory authorities need in the decision-making process and follow-up activities. Moreover, key actors other than regulatory authorities accept internal control of their own and external reports to find and address common problems in regulatory activities. These actors thus need to report disordered behaviours and give their suggestions based on their own roles to regulators. In the evolving economy, market actors and social actors are in symbiosis, which brings both into a mutually beneficial relationship. Social actors, especially consumers, seek improvement in their experience with products or services from market actors, and this means that they are playing the dual roles of recipients and responders. Market actors, on the other hand, work on how to improve efficiency and quality through innovation and competition (or cooperation); thus, they act as innovators who compete or cooperate.

However, the process of innovation may contain uncertainty, which leads to disordered behaviours of market actors that affect the experience of social actors and undermine the market itself. Regulation, then, is needed to ensure the balance of such symbiosis. In such conditions, it is necessary for regulatory authorities to interact with market actors and social actors, including consumers, both to supply essential elements for improving regulation and then to improve behaviours based on their consensus on common problems. Those three groups, government, market actors, and social actors, interact within an arena, as described in the co-governance concept. These essential elements and opinions reflect their identities and responsibilities in the operation of the social system, and consequently, they draw up their codes of conduct based on their identities. These actors are also responsible for their codes of conduct, which in turn prompt actors in co-governance to choose their own modes of interaction for addressing common problems. Consequently, there is mutual dependence, which allows the regulatory framework to operate on

a network rather than a hierarchical basis. These key actors have heterogeneous information, resources, and knowledge from different links and sectors in the market and influence the design of regulatory processes with diverse opinions.

This classification represents the reciprocity and social order among these key actors in the decision-making process for a common goal, such as a well-functioning market based on quality. For instance, in food safety regulation in the age of the digital economy, regulatory authorities can be the final decision makers of policy development in the food safety regulatory process, collecting and transforming diverse opinions from other actors involved in the online food industry. Online platform corporations are hubs that gather suppliers and consumers into an integrated but complex supply chain through a network structure and acquire their information, resources, and knowledge for supply and product delivery. These digital platforms reconstruct elements of the physical economy into the digital economy. This network is growing rapidly in a decentralised way, which means it is open to actors involved in the change of the market at the social level. Thus, it is convenient for actors in the digital economy to report issues to regulatory authorities and provide their suggestions. These interactions with regulatory authorities and market actors are crucial for developing the regulatory process as the shaper of the governance relationship. Market actors in the digital economy are the main source of disordered behaviours due to their innovation through constantly expanding networks. In turn, social actors, including social media, professional third parties, and consumers, reflect such behaviours through the provision of information. Hence, the interactions among these actors may reflect the features of the co-governance concept, which are presented in the next section.

2.4.3 Structure of the sites that gather key actors

Three types of actors are key to a functioning new regulation, as suggested in the co-governance concept: the formal regulators as credible authorities to collaborate on the new framework and cooperate with market actors, market actors as agents of innovation and competition (or cooperation) for improving the experience, and members of the social sector (e.g., consumers) as the recipients and responders who give feedback on disordered behaviours. These key actors interact with each other for a common goal, which is to reduce potential disordered

behaviours amid a changing market, such as the web-based market that attempts to deconstruct and reconstruct certain industries for development but may be subject to inconsistencies between the supply side and service delivery. Such an arena for interaction would be different from just formal regulators shifting or mixing regulatory strategies that make redundant complex rules but carry out imprecise processes. Through the concept of co-governance, new regulations and their mechanisms for implementation can be identified. Hence, the five features of new regulation in the view of co-governance are as follows:

- The identification of problems that impact key actors involved in the change of market, including formal regulators, market actors, and consumers, and the factors of such problems. The identification of problems in the change of market and its factors reflect the comprehension of such problems by incorporating them in specific and legislative procedures to reform the regulatory framework

- a reformed regulatory framework that allows for new relationships based on the capacities of key actors in response to problems

- The clarification of roles of these key actors involved in the change of market and their capacities in the new regulatory framework so that they can exchange resources, information, and knowledge

- a structure of interaction assumed visually as a grid or a similar structure as an arena prepared for key actors to interact based on their new relationships, the regulatory framework, which overlaps and synchronises with the evolving economy, and accepts oversight from regulatory authorities and reports of problems from social actors

- The capability of adjusting and repeating the above process to improve the regulatory framework (see Figure 2)

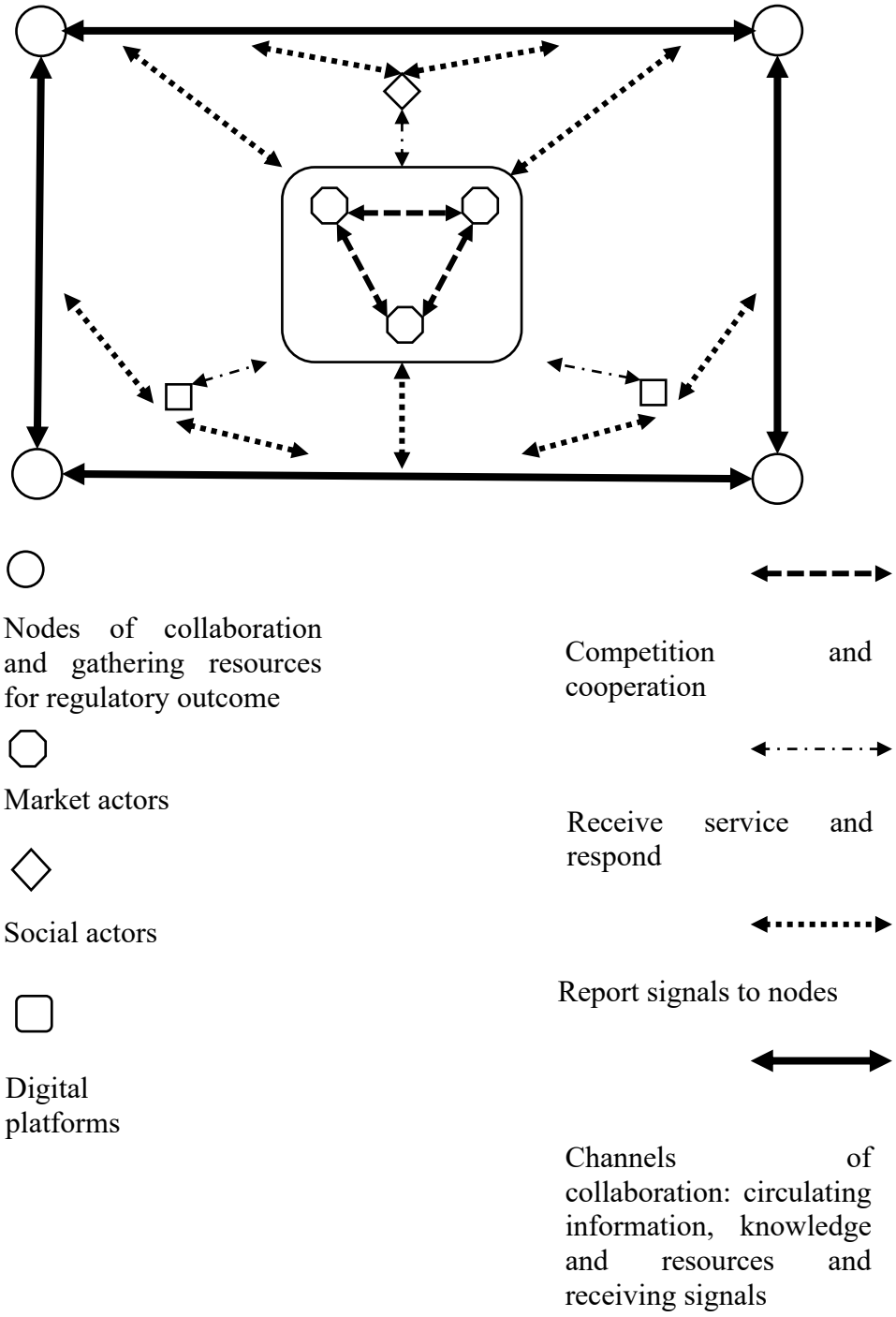

Figure 3 The operation of the grid in co-governance

As mentioned in Section 2.2, the horizontal network of the digital economy has aggregated both suppliers and consumers to improve efficiency, but at the expense of the loose verification and review of users and undermining quality. In the theory of exit, voice, and loyalty, with consumer voice and exit, there is pressure on

suppliers to improve service quality, especially if they are loyal to the service (Hirschman, 1970). In the shared arena opened and led by formal regulators, the report, based on their identities as key actors, is the signal to alert other key actors and receive responses from each other instantly through multiple channels. Since these key actors involved in the change of market activities report disordered behaviours as signals of improving regulation, their report implies a willingness to interact. This willingness to address common problems has become the consensus for actors in such an arena to come up with agreed-upon regulatory objectives. When the regulatory objectives are determined, an altered legislative procedure for making decisions followed by practice is in place.

The achieved consensus on diminishing behaviours that affect the well-functioning of the economy or society in an evolving economy or society has set the agreed-upon regulatory objectives. The consensus means that multiple groups of actors start to interact through various modes to exchange resources, information, and knowledge as the essential elements to build channels of interaction structure. The channels for the flow of interaction set the structure of the interactive relationships among the actors. The direct outcome of such interaction is the horizontal network, which is the shared arena of co-governance. Such a network of interactions among key actors needs a structure that can contain different interactions of key actors. In the co-governance concept, such structures are assumed to be grids or loops that evolve along with market changes.

The grid structure of the network in co-governance is developed from this concept of computer science, and it has become a new regulatory framework. Grids refer to zones where regulatory agencies gather resources, information, and knowledge to fence, oversee, and influence the behaviours of the users or members (Jiang and Ren, 2007). Grids are the basic and core operational units of networks in co-governance amid evolving economic or social activities. Such a concept was originally defined as an open protocol architecture as the basic mechanism by which users negotiate, establish, manage, and exploit shared relationships. This grid ensures that users can set extensive, interoperable, portable, and shared standards and then provide standard services (Foster, Kesselman, and Tuecke, 2001). In this grid structure, regulatory authorities can respond to the signals of

common problems reported by other key actors in the regime by changing the regulatory process to reduce emerging behavioural problems. In addition, grid structure may not be the only structure that the new regulation, explained in the view of co-governance concept, accepts, but in principle, the market activities or the source that causes the change of market is, within this structure, to be overseen by formal regulators and receive feedback from society, especially consumers.

Since digital platforms, as technology intermediaries, have advantages in information and service delivery as information hubs but without internal behaviour control rules, a new pattern of behaviour control, different from voluntary self-regulation and enforced self-regulation, is necessary. This control accepts influences from other key actors based on exchanging information, advantageous resources, and expert knowledge to ensure a constant course of behavioural improvement and to prepare a regulatory framework for new potential problems. In addition, as governments at both the central and local levels are realising the importance of applying internet-based digital technology to lead the improved regulatory framework, formal regulators gather data from other participants and analyse, exchange, and compare that data for further decision-making and embed it in the process of implementing, monitoring, and enforcement.

Since the regulatory authorities have responded to the change from an evolving economy with improved regulatory procedures, a change to the regulatory framework itself has become necessary. The structure of the regulatory framework encompasses the interactions among key actors involved in the evolution of the economy. Theoretically, due to the flexible response among key actors, the structure of the regulatory framework in co-governance will adapt to a new economy by expanding through a network of grid structures. Such adaptability leads to a shared and open arena that covers the evolving economy, such as the networked digital economy. One thing to be noticed is that even though this arena is shared and open, it still needs review and verification followed by monitoring from authorities to enforce the rule of law. This interaction can be overseen by other key actors, especially regulatory authorities, as leaders of regulatory frameworks. Such interaction ensures the smooth running of the new regulatory framework embodied by the grid network based on co-governance. The next subsection

explains how such networks work through a grid structure.

2.4.4 Working mechanism of the co-governance concept

To ensure the operation of such a grid structure, norms must be established to ensure the outcome of regulation. The start of regulating disordered behaviours in the grids of networks means the practice of new regulation in the view of the co-governance concept. Hence, the co-governance concept matters in comprehending the process of improving regulatory frameworks to ensure the sustainability of improving the behaviours of market actors when interacting with other key actors. To test the existence and effectiveness of the co-governance concept, especially in the case of online catering services in China, the analysis that follows focuses on the process of addressing problems.

The comprehension of problems shared by key actors in the development of a changing economy or society is the first component of the analytical framework of co-governance. Key actors need to understand the problems that they are mutually confronting and to be aware of the factors that lead to such problems. This part is to test whether key actors have a clear understanding of emerging disordered behaviours and incidents amid changes in the market. The next part of the analytical framework concerns what key actors have done in response to problems or the factors leading to problems. This response is achieved through rulemaking and restructuring for a new regulatory framework. The rulemaking is to test whether key actors have responded to problems or factors leading to problems by gathering and interconnecting their diverse capacities for a total problem-solving capacity. The restructuring, which is mainly conducted by the formal regulators amalgamating themselves, is to explore whether a holistic and horizontal structure based on the interconnection of key actors is built to change regulation. This amalgamation is intended to prepare key actors for deploying their diverse capacities as one to explore solutions. Such responses test whether key actors have reached a consensus on addressing shared problems.

Consequently, explaining such deployment in practice becomes the next focus of understanding the change in regulation through the co-governance concept. After formal regulators amalgamate themselves into one authority and key actors

interconnect their diverse capacities into a total problem-solving capacity, the changed regulatory framework requires new behavioural control in practice. The co-governance concept explains how key actors interact to make a joint effort to put a new regulation into practice based on their interconnected, diverse capacities. The interactions of key actors are to test whether this control accepts oversight from the amalgamated formal regulators, whether those actors have exchanged their resources, information, and knowledge to build this control for reducing disordered behaviours, and whether such control has received feedback. This explanation is based on the process of addressing problems through problem discovery and disclosure, problem management, and problem feedback.

The key actors are assumed to interact via the new regulatory framework embodied as a network of certain structures in the co-governance concept. This network covers the evolving economy, which is embodied as constantly innovating markets, such as web-based markets, as part of the digital economy run by digital platforms. Such networks gather critical actors in new web-based markets to improve regulatory frameworks. Key actors involved in the change in social or economic behaviours must enter this network to express their opinions and report issues on the disordered behaviours involved in such change.

Hence, conceptually, key actors must gather in groups or sites of those unique but reciprocal sectors and links in networks. Such networks, containing certain sites or groups in the co-governance concept, constitute the grid structure mentioned in Section 2.4.3, and these sites or groups can be viewed as nodes that can gather thoughts, methods, and resources from their members and infuse these into a particular system to direct risk reduction or report risks (Burris, Drahos, and Shearing, 2005). The concept of nodes comes from the discourse of nodal governance. This theory asserts that collective behaviour turns the operation of various actors into an outcome-generating system (OGS) in which governance is constituted in nodes. Nodes in this theory are defined as sites that possess technologies, mentalities, and resources for mobilising knowledge and capacity in governance. The advantage of nodal governance is that actors in OGS can use their knowledge and capacity flexibly to manage the course of events.

Four essential characteristics—mentalities, technologies, resources, and

institutions—are exhibited at the site of OGS. Mentalities refer to the modes of thinking about issues to be governed by nodes (Burris, Drahos, and Shearing, 2005). If nodes would like to exert their influence on issues, they demand technologies as a set of methods, which is the second characteristic. As modes of thinking and methods are critical for nodes, resources, as the third necessary characteristic, can support the operation of nodes. Nodes will deploy their actions with those conditions, so a structure of how to mobilise these conditions is in demand. The grid structure for deploying these actions can be infused by various forms of organisations, such as government bodies, firms, professional associations, and communities. Similar examples can be found in food safety policymaking in the European Union (EU). In the process of making food safety regulation policies to reduce institutional ambiguity and the dislocation of policy courses reflected by food safety incidents, such as bovine spongiform encephalopathy (BSE), the EU has increasingly focused on public interest and interconnected key actors involved in the practice of the food chain (Paul, 2012). Such networks are the main methods through which nodes can indicate their efficacy, just as the network in a new web-based market has been growing.

However, the nodes in co-governance may not fully guarantee the outcome of collective behaviours in gathering thoughts, methods, and resources to build a system to manage these factors on reducing risks; the outcome may be problematic without oversight from authorities. The regulatory authorities, as the leader of this arena, are critical in gathering the capacities of key actors in addressing problems caused by disordered behaviours amid market changes. Gathering these capacities means the regulatory authorities can access these capacities for precise decision-making followed by practice. The regulatory authorities achieve this by using their expertise in inspection, monitoring, and enforcement in exchange for problematic information from market actors and reports from society. In addition, the authorities are accountable for monitoring the behaviours of key actors and enforcing the rules of the arena to ensure order. In turn, the key actors have the right to ensure that the set of rules can adapt to changes in the market and report problems when the rules of the arena need amendment. The authorities need to oversee this process to guide the outcome of the collective behaviours of key actors in the arena of co-governance. The authorities can then also gather the outcome of

the report from these nodes for the analysis and assessment of emerging disordered behaviours. Hereby, the authorities can find a clear and credible direction to adjust the regulatory framework and then design, improve, or recede regulatory processes on particular regulatory objectives.

Apart from the report of key actors to authorities on the establishment of rules, these groups of actors also interact with each other through the network of grids in the shared and open arena when risks emerge from the new web-based market. Key actors deploy their resources, information, and knowledge through modes of interaction, including collaboration, competition, and coordination. In grids that circulate information, resources, and knowledge through nodes, different modes of interaction are available for key actors to choose from based on their identities and functions. Collaboration plays a central role in operating grids within the network of co-governance, and it takes place among key actors who reach a consensus to achieve regulatory objectives. Collaboration can be defined as interaction through joint activities based on formal or informal contracts to reach a consensus and enact certain issues, such as food safety as a regulatory objective (Bardach, 1998). In this interaction, key actors involved in certain issues can share elements such as information, resources, and knowledge through both formal and informal contracts to achieve agreed-upon solutions to certain issues. In addition, key actors also cooperate and compete within the nodes of grids in the network of co-governance to circulate information, resources, and knowledge and receive signals of disordered behaviours from key actors.

The first function of collaboration is to help identify key actors and ensure their interaction based on what they are qualified for and best at (such as providing information on food incidents). Gathering in certain nodes in shared and open arenas is the premise of such identification. Individual or organisational identities and the maintenance of such identities will determine the relationship in collaboration; in other words, the social capital demonstrated and maintained by individuals and organisations has confirmed the interaction mode in the relational dimension (Burt, 2000; Hatmaker and Rethemeyer, 2008; Jordana et al., 2012). Social actors, also mentioned by Ostrom in polycentric governance, can maximise their functions and identities in co-governance. For instance, consumer

organisations can interact with catering SME organisations by lodging their complaints about food safety, and catering organisations can interact with catering suppliers by demonstrating how to improve professional skills in food safety. In addition, on the premise of constantly improving rules in shared and open arenas, because the collaboration can be commenced through formal contracts, the authorities can oversee the process of collaboration and enforce the contract when the outcome falls short of expectations.

Collaboration can also build the capacity of the shared and open arena to enhance the nodes within it and the credibility of authorities in designing effective regulatory processes. In the context of a web-based market, nodes can come from various sectors and links within it. These nodes, which generate outcomes in the practice towards a common goal with possessed resources, including knowledge, technologies, and mentalities, can highlight the identities and specialities of their members and show each other their problems in collaboration. The extent of maintaining consistency and commitment to tasks and values determines the identity of members in nodes at the individual level. At the institutional level, the maintenance of characteristics is also critical to organisations in nodes because characteristics reflect their comparative advantages and the sector or type that indicates the origin of those organisations (Carlisle and Gruby, 2017). The collaboration within the nodes, then, can consolidate the capabilities of individuals and organisations to assist in improving their skills and the development of their systems to reduce risks and enhance their social capital. Furthermore, collaboration can help solve the problems of members in their own nodes by gathering thoughts, methods, and resources from other members to build a risk reduction system. In addition, nodes from other sectors and links in web-based markets can exchange their information, resources, and knowledge through collaboration to improve the supply chain of this new market.

Due to these behaviours, SMEs and online platform corporations, as critical actors in the web-based market, can benefit from their own nodes and also help each other across sectors and links to ensure the good functioning of the new web-based market. Consequently, the networks within or among nodes in the arena of co-governance can improve the experience of reducing risks and then attract more

members to join them for the same purpose. For example, in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), both private and public organisations involved in decision-making can exercise their influence with their resources to affect the activities in networks to reach agreements. Such behaviour can form nodes based on such agreements to show demand or make decisions so that members can manage the course of certain issues (Burris, Drahos, and Shearing, 2003). The collaboration of such key actors can possess more information, resources, and knowledge than the traditional market, and increase the capacity of the arena in co-governance to detect emerging risks as early as possible.

Moreover, the process of collaboration is also the process of reallocating governing functionalities and information through communication that is based on organisational identities and their comparative advantages. The reallocation of governing functionalities and communication through collaboration can also enhance the interaction of stakeholders by consolidating comparative advantages and organisational identities. Thereby, the collaborative mechanism can offer the analytical basis of the arena in co-governance for authorities on certain regulatory objectives, such as food safety. Furthermore, key actors can also constantly reduce emerging risks based on the collaboration they have achieved.

Other modes of interaction, such as cooperation and competition, take place among formal regulators, market actors, and consumers. Even though collaboration is the central mode, these modes can still be dispensable with. To solve problems caused by disordered behaviours in economic or social development, market actors, in consensus with regulatory authorities and social actors, need to improve their services or products on their own to compete with other market actors. Otherwise, if market actors cannot improve services or products alone, but have comparative advantages, they seek cooperation with each other. Moreover, choosing these modes of interaction is based on the capacities possessed by these key actors. Such modes of interaction are also approaches to achieving regulatory objectives for market actors themselves. Additionally, to ensure the progress of achieving regulatory objectives, key actors in co-governance also coordinate to adjust the circulation of information, knowledge, and resources, and the application of technology plays a supportive role.

Consequently, new regulation, interpreted through the lens of the co-governance concept, is the outcome of gathering and arranging nodes into grids that help reduce and simplify hierarchical regulation to reduce emerging disordered behaviours in an evolving economy. Moreover, new regulations give key actors in new web-based markets the space to have a voice in redesigning the regulatory process. Collaboration can identify the nodes of which actors can become members and be clear about their respective strengths and weaknesses in reducing risks. As these actors, within nodes or among nodes, can interact on how to work with their comparative advantages under the oversight of authorities, they can increase the capacity for regulation. In turn, these actors can constantly share what they can do best to reduce the emerging risks of a new web-based market.

In sum, the literature on regulation, both in concept and in practice, has depicted responsive relationships between the formal regulators, especially from government regulatory bodies, and the regulated firms, such as new market actors, including online catering platform corporations and the catering suppliers enrolled as online merchants. As the evolution of the new market has brought rapid growth, traditional regulation cannot just focus on the cycle from the awareness of problems to making and enacting compliance with rules for new problems. The tension between regulators and regulated firms is exacerbated in such a cycle. As the new market advances to meet consumer demands, a chasm has opened up between the traditional framework focusing mainly on compliance and the rapidly growing new market. Moreover, the literature on regulation still emphasises making and enacting rules through different models of the regulatory process, such as the RIT model and regulatory enrolment. As formal regulators do not have full information on food safety risks and are at a comparative disadvantage compared to market actors where information is concerned, especially monopolies, the rules and their enactment can be problematic and may receive passive compliance from market actors (Scott, 2001).

Co-governance, as an alternative to traditional regulation, means sharing the space of the regulatory process with other entities or actors involved in market activities and forming a new network in which key actors interact to reduce emerging problems resulting from the developing new market. This governance

fills the gap of regulation in making and enacting rules that receive passive compliance. Through co-governance, the formal regulators and the regulated firms, such as online catering platform corporations and suppliers, can interact for the common good, developing the economy while managing food safety risks instead of undermining the public interest by playing with regulatory rules.

Based on the regulation literature and the theoretical framework of co-governance discussed above, a qualitative methodology should be designed to study the course of changes in food safety regulations in online catering services in China. The methodology chapter directs the subsequent three analysis chapters to account for the information management problem of traditional regulation on physical catering businesses, the inability of traditional regulation to adapt to online catering services, and the development of a co-governance system that has changed the food safety regulatory framework for online catering services.

2.5 Research questions

Main research question:

How has food safety regulation changed to adapt to the food safety problems of online catering services in China?

Sub-questions:

1. Why did the regulation change in a new market, and why is traditional hierarchical regulation incompatible with the new market?

2. How do key actors in the new regulatory framework comprehend shared problems such as food safety breaches or crimes?

3. Why is participation from the state and societal organisations necessary in the new regulatory framework on the new market? What new relationships are created between these actors?

4. Through the analytical framework of the co-governance concept, how does the regulation accepting a horizontal and open structure address the complexity of the new market?

5. How do the key actors, especially private market actors and social actors, interact in the new regulatory framework by building a control system that accepts oversight and feedback?

To address these questions, multiple dimensions in the analytical framework of co-governance theory are presented to focus on how regulation is developed to cope with the changing market. Food safety regulations on online catering services in China are the case study used to verify such development. In this analytical framework, the problems and factors shared by key actors involved in the evolution of the economy or society need to be discussed in certain industries as this initiates the improvement of regulation. The roles of actors involved in food safety regulation determine who has joined in the change of regulation through the lens of the concept of co-governance. The roles of actors are clarified based on the essential elements that identify them, such as professional knowledge, information, and resources.

The agreed objectives are explained through a discussion of the legislation and its outcome among key actors. Laws, policies, and standards for improving regulation can explain the norms that actors have drawn up. The agreed-upon objectives lead to the interaction of key actors who choose their own suitable modes to shape their relationships for achieving regulatory objectives. Such modes are explained through the process of problem solving. How these actors gather their essential elements and which elements they have input in the change of regulation is explained through grids in the network of co-governance concepts, which then explain the interaction structure in their organisational and individual relationships. Whether the actors repeat the above process and how much they have done in the progress of changing regulations may explain their further adjustment.

Chapter 3: Methodology

3.1 Aims and objectives

This chapter outlines the methodology of this thesis. The first section describes its qualitative research design on co-governance in a case study of regulating online catering services in China. The second section shows how the primary data was collected through fieldwork. The last section discusses how the primary data was processed and analysed through the analytical framework of the co-governance concept.

3.2 The qualitative research design for studying the change in regulation through the co-governance concept

In the context of regulatory governance, this thesis aims to highlight the changing forms of regulation, from traditional, fragmented, and hierarchical regulation to a more holistic and horizontal model of co-governance. In theory, co-governance offers a shared and open arena or process led by authorities through which key actors involved in the change of social or economic behaviours can interact to address shared problems in such change. In coping with the new web-based market as part of the digital economy, the co-governance concept may have the potential to explain the change of regulation in this market and the process of this change in an alternative way. In this thesis, the food safety regulation of online catering services in China was selected as a case study to be analysed through the analytical framework of the co-governance concept. This analysis empirically tests the interactions among key actors involved in changing the structure of food safety regulation of online catering services. The research aim is to explain how regulation has been changed by exploring a co-governance theory and interpreting how the framework of food safety regulation on online catering services has changed in China.

This research design follows an inductive approach to testing a theory via the collected data. Hence, this thesis adopts a qualitative methodology, in which grounded theory is one of the important methods for discovering and verifying theories, hypotheses, concepts, and propositions through analysing data directly. It should be noted that the co-governance concept in this thesis is an initial theoretical

idea discussed in the literature review. Thus, to complete the co-governance concept as a theory from the ground up, the constant interaction between this concept and the data is iterative, and more details will be analysed and given in the next few chapters. This method is applicable in the study of co-governance as a concept by interacting with the data in the case of food safety regulation on online catering services.

Grounded theory focuses on generating or discovering theories in the process of interacting with collected qualitative data directly, and it is iterative. The essence of grounded theory is to ensure that theory and data can fit with each other as closely as possible (Antonsich, 2008; Bryman, 2012). In this theory of methods, researchers can verify new theories through constant comparison between concepts and data. Based on concepts developed from such initial data analysis, researchers can seek to collect additional qualitative data based on existing data. Constant comparison means that the researcher analyses data while coding to develop concepts and then refines concepts by comparing data. Selecting new cases helps to expand or further refine concepts and theories (Taylor et al., 2016). To generate and verify theories, the researcher needs to collect data, develop concepts based on the data, check whether the data is related to this concept and whether extra data is in need to support such concepts, and confirm the concept under study.

Grounded theory can pin down how theory is generated via the data interacting with a concept. It is then necessary to design the process of interaction between the concept of co-governance and data. The co-governance concept aims to explain how regulation is changed into a more horizontal structure, and this change is based on problems from the changes in the market, which impact key actors involved in such change. Furthermore, in this concept, multiple groups of actors impacted by problems interact with each other through an open arena designed and hosted by authorities to address such problems. Thus, data needs to be collected based on problems in the change of market and key actors involved in such change, but impacted by these problems. Consequently, three variables of data, including the perception of problems and the factors that lead to an impact on key actors, the design of a regulatory framework in response to the impact of addressing problems, and the practice based on the designed framework, are considered for comparison

with the co-governance concept.

In grounded theory, a case study, such as interpreting the food safety regulation of online catering services, is needed to discuss the co-governance concept. In the case of regulating the food safety of online catering services in China, it is necessary to present factors that lead to quality problems in the digital economy. The rapid growth of the digital economy is transforming traditional industries, and it has propelled digital platforms and suppliers enrolled online to increase their supply. Such growth, focusing on increasing supply without proper internal control capacity, leads to quality issues, such as food safety problems in online catering services. In the change of market attributed to the digital economy, the quality issues for the key actors involved in the change of market, including market actors, regulatory authorities, and consumers, impact the traditional regulatory framework. The factors leading to this impact include quality control in market activities amid the rapid growth of digital economy capacity and the adaptability of traditional regulation to the outcome of such control. Studying the change of regulation through the lens of the co-governance concept helps to interpret the phenomena in regulating the problems amid the change of the market. Such interpretation requires data categorised by the problems caused by the change of market and the factors in such problems impacting key actors, the perception of key actors of such problems and factors, the design of a new regulatory framework, and their interaction for addressing problems in the chosen case.

The first category of data is how the key actors share their understanding of such problems, how these problems impact key actors, and the factors leading to such problems. It can be assumed that different key actors have different perceptions of shared problems and the factors leading to the impact on key actors due to their knowledge, resources, and information and their abilities and willingness to deploy these as their capacities (Hood, 1991; Verbruggen, 2015). For example, by regulating the food safety of online catering services, safe food helps maintain individual and population health and improve standards of living; thus, concerns over food safety and relevant issues are also health issues. Furthermore, an unsafe food supply means not merely a disease burden but also an economic burden on society. Formal regulators, therefore, view food safety through a

legislative regulatory framework based on expertise in microbiology, chemistry, personal hygiene, and environmental hygiene.

As for proprietors in catering businesses, online catering services have become an opportunity for them to innovate and gain more profit in a new market; food safety becomes a secondary matter for them unless formal regulators require their compliance. Consumers regard online catering services as services that may entail food safety problems but that are convenient for their daily lives. Consequently, they may develop their own skills in finding safe products online based on their personal experiences rather than professional knowledge. The understanding of food safety of this group is highly contingent on experiences and the individuals influencing it. Through these perceptions and combining them with the institutional arrangement and the practice of food safety regulation, the data was collected and then compared with the factors correlating to the adaptability of regulation on the quality problems amid the changes in the market.

Second, after the problems regarding the changes in the market and the factors in such problems leading to the impact are presented, this thesis needs data about how key actors design the new regulatory framework in response to the problems caused by the changes in the market and the factors leading to such problems. Key actors are assumed to have diverse capacities at the level of rulemaking and restructuring in such a changed framework. Moreover, these capacities are interconnected based on the weaknesses of key actors when they address problems alone; thus, they gather capacities into the new regulatory framework to address problems based on such interconnections. The formal regulators lack market activity information, which is possessed by digital platforms, to prevent market failure. Digital platforms need quality control, which can be built with the help of formal regulators to maintain the well-functioning of services. Consumers need education on quality control and channels to provide their feedback that are opened and run by formal regulators and the digital platforms. The data came mainly from official documents about the change of regulatory framework, the capacities of key actors involved in this framework, and how their capacities were interconnected to address the problem together. The data was compared with these dimensions.

Third is what key actors have done to ensure that they have put the agreed-upon

change of regulation into practice. In practice, the change of regulation deploys the capacities of key actors based on their roles and ensures their interaction to address problems from the change of the market, based on the designed framework. The key actors interact based on their interconnected capacities through a process of addressing shared problems, including problem discovery and disclosure, problem management, and problem feedback. Furthermore, these diverse capacities, interconnected at the level of rulemaking and restructuring of the regulatory framework, need to be put into practice; thus, interaction modes are required to test whether the interactions are in effect. The data was collected based on such criteria and compared with these dimensions.

Quality problems caused by changes in the market and their impact on regulation are complex and have incorporated multi-faceted concerns. Therefore, the design of the methodology must ensure that as many facets as possible can be included in the research design. Thus, this thesis adopts qualitative research, and its data collection is based on the interaction between data and concept to explain how these key actors interact with each other and their activities, and how they perceive the issues in these interactions to generate and verify the co-governance theory. This research design adopts a case study based on two cities in China.

One city, City A, was selected as the main case. Another city, City B, was selected as the shadow case. The data from City B was used as supporting evidence to verify the findings of City A and give breadth to their understanding. This case study was chosen to examine how much the food safety regulation of online catering services has changed in China. The design of the case study here focuses on how online catering services are regulated in major cities in China; thus, one city is the leading case, and the other, with similar conditions, is the supplement to interpret what has happened to food safety regulation in China. In China, the administration of food safety regulation has four levels: central government regulatory bodies, provincial government, municipal government, and county government. In addition, there are also municipalities under direct leadership from the central government, such as Beijing (the capital), Shanghai, Chongqing, and Tianjin. These municipalities have their own access to make local rules to administer food safety laws at the same administrative level as the provincial

government. City A is the capital city of one southern province in China. Hence, as a city where both the provincial government and the municipal government are administrating food safety regulation at the provincial and municipal levels, the role of City A is special in fulfilling the responsibilities of local food safety regulation and coordinating with the provincial administration. City B is one of the municipalities led directly by the central government; thus, it has provincial access to administer food safety regulations, but its regulatory situation is at the local level. The special situation of both cities means they have the flexibility to innovate in food safety administration, especially in coping with new web-based markets, such as online catering services.

Public policy research on public policies in China is not easy, because it depends on the personal connections of the researcher with local participants. The data from observations and interviews were collected from local regulatory authorities, market actors, and consumers in City A via interviews and non-participant observation. City A was chosen because the researcher used to live in this city and has sufficient connections. In addition, City A was chosen due to its representativeness, as it is open to different cuisines from all over China and overseas, but still adheres to its local traditional cuisine. City A is the capital of one of the provinces in China with a population of more than 18 million, and its size is 7,434 km^2 with 11 administrative districts. City A has a traditional local cuisine that has a great influence on the dietary habits of its residents. In addition, other cuisines are also welcomed in this city, but the local cuisine is still in most favour.

Food safety regulations in City A mainly follow a regulatory process at the national level. Such conditions give City A strong diversity; thus, it is an appropriate city for the case study. In addition, the researcher has personal connections in this city, so City A is the core case. However, although the other city, City B, has a similar situation as City A, it is harder to conduct fieldwork there because the personal connection of the researcher in this city is weak and consequently, it was not so easy to access interviewees, especially those from the local government and the proprietors of online catering services. The officials of regulatory agencies and the food safety managers of online catering platforms in this city were unwilling to attend interviews, making excuses such as

confidentiality. This is why City B became a shadow case, not a full case study, but it can still verify the findings of City A from the interviews with consumers and the observations of catering suppliers. Hence, only interviews with consumers and observations of catering suppliers were conducted. In addition, interviews with scholars and journalists on food safety were conducted in City B. The data from the interviews and observations in City B, as the supporting evidence to City A, was used to test whether the analysis of categories of collected data shared similar outcomes to verify how specific the findings of City A were.

For this research, participants of City A were selected from local universities, enterprises, regulatory officials, proprietors of catering businesses, and the digital industry. The participants from universities and enterprises were consumers who were busy with study or work and frequently ordered takeaways from online catering platforms. In total, 21 consumers were interviewed. Three regulatory officials, due to their occupation as inspectors at local regulatory stations, were the participants who inspected and monitored proprietors of online catering services. Ten proprietors of online catering services were interviewed, as they control food safety directly. Two managers responsible for controlling the quality of food safety information from those proprietors were interviewed. These participants were contacted through social media, such as WeChat. In addition, the participants in City A helped the researcher to find other participants through their personal connections.

The data in City B was collected from the interviews of 11 consumers, one media worker, and one local scholar, the speeches of two food safety managers from local enterprises during a local conference including digital platforms, one regulatory official from a local conference about food safety, a local food safety report compiled by the local regulatory authority, and non-participant observation of 11 local catering proprietors. Both City A and City B share similar complexities in food safety regulation. Samples from City A included key actors from the regulatory authority, market actors, and consumers. This means that data from City A constituted the main part of the analysis. The data from City B provided a supplement to this analysis at the macro level. Due to the direct leadership of the central government, the regulatory process and activities of City B represent the

tendency of the most common regulations in China, instead of being more experimental. City B shares the same complexity of the regulatory situation as City A. City B is a municipality under the direct leadership of the central government, with a population of 25 million, and its size is 6,340 km^2 with 16 administrative districts. It has multiple cuisines, not just local but also from other regions in China and overseas. The local food safety regulation, in consequence, is complicated. Thus, the food safety regulation in City B has more discretion in making its own regulatory process than following the national regulatory process. Thus, the local regulatory authority of City B has made its own policies for food safety regulation as well as following policies acceptable at the national level.

Additional data was collected from the internet. The first were official documents, such as food safety laws, food safety regulation five-year plans, food safety policies, and food safety standards from the central government. The report documents of concentrated nationwide food safety inspections were also included. Second were industrial reports and analyses about food safety from digital platforms, as well as commercial reports from professional consulting firms that provided an analysis of how the food industry will be developed and suggestions for food safety. The last source of textual data was from mass media, which provides news and comments about food safety concerning authorities, market actors, and consumers.

Table 3. 1 The number of participants in the fieldwork

Categories of participants	**City A**	**City B**
Consumers	21	11
Officials from local regulatory agents	3	1
Local catering suppliers	10	11
Food safety managers from online catering platforms	2	2
Scholars	0	1
Media worker	0	1
Total	**63**	

City A is the main case for this study due to being more accessible thanks to the personal connection of the researcher of this study. It was difficult to contact participants from the local government in City B because the local regulatory officials were reluctant to grant interviews without permission from the local government. Hence, City B was used for supplementary description at the macro level during the analysis. Overall, during fieldwork conducted for the thesis, the researcher interviewed 63 participants, including consumers and local regulatory agents, who were involved in the regulation and delivery of food safety in City A and City B (see Table 3.1).

Looking at another dimension, based on the groups of key actors, the first group that was interviewed was the governmental regulators, who are the representatives of public regulation in the hybrid food safety regulatory system. Government officials from government regulatory bodies were asked whether online catering platform corporations can comply with the enforcement and monitoring of formal regulatory processes, whether suppliers in online catering services can comply with the regulatory process, especially during enforcement, and whether government bodies can receive and handle food safety incidents efficiently. Five interviews were conducted in both cities with officials at the subdistrict level from local food safety regulatory authorities. These officials work at local regulatory stations, and they lead the inspection and monitoring of catering businesses in their administrative area.

The data of market actors was collected through interviews and observation. One group is food safety managers from online catering platform corporations, and the other is proprietors of local catering stores. The online catering platform corporations were the first to be investigated, focusing mainly on setting hygiene standards for the regulation of implicit hygiene issues, which led to trust issues, the relationship between innovative business models and hygiene problems from the supply and demand side, the perspective from such market actors about online catering food regulation, and whether the social intermediaries as an incorporated function in corporations can be effective in the regulatory process. Four interviews were conducted in both cities.

The next group that the research focused on was the market actors of physical

suppliers: the physical catering SMEs. In this project, the focus was on online catering platform corporations as new intermediaries, converging stakeholders into a regulatory community. Such intermediaries can presumably be embodied as empowered institutions or emerging functions incorporated into governmental regulators and online catering corporations to ensure food safety in online catering services. As catering SMEs are the physical proprietors that process and produce takeaway products, they are critical regulatory targets. The exploration of this group showed that the online catering platform corporations as new intermediaries enhanced their efficacy in the regulatory process of food safety regulation online catering services (He et al., 2016). More than 20 catering stores were visited and observed within six months. Catering suppliers in City A were observed between February and the middle of March 2019. Catering suppliers in City B were observed between the end of March and the beginning of June 2019. The researcher visited these stores during their opening hours and ordered dishes, checked the licences of these stores, observed kitchens, and then asked questions about how they ensured food safety.

The last group that the thesis focused on was consumers of online catering services. These participants were customers who received services and gave their feedback to catering suppliers, online platforms, and regulatory bodies, including governmental regulators. In total, 33 consumers from both cities participated in in-depth interviews about their experiences with online catering services and their opinions on the food safety regulation of this new evolving market. Consumers were selected based on whether they were used to ordering takeaway online, and they were contacted through WeChat, one of the most popular social media sites in China, to arrange interviews with them.

The investigation of these participants provided data on what participants experienced in the complex activities within a new web-based market based on essential elements, including identities, resources, knowledge, and information of their groups involved in regulation, and how they experienced the change of regulatory framework, based on their answers to interview questions. Furthermore, multiple data sources from data collection methods helped to assess the existence of relationships among these groups and the collaboration among them. Through

the data analysis of City A and City B across the settings of these groups, the researcher examined the effectiveness of co-governance as a mechanism for regulating complex online catering services and examined whether co-governance has changed the food safety regulation of online catering services.

3.3 Data collection methods

The primary data was collected from the abovementioned target groups through fieldwork using three methods: semi-structured or unstructured interviews, non-participant observation, and document analysis. The purpose of data collection was to check how relationships between regulators, online catering platform corporations, catering suppliers, and consumers were developed, and what these relationships were. These key actors were the main targets for collecting primary textual data from online catering platform corporations, such as Ele.me and Meituan in China. In addition, statutory policy documents were collected and analysed.

During the fieldwork, the first step was to contact potential interviewees from multiple areas relevant to online catering services. These groups included consumers, owners, or managers of catering suppliers, managers from online catering platforms, and inspectors from the local governments. The next step was to interview and observe these groups and gather documents from websites involved in food safety regulation on online catering services. Interviews, participant observation, and document analysis were the main methods used to collect primary data at this stage. Semi-structured interviews were conducted with formal regulators, such as officials from the State Food and Drug Administration (SFDA) or the recently amalgamated State Administration for Market Regulation (SAMR), online catering platform corporations with other relevant suppliers, especially SMEs, consumers, and people from media and higher education. Observation of the catering suppliers also took place in City A and City B within six months. During this period, document analysis was also conducted online.

3.3.1 Interviews

The interviewees came from several categories, including government officials such as local food safety regulation inspectors at the subdistrict level who are responsible for implementing food safety regulations, managers from online catering platforms, catering suppliers, and consumers. Government officials are the most critical actors in the food safety of online catering services, as they are responsible for making mandatory policies and standards, enforcement, and monitoring whether market actors have improved their food safety practices or not. Managers responsible for checking food safety information quality from online catering platforms have direct contact with local catering suppliers, and they are responsible for ensuring the capability of providing safe service from these physical suppliers through review and verification. In addition, online platforms possess rapidly increasing information about services for intermediation with consumers and deliver services based on such information. It matters whether platforms can truly introduce service information to consumers and deliver a service that is consistent with such service information. Catering suppliers are directly responsible for food safety, and their food safety practices determine reactions from both government officials and online catering platforms. Consumers are the basic recipients of online catering services, and their reaction matters to the practice of catering suppliers, the regulatory process by government officials, and the management of online catering platforms. Consumers' reactions show whether they accept the performance of other key actors.

Unfortunately, there were difficulties in data collection. The first came when contacting interviewees from government bodies. This step was difficult because most of them had limited time, and it was difficult to access them without some connection to them. Interviewees from online catering platforms and suppliers were the next groups that were difficult to contact. These interviewees were not familiar with the research, and they may have worried about their information security breaches and reputations. To overcome this difficulty, the collected information was anonymised, including the names of the cities and the names of the interviewees. Social media, such as WeChat, were utilised to contact interviewees from the groups of key actors. In China, WeChat has become the most

popular social network APP that residents use during daily life, including family affairs, work, entertainment, and trade. This social network APP is the most efficient tool to contact participants. The food safety conferences were taken into consideration for recording the lectures of relevant key actors on food safety regulation and for contacting other potential interviewees from these groups. In City A, the government officials, especially two inspectors of the local government, were contacted through personal connections, and they agreed to be interviewed. In City B, the researcher did not have any personal connections with the government officials; thus, they had to be contacted during food safety conferences. The speech of one official about how City B had put new regulations into practice was recorded at a conference of food safety regulation. To solve such an issue of contacting interviewees, City A was selected as the critical case to be studied, and the participants of City B interviewed and observed were regarded as the side evidence to the case of City A. The collected data of participants from City B were based on the parameters set for the case of City A, but these participants were not in City B because they were interviewed online through WeChat. Two food safety managers of online catering platforms in City A were contacted through local government inspectors. In City B, two food safety managers from online catering platforms were contacted at a food safety conference. The 32 consumers in both City A and City B were contacted through social media, such as WeChat, or through the researcher's personal connections at local universities. One scholar on food safety regulation law and one manager of food safety media were also interviewed, and their answers became the background of food safety regulation in China.

Interview format and interview questions

Semi-structured interviews and unstructured interviews were the main methods used to collect primary textual data before the analysis of online catering services' food regulatory networks of online catering services. The main aim of the interviews was to understand the identities, relationships, and behaviours of these key actors and how they are changing the regulatory framework through their activities. The identities pinpointed where different key actors can act and excel in the food safety practice of online catering services. These relationships help these actors to understand how they can collaborate with each other based on their

identities, resources, knowledge, and information. The behaviours of key actors can show what these actors are good at in food safety practice, what they can improve to maintain collaborative relations, and what they can provide to help improve the rules on reducing emerging risks from online catering services.

As for formal regulators, officials from the local Food and Drug Administration (FDA) or the recent Administration of Market Regulation (AMR) that was established in 2019 were interviewed. The focus of the interview questions was on monitoring, enforcing the law, reviewing, and evaluating the regulatory process led by state actors. In terms of online catering platform corporations, the employees and managers were another key group that was interviewed about how they manage the risk control process and how they perceive the role of social intermediaries under the legitimate circumstances of co-governance. Catering suppliers, enrolled as online merchants on the online catering platforms, were the next group interviewed. The questions for this group were mainly about the safety practices of these suppliers. Consumers, as a vital group receiving online catering service consumption, were the last group to be interviewed. Consumers of online catering products are mostly college students and working people. Thus, 32 interviewees selected from college students and working people were interviewed. The main task of interviewing this group was to collect feedback regarding online catering products and their perceptions of food safety regulations. One manager from the food safety media and one scholar on food safety regulation were also interviewed to confirm the general situation of food safety regulation in online catering services in China.

Interview locations

The search for practitioners in both formal regulatory agencies and online catering platform corporations was a major task in this research process. In this process, whether participants were contacted depended on the personal connections of the researcher; thus, social networking played a key role in ensuring that the researcher could contact participants efficiently before conducting the data collection. As for online catering services in China, relevant practitioners were located through email and social media, such as WeChat. The identification of these individuals also helped with finding other practitioners to interview, both in online

catering services and formal regulators.

Two cities, A and B, were selected for fieldwork. China is a large country with diverse cuisines and diet habits. Hence, City A was chosen due to its representative reputation, which is open to different cuisines from all over China and overseas, but still adheres to its local traditional cuisine. City A is the capital of one of the provinces in China with a population of more than 18 million, and its size is 7,434 km^2 with 11 administrative districts. City A has a traditional local cuisine that has a great influence on residents' diet habits. In addition, other cuisines are also welcomed in this city, but the local cuisine is still in most favour. Food safety regulation mainly follows regulatory processes at the national level. Such conditions give City A strong diversity; thus, it is an appropriate city to do the case study on. In addition, the researcher has personal connections in this city; thus, the case in City A is the core case.

However, the next city, City B, which has a similar situation as City A, was hard to conduct fieldwork in because the personal connections of the research in this city are weak. Hence, the data from the interviews and observations in City B are supportive evidence for City A. City B is a municipality under the direct leadership of the central government, with a population of 25 million, and its size is 6,340 km^2 with 16 administrative districts. It has multiple cuisines, not just the local one, but also from other regions in China and overseas. The local food safety regulation, in consequence, is complicated. Thus, the food safety regulation in City B has more discretion in making its own regulatory process than following the national regulatory process. One district in each city was selected. Most interviews have been recorded at restaurants, café, universities, and the offices of local food safety agencies. Some interviews are recorded online or through phone calls.

3.3.2 Observation

In the field research, non-participant observation was the next step in checking respondents, especially catering suppliers. The rationale behind this method is to collect descriptive data from field research during social interaction with formal regulators, online catering service platforms, and physical catering SMEs (Taylor et al., 2016). Food safety regulation in online catering services is a challenge for

the traditional regulatory regime, which includes formal regulators like the China Food and Drug Administration (CFDA) or the recent SAMR, accreditation institutions such as Eco-Lab and Intertek with reviewing, certification, and verification functions, and other professional organisations such as the China Hospitality Association.

Government officials were observed during their inspection of catering suppliers at food outlets. Two inspections, one for each city, were observed. The inspection standards and methods in both City A and City B were similar. Officials in the two cities were contacted in different ways. The observation was designed not to interfere in the activities of the catering suppliers and government officials; thus, the observation was passive, and the researcher was the bystander in the process. The kitchens of these suppliers were the critical content under observation.

In City A, the observations were arranged with local government officials after the interviews with them. The observation in City A was a passive one, while the researcher was the bystander watching the process of food safety inspection and enforcement of catering suppliers in an outlet. This observation took more than two hours, including asking some simple questions and watching inspectors guide proprietors on food safety practices. More than ten suppliers were observed. The kitchens of these stores were mostly open as they are behind transparent glass-fronted windows; thus, it was easy to see how the kitchen staff were working and whether they might act incorrectly when processing ingredients and cooking. Questions were asked and answered by the owners of those suppliers during the observation.

This situation was the same in City B. In City B, there was just one difficulty from the local government, as government officials did not agree to a formal observation. The observations were carried out by the researcher alone, but still in a passive way. More than ten local catering suppliers, mostly from an outlet, were observed. The same questions as in City A were also asked, and these suppliers were publicly observed. During the observation of catering suppliers in City B, catering suppliers were observed through daily consumption instead of being concentrated on, as in City A. These suppliers were visited, and questions about food safety management were asked. Notes were taken during the observation in

both cities, such as whether the kitchen was clean and transparent to consumers, whether the staff cleaned their stores regularly, and whether they displayed their food safety grades, permits, and licences in conspicuous positions.

Participant observation was another observation from the viewpoint of the researcher, but it was a review of the user experience. Online catering platforms were visited online to check how safe the suppliers enrolled as online merchants were, based on whether they had scanned and uploaded permits, licences, food safety grades, clear, accurate and authentic pictures of physical stores, ratings from consumers, and food safety promise labels given by platform corporations.

Thus, during the process of observation, those groups were observed to see how they handled food safety practices and regulatory activities. During the observations, the researcher gained permission from officials of the local food safety regulatory authority to watch how they inspected local catering stores, had a group conversation with these managers of these stores for information about their food safety practice, and checked their stores in the field, such as the storage of ingredients, food processing, and working environment. Notes were taken in the process of observation to record the administrative activities of inspectors from local regulatory agencies, the operation of proprietors of local catering stores, and the reaction of consumers to food safety issues. The purpose of this method was to examine the relationships among key actors in the food safety of online catering services and to find whether the behaviours of interviewees were consistent with their answers.

The observation of formal regulators, online catering platform corporations, catering SMEs, and increasingly socialised consumers illustrated the relationships and interactions among them on the issue of food safety in the operation of the online catering service model in new regulation systems, especially the hygiene problem as the most urgent one.

The process of non-participant observation also collected event data from food scandals that had happened in the past, checking the behaviours of different actors and the reasons behind those behaviours. This step helped to outline both the structure of online catering services' food safety regulations and the relationships

between various actors.

3.3.3 Document analysis

The purpose of the document analysis was to compare the rules made by stakeholders in online catering services with their behaviours. The documents include the five-year plans for food safety, the project of improving the service quality of the catering business, national reports on the catering business, the Electronic Commerce Law, the Food Safety Law of 2009 and its amendments in 2015 and 2018, Food Safety Law implementation rules, food safety compliance policies on online catering services, national operation standards for food safety of catering businesses, and industrial standards for delivery services. These documents can be extracted and viewed from the websites of the State Council, the Ministry of Commerce, the State Administration of Market Regulation, the local administrations of market regulation, and the industrial associations. Food safety management documents and industrial reports of online catering services were extracted from the service websites of online catering service platforms. Other information, such as reports on food safety news in online catering services and measures of both government and platform corporations, was viewed through media websites as supporting textual data.

3.4 Data analysis

After the collection of primary data, the next stage was the analysis based on the analytical framework of co-governance to explore the change in the regulatory framework on the food safety of online catering services. The data was organised by archiving the answers of participants in the fieldwork by using qualitative analysis software named NVivo. The answers were coded through the categorisation of key actors involved in food safety regulation, including regulatory officials, market actors of online catering services, consumers as critical actors, and participants from media and academia as supplementary actors. The answers from the interviews with participants were categorised based on their group identities and cities. The interaction modes among key actors in co-governance were tested through a comparison of the answers from these interviewees. The keywords in the interview questions and answers from each group of key actors and the notes of

observation were selected for coding. In the group of formal regulators, keywords included the change of laws, policies, and standards; relationships with proprietors, digital platforms, and consumers during regulatory activities; methods amid regulatory activities; education of quality control; and feedback. In the group from the digital platforms, keywords included measures of quality control, relationships with formal regulators and physical suppliers, training of quality control for physical suppliers, and a redressing mechanism on feedback. In the group of physical suppliers, keywords included direct quality control, frequency of cleaning and disinfection, and training. As for consumers, keywords included the process of choosing products, criteria for choosing products, concerns over quality problems, the reaction to quality problems, the outcome of giving feedback to formal regulators, physical suppliers, and digital platforms on quality problems, and education on the quality of products.

Specifically, in the case of online catering services in China, the coding of answers from regulatory officials is based on what capacity they have to cope with online catering services, what they have done when regulating online catering services, how they inform market actors and consumers about food safety and receive their feedback, and whether the change of regulatory authority has improved the situation of law enforcement. The coding in the group of market actors was based on how the food safety information was managed by the platforms, how the internal food safety information control works to cope with food safety incidents, how data exchange and comparison with local authorities work, and how feedback from regulatory authorities and consumers is processed and addressed. The coding in the group of consumers focused on how consumers choose products, what food safety is to them, whether they have encountered food safety problems and how they have reacted to these problems, how they access food safety information, and whether they have given feedback to market actors and local regulatory authorities. As for the observation data of catering suppliers, their coding was based on how they put internal food safety control into practice, including compliance with local regulatory activities. Such coding was tested through an analytical framework of co-governance to explore whether the answers and behaviours of key actors conformed to interaction modes of co-governance.

Based on the concept of co-governance, the data analyses looked at how regulation has changed by presenting the case of online catering food safety in China. It is necessary to understand the shared problem that is impacting and bring the key actors involved in regulation together. The process of constructing the analytical framework based on this concept is difficult because the relationships between key actors are dynamic and constantly evolving, which the researcher needed to capture adequately. Hence, the strategy for studying the change in regulation through the concept of co-governance needs to be outlined. The first step was to locate the conceptual problems of the regulation literature. The purpose of the conceptual study of regulation is to point out that hierarchical regulation cannot adapt to rapidly changing market activities to reduce emerging risks. The review of regulation literature, then, suggests that co-governance matters in improving regulation in the context of new web-based markets. Co-governance can include key actors rather than creating antagonistic relations. Second, a definition, the features, a working mechanism, and a developing process constructed the theoretical framework of co-governance to explain what co-governance is, what makes it significant in improving regulation, and how it works. Next, an analytical framework, based on the theoretical framework, was built to analyse the primary data collected from the fieldwork.

Once the gathering of primary data came to an end, it was followed by an analysis from multiple perspectives. The data from documents, such as policy documents and standards related to food safety regulation and internet-based food regulation, were the secondary data. Since grounded theory is the basic strategy focusing on collecting, collating, and analysing primary data, the data from documents is used to trace how the regulatory framework has been changed in the dimension of institutional arrangement. Such data provides additional evidence for the comparison between the concept of co-governance and the data (Taylor et al., 2016). Analysis of that data tests:

What are the problems and the factors leading to the impact on traditional regulation that motivates the change of regulation?

Who are the key actors involved in the change of regulation?

How do key actors reflect their identities and advantageous elements, such as knowledge, resources, and information, in reacting to common problems in an evolving economy?

How are these elements, or capacities, interconnected in a new structure of the regulatory framework?

What system have key actors built through regulatory instruments, such as legislation, policies, and standards, and put into practice through enforcement?

How do key actors choose to interact to address problems as a whole?

Do key actors repeat the process to improve regulation?

The relations of the key actors involved were complicated due to changes in the regulatory framework. As the new web-based market has brought emerging risks, food safety regulation needs documents about the development of regulatory processes from multiple government bodies. Tracing this change in the regulatory framework is difficult because the framework is constantly evolving due to the changes that are happening in the market. The critical criterion in dealing with these difficulties is how to categorise multiple relationships among different groups of key actors in the context of web-based markets, such as online catering services. Based on the analytical framework of co-governance developed in this thesis, the analysis of the relationships between key actors is partially based on government food safety websites, regulatory body websites, social media, and the websites of online catering platforms.

Conclusion

In this chapter, a qualitative methodology was applied to this research, which was designed based on the constructivist grounded theory strategy. As participants may have different perceptions of food safety risks from their own social backgrounds, interviews, observation, and document analysis were the main methods used to collect data from fieldwork. The difficulties in contacting participants, especially participants from official backgrounds, were mitigated by the researcher's personal connections to local regulatory authorities through

contacting friends, participation in food safety conferences, and observation of the behaviours of proprietors. Since the answers and speeches from participants might not be as standard as expected, the gathered data needed to be deconstructed and categorised based on an analytical framework. Thus, qualitative analysis software was used to categorise textual data from interviews based on the backgrounds and habits of key actors in food safety regulation and to interpret the data so that the analysis could proceed. In addition, understanding the relationship between regulation and co-governance and the relationship among key actors involved in food safety regulation was also important. Hence, in the discussion about regulation literature, it has been conveyed that hierarchical formal regulation cannot work alone, as the market itself has been evolving and the web-based market is the outcome. Thus, co-governance, which might provide a horizontal structure among key actors involved in a new market, could improve the existing regulation by including new market actors. Based on this understanding, an analytical framework could also be created to examine what has happened in the development of food safety regulations in China.

This structure examines whether co-governance in practice can change hierarchical regulation. This depends on how key actors construct relationships to report problems, achieve consensus, make new processes to address such problems, interact with each other, change behaviours, and then repeat this cycle for improvement.

The next three chapters analyse a case study of the food safety regulation on online catering services in China through the analytical framework presented in the literature review chapter. Chapter 4 analyses the problem and its factors leading to the impact on key actors in regulation by depicting the status of development in SMEs between 2011 and 2016, the key actors impacted by this problem and the root causes of such a common problem. Chapter 5 analyses the new regulatory framework as a response to shared problems, which is the basis of changing regulation in practice, and what relationships and structures among key actors are formed. Chapter 6 analyses the interaction modes they have chosen to address such problems based on the problem-solving process, including problem discovery and disclosure, problem management, and problem feedback for improving regulation.

In addition, the interpretation of documents such as laws, policies, and standards based on the concept of co-governance shows the variation in food safety regulation in China from 2011 to 2019. This variation is the narrative thread running throughout these analytical chapters.

Chapter 4: Traditional Food Safety Regulation, the Development of Online Catering Services, and Food Safety Problems

4.1 Introduction

As discussed in the literature review, the co-governance concept contributes to viewing the change of regulation as the one that interconnects diverse capacities of key actors to comprehend the shared problems from the change in the market and the factors that may lead to problems, responds to these problems, and then deploys them within a more open and horizontal structure for addressing these problems via guiding market. Hence, applying the co-governance concept, this chapter defines the shared problems that impact key actors, including formal regulators, market actors, and consumers, and then analyses the factors that lead to such problems. The necessity of changing traditional regulation is presented by explaining its limitations in the analysis. The food safety problems and the factors leading to such problems in the case of the food safety regulation of online catering services in China are introduced as the case for analysis.

The key issue is embodied in the inherent problem of catering businesses as a traditional industry and food safety regulation before recent reforms that tried to manage food safety problems from small and medium-sized catering enterprises (SMEs) in China between 2011 and 2016. First, catering SMEs themselves were insufficiently trained and invested in food safety management; thus, this situation led to the poor food safety practices of these market actors. Consequently, such poor food safety practices led to a failure to comply with food safety regulations. Furthermore, the growing need for mass catering has led to the rapid growth of large numbers of new catering suppliers. SMEs, as the main force of catering suppliers, retained this inherent problem, which was then exacerbated by the rapid development of online catering services. At the same time, the traditional regulatory framework of food safety follows the rigid and inflexible legal system, statutory policies and standards, government body setup, and pattern of enforcement. Under such circumstances, the traditional regulatory framework lacks the resources and flexibility to deal with this rapidly growing market.

Government bodies as regulatory authorities have been putting efforts into managing food safety from catering SMEs, but such controls are difficult without sufficient information from the SMEs. Gaining comprehensive and authentic food safety information about catering SMEs was difficult for regulatory authorities due to a lack of compliance. Based on the empirical problem and its factors above, the co-governance concept suggests that key actors seek to address the shared problems that impact them in the changing market together, but such problems and their factors need to be clarified. Defining a shared problem, or a public problem, leading to a change in regulation matters when studying how the co-governance concept explains the changes in regulation. A shared problem means a clear and concrete statement of the problem to be solved (Noveck, 2021). Thus, in the context of the rapid growth of a new web-based market through a network structure, the shared problem, such as food safety regulation in online catering services mentioned in the literature review, can be regarded as a service quality problem. These factors need to be clarified when defining and analysing such a problem (Dewey, 1986; Farra, 1988).

Web-based markets have created challenges in terms of the quality of products, and traditional regulation has found the quality of products in this market difficult to control. Hence, the root causes of these shared problems are twofold. The first is the inherent contradiction between quality control and the increase in market actors in traditional industries exacerbated by the digital economy. The second is the inherent dilemma of traditional regulation in covering as many increasing market actors as possible, but with a limited capacity based on imposing formal rules on market actors. In addition, consumers caught between the market and regulatory authorities are highly aware of problems in terms of the quality of service. Such a shared problem caused by the two factors above, in the co-governance concept, impacts key actors, including regulatory authorities, consumers, and market actors, and then leads to difficulty in regulating this market. Challenges in the quality of service in the context of a complex, web-based market have led to pressure to create new types of regulation.

Hence, this chapter argues that rigid and inflexible traditional regulation has a limited capacity to regulate rapidly increasing market actors effectively, especially

in the era of the digital economy, such as online catering services. The reasons are that these market actors, in order to meet growing needs, neglect service quality, and the speed with which they enter and exit the market leads to the difficulty for regulatory authorities of obtaining reliable information or enforcing regulation alone. This chapter comprises three sections. The first section focuses on the general situation of traditional food safety regulations in China to show why quality control has decreased amid the proliferation of market actors. The number of catering SMEs is enormous and increasing, and their behaviours of cutting costs for the sake of profit and frequent changes of ownership are increasingly destabilising food safety.

The second section discusses how traditional regulation faces a dilemma between large numbers of market actors and limited regulatory capacity. The fundamental problem of traditional food safety regulations aimed at catering SMEs in online catering services in China is presented as the case and discussed in the third section. The rapid growth of online catering services has exacerbated the quality problem of traditional catering businesses. This service is a digital network that matches the supply side to the demand side by integrating as many users as possible via intermediation services. In the context of online catering services, online catering platforms mainly enrol as many catering SMEs as possible to meet the needs of consumers. In the case of food safety regulations on catering SMEs in online catering services, this section illustrates the underdevelopment of information management in the traditional regulation model and the reasons why the shared problems in the change of market necessitate the change of regulation.

4.2 Growing but unstable market: The underdevelopment of food safety management of catering SMEs between 2011 and 2016

This section analyses the first factors that lead to shared problems impacting key actors and then leading to the change of regulation. This suggests that the rapidly growing number of market actors in certain industries leads to a reduction in quality control in order to increase supply. It describes how the catering business developed in China before the food safety incidents of online catering services in 2016. It then discusses how catering SMEs have turned out to be a problematic catering business sector and why their food safety information was hard to trace.

In China, the number of market actors has grown, providing an increasingly wide variety of products to meet the increasing and evolving demands of consumers. SMEs are indispensable in meeting such demands. For instance, catering is a special sector of the food industry, as it covers links from ingredient procurement, processing, and circulation to retailing. In this context, the categorisation of enterprises in China needs to be clarified first. In 2011, the Chinese government started to categorise enterprises according to their annual revenues. In the food market, the enterprises were categorised into enterprises with an annual revenue of more than CNY 2 million (Chinese yuan) (equivalent to more than GBP 220,000), and enterprises with an annual operating revenue of less than CNY 2 million (equivalent to less than GBP 220,000): these two categories constitute the food market in China. Enterprises with an annual revenue of more than CNY 2 million accounted for 72% of the market share in 2013. Enterprises below the designated size, with annual operating revenue of less than CNY 2 million, but ten employees, constituted 18.7% (CE, 2013). Using another classification, the enterprises can also be categorised as large enterprises, medium enterprises, small enterprises, and micro enterprises, based on the number of employees and their operating revenue (NBS, 2018a; NBS, 2018b). In the food market, there is a large proportion of daily eat-out catering consumption, also known as mass catering in catering businesses, and it accounts for more than 90% of the catering market.

In addition, using the statistics of the Chinese government, there were two methods to classify traditional catering enterprises: one was based on the scale of operation, and the other was based on its annual revenue. Catering enterprises whose annual operation revenue was above CNY 2 million had just 21% of the catering business market share. The top 100 catering groups had only 5% of the market share across the entire catering market. On the other hand, there were catering SMEs, enterprises with operating revenue of between CNY 1 million (equivalent to about GBP 111,850) and CNY 100 million (equivalent to about GBP 11,185,800) and employing between 10 and 300 people. Catering SMEs were the majority in terms of quantity, but their production capacity was scattered. Thus, large enterprises were perceived as the source of systemic food safety risks in the catering industry by the risk-based food safety regulation system aiming at

reducing such risks (Ministry of Commerce (MOFCOM), 2014; MOFCOM, 2015; MOFCOM, 2017; National Bureau of Statistics, 2017; National Bureau of Statistics, 2018; Feng, 2019). Before 2016, more than 3 million catering enterprises, mostly SMEs, participated in the catering market (MOFCOM, 2014; MOFCOM, 2015). Hence, massive demand leads to the massive and rapid growth of market actors. In addition, SMEs are part of the main force to meet such demand.

However, as the number of SME market actors is increasing rapidly, concerns about the overall quality control of market activities from this group are growing. These market actors tend to prefer the increase in supply to meet the needs of consumers by decreasing quality control. In this process, breaches or violations of quality control are more likely to occur in large numbers of SMEs. The regulation in such a situation is not negligible, as it may affect the good functioning of certain industries as well as the well-being of citizens. For example, SMEs, including micro- and self-employed enterprises, dominate mass catering production due to the enormous need for catering products in China. China has an enormous population consuming catering products. The multiple styles of cuisine mean that China has one of the most complicated and heterogeneous food safety regulatory situations in the world. The catering SMEs benefit by escalating the intensity of market competition to reduce costs and promote innovation (Liu, 2011; CE, 2013; BCP, 2017). However, both government officials and scholars have voiced their concerns regarding the situation of food safety regulations for catering SMEs.

In reports from academia, most studies agree that the catering industry is situated at a low industrial level, with only a few large-scale catering groups (Liao and Wei, 2013; CE, 2013). According to the China Food Safety Forum, catering SMEs in China can be described as having a large and diversified total consumer population, working from a scattered and chaotic low-level industrial base, suffering from non-standardised production and marketing orders, receiving insufficient training in food safety, showing unwillingness to comply with rules, and having weak capacity in self-management (State Council, 2016; Yin et al., 2017; Feng, 2018). The general situation of catering SMEs, thus, means that responsibility among catering proprietors is underdeveloped (CE, 2013; Luo et al., 2013; MOFCOM, 2014; MOFCOM, 2015; State Council, 2016).

The government annual report of catering businesses from MOFCOM shares a similar perspective: the catering SMEs in China lack funds and training since the opening up and reform of the economy, and their labour costs and material costs are still increasing. Thus, catering SMEs in China find it difficult to operate due to increasing costs of energy, rent, ingredients, and staff, and decreasing profits. Each link in the operation process of catering SMEs is unstable and hardly traceable, and they are less capable of food safety management than large enterprises. Catering SMEs are not fully aware of whole-process safety self-assessment, including ingredient procurement, processing, circulation, and retailing in operation. Micro catering enterprises lack funds, which leads to hygiene problems and incomplete management systems. The self-employed proprietors in the catering business are the most difficult group to regulate due to their large number, unqualified operations, poor production environments, simple and crude production facilities, and backward manufacturing techniques. Catering SMEs, including micro catering enterprises and self-employed proprietors, are scattered, not approved in market entry, and itinerant. In addition, catering SMEs, which aim to meet the increasing need for mass catering, keep changing ownership frequently due to complex market entry approval procedures from multiple local administrations. (Luo et al., 2013; MOFCOM, 2014; MOFCOM, 2015; State Council, 2016).

Catering SMEs in China also have constant difficulties with their operating costs. High rent, the high price of raw materials and human resources, and low profit margins are the main pressures on catering SMEs. Catering proprietors cannot afford to pay for the increasing cost of food safety practices, even though the central government tries to stimulate the marketisation and upgrade of catering businesses and encourage innovation (MOFCOM, 2017; Meituan, 2018). Hence, it is common for catering SMEs to breach food safety in catering businesses, and food safety in catering SMEs is in greater need of support and regulation from authorities than in large enterprises. Overall, catering SMEs in China between 2011 and 2016 had highly underdeveloped food safety management systems. This underdevelopment has led to difficulty in food safety regulation in such a rapidly growing market.

In sum, the growing need for a large variety of products is propelling SME

market actors to increase supply by cutting costs in quality control. This means that even though the rapid growth of market actors can increase supply in a short period, it can also lead to cutting costs in service quality control to achieve this increase. Consequently, to increase profits due to considerable growing demand, SMEs are inclined to cut costs in ingredients and staff training. Such behaviour leads to a disregard for quality control. Formal regulators also describe SMEs as attracting large and widespread consumption, but their market structure and order are scattered and chaotic. This means that the industrial foundation of the SMEs is not solid enough, and the unstandardised production and the lack of training, compliance, and self-management have also undermined it. Industry standards and market information, then, are deficient for both proprietors and regulators in this sector due to such a scattered industrial structure. Thus, collecting quality control information from SMEs is extremely challenging for formal regulators. Such unstable quality control leads to the dilemma of traditional regulation.

4.3 The dilemma of traditional regulation: Authorities with limited capacity regulating rapidly increasing catering SMEs in China

As discussed in the last section, market actors are rapidly growing in number, and the SMEs as the majority of them lack funds and training in quality control. However, SMEs, propelled by the growing need for products, continue cutting costs in quality control. Such a situation has reduced the service quality in certain industries, such as catering businesses. To cope with the large number of SMEs that are neglecting quality control, regulation is vital, and the limited capacity of traditional regulation is the second root cause of service quality problems. Hence, this section suggests that traditional regulation relying on overlapping and complex rules and formal processes has limited its ability to regulate proliferating SME market actors.

To cope with rapidly growing market actors, especially those in underdeveloped industries, traditional regulation is inclined to make overlapping and complex rules and set up multiple regulatory bodies in an attempt to cover the stages of the market activity process. Such an approach has constrained regulation. Hence, it is necessary to explain the problem of structure in traditional regulation, particularly food safety regulation in China. In the case of food safety regulation

of online catering services in China, as the catering SMEs cut the cost of food safety management and showed an insufficient willingness to improve food safety practices, the traditional regulation worked by directly intervening in catering SMEs with rigid food safety administration measures as regulatory activities. Such regulation attempted to cover all the stages of market activities of catering SMEs, from market entry, ingredients, processing, and circulation to retailing. These aspects were assigned to multiple government bodies in agriculture administration, quality administration, food and drug administration, health administration, and industry and commerce administration. Such an arrangement was meant to cover the whole supply chain of catering businesses.

This structure was meant to constrain the behaviours of service quality issues, but eventually, it further impelled the market actors to cut costs of quality control to increase supply. Such control of the stages in the process of market activities meant that traditional regulation relied on the rigid and inflexible structure of the legal system. For example, between 2011 and 2016, the Chinese government followed traditional food safety regulations. The food safety regulations in China comprised a legal framework, a set of compliance policies and standards, multiple dedicated departments, and a pattern of administration.

The legal framework includes laws and rules of conduct about those laws explaining and conducting regulation at the macro level. The laws and their rules of conduct divided market activities into several areas and distributed responsibilities to regulators to control the behaviours of market actors in these areas. As for the alteration of laws regarding food safety in China between 2011 and 2016, the legal system included legislation and rules of conduct for the implementation of food safety laws. The rules of conduct for implementation, or regulations for implementation, refer to how general food safety regulations should be in practice. The food safety legal system for catering services in China at the time was composed of the national food safety law (FSL), with regulations for implementation and local regulations.

In 2008, the ‘Sanlu milk powder incident’ revealed the inadequacy of the food safety regulatory system in China. Melamine, which is unsuitable for food production, had been added to baby formula, and this adulteration triggered public

panic and criticism of the government. This incident compelled the Chinese government to improve the food safety system, starting with the food safety legal system (Xiong, 2018). The *Food Safety Law of China* (FSL) was promulgated and came into effect in 2009. The FSL was a strict law designed to strengthen the ability of the government to apply food safety regulations and address the failure to observe food safety standards with relevant procedures. As for the catering business, other regulation documents mentioned food safety in catering services, such as the *Safety of Agricultural Product Quality Law in 2006*; the *Product Quality Law in 1993,* and then its *amendments in 2000 and 2009*; the *Consumer Rights Protection Law in 1993,* and then its *amendments in 2009 and 2013*; the *Standardisation Law in 1988,* and then its *amendment in 2017*, etc.

These laws and their rules of conduct for implementation supported the FSL in 2009. The FSL was then revised three times and amended in 2015, introducing regulatory ideas from the developed countries, and increasing the number of articles. The responsibilities in the FSL have been distributed and assigned to multiple government bodies regarding agriculture, market entry, quality, processing, circulation, and retailing. The FSL 2015 amendment addressed issues in online food retailing, infant formulae, and stricter penalties. The national policies are regarded as support for the FSL amendment in 2015, including the *Food Production Licence Administrative Measures*, the *Food Business Operation Licence Administrative Measures*, and the *Catering Service Food Safety Supervision and Management Measures*. As for local policies, these were rules of conduct for local food regulations, with a series of guidance documents for their application. Thus, the laws regarding regulation are applied at various stages in the process of market activities. Such a situation has continued in terms of policies and standards.

The legal framework of regulation on quality requires the practice of government bodies to be in effect. The traditional government bodies for such regulation follow the same structure as the legal framework. In the case of food safety regulation in China, government bodies in agriculture, health, hygiene, commerce, quality, food, and drugs are the specific and substantial entities that enforce the administrative responsibilities prescribed in the regulatory laws of

certain industries. These bodies need an administrative setup and a series of policies and standards regarding the regulation of market activities. For example, to implement the responsibilities of catering businesses as prescribed by the laws on food safety, both the central government and the local governments needed to set up departments to administer the implementation of those responsibilities and then be accountable to food safety administration. During the setting up of the regulatory department between 2011 and 2016, 2013 was a critical time point. As FSL 2009 was promulgated, the organisation of relevant ministries was coordinated by the Ministry of Health (MOH). The MOH was also responsible for information disclosure and food safety risk management.

A National Food Safety Commission (NFSC) was also established in 2010 (State Council, 2010). The NFSC was responsible for the analysis of food safety situations, the planning, deployment, and coordination of food safety administration, critical decision-making, and the supervision of regulatory responsibilities. In other words, the NFSC was responsible for the overall supervision of food safety and coordination between the various departments involved in it. Meanwhile, national food safety in the catering business was administrated by multiple central departments according to the links in the supply chain of catering businesses, including the State Food and Drug Administration (SFDA), the State Administration for Quality Supervision and Inspection and Quarantine (AQSIQ), the State Administration for Industry and Commerce (SAIC), and the Ministry of Health (MOH). The Ministry of Agriculture (MOA) was responsible for the food safety of the ingredients. Food safety at the processing and production stages was under the supervision of the AQSIQ. The AQSIQ and the SAIC were jointly responsible at the marketing stage for the circulation of food products. The SAIC was also responsible for the market entry approval of catering businesses. The SFDA was responsible for food safety in catering services in coordination with the other three ministries noted above (Yin et al., 2017).

This organisational arrangement meant that the responsibilities of multiple governing bodies overlapped, and it led to the passing of blame among them (Cui and Jiang, 2013). In the case of food safety regulations in China, in 2013, a reform promoted the reorganisation of the functions of various departments. The functions

related to food safety in the departments above were integrated into the China Food and Drug Administration (CFDA), which replaced the SFDA. The CFDA also worked as the Food Safety Commission Office (FSCO) to receive a directive from the NFSC of the State Council to coordinate with other government bodies on food safety (State Council, 2013). In addition, the MOH's food health regulatory function was integrated into the National Health and Family Planning Commission (NHFPC) with the National Population and Family Planning Commission. The NHFPC was responsible for food safety risk management, including surveillance, analysis, assessment, and communication (Article 5, 2015 FSL). Thus, the national level of food safety regulation changed from being segmented for each link in the supply chain of catering businesses to a departmental arrangement that integrated various previous food safety functions from different departments. Such a reform meant that food safety in the supply chain of catering services would not be regulated separately by multiple departments, but reduced to the CFDA, NHFPC, and the MOA. These three government bodies were led by the FSCO as the coordinating department of the CFDA. However, these three government bodies still needed cooperation from other departments, such as MOA, AQSIQ, and SAIC, on defective products and food safety accidents.

To enable government bodies to enforce regulations, policies, and standards, regulatory instruments became another important component in regulation. Policies and standards provided details and criteria directing government bodies on how to enforce regulations. In the case of food safety regulations in China, the government bodies responsible for food safety regulation had the authority to create specific policies and standards. The set of compliance policies and standards based on the legal system underpinned the regime of food safety regulation, distribution of responsibilities, and guidelines for formal regulators and regulated enterprises. In addition, the departments of central governments were responsible for creating and releasing these policies and standards. Concerning the food safety regulatory pattern in the catering business, the policy tools and standards of regulation were still in development. There were several policies and standards released or already in effect between 2011 and 2016, including the *Notice about establishing summoning proprietors responsible for the food safety system in 2010*, the *Temporary measures on unannounced food safety inspection on catering*

services in 2010, the *Food safety administration measures for catering services in 2010*, the *Catering business licence administration measures in 2010, Supervision measures for food safety credit management in catering service units in 2011,* and the *Guidance for the enhancement and innovation in social supervision of food safety in the catering business in 2012*, based on the 2009 FSL, the *Guidance for the quantitative classification of food safety administration on catering businesses in 2012,* and the *Measures for the quantitatively classified administration on food production and operation in 2016*. These policies and standards determine the available tools of traditional food safety regulation for catering businesses (Luo et al., 2013). Moreover, the State Council released annual documents about priorities in food safety administration and a five-year plan for food safety regulation to direct the development of food safety regulation.

According to the statutory policies and standards, when the local government regulators conducted food safety administration, especially inspections, they checked the regulated enterprises based on the risk levels, which were categorised as A, B, and C. Level A (laughing face logo) would be given to the enterprises with scores higher than 9.0, level B (smiley face logo) would be given to those with scores from 7.5 to 8.9, and level C (poker face logo) would be given to those with scores from 6.0 to 7.4. Such a classification was associated with the frequency of food safety administration. In addition, the food safety risk assessment system was developed in 2011 by setting up the National Centre for Food Safety Risk Assessment, which offers a scientific basis for risk management (Chen, 2011). Food safety risk surveillance was initially introduced into food safety regulations in China after the reorganisation of the food safety regulatory authorities in 2013, and then the surveillance plan was completed in 2014 (Lu, 2011; NHFPC, 2014). Furthermore, the FSL 2009 focused on the food recall system and traceability system, which continued to function and were improved based on the FSL 2015 amendment. Food safety risk management was still in development at the time (Yin et al., 2017; Feng, 2018). The risk management measures at this point added more burden to the local Food and Drug Administration (FDA), with limited public resources in their administrations. In principle, Level A enterprises should be inspected at least once in 12 months, Level B enterprises should be inspected at least once in 6 months, and Level C enterprises should be inspected once in 4

months. The local FDA would determine how many times and how often inspections should be conducted. The catering enterprises with scores below 6.0, or those that were unable to meet more than two requirements, would not be given a food safety level. In addition, these three levels were categorised into the dynamic level given in the field inspection and the annual level given based on the annual assessment of the performance of the dynamic level (SFDA, 2012). Hence, multiple regulatory authorities have categorised the market actors based on their risk of breaching regulations, managed their credits based on breaches, and cut the activity process of market actors into multiple stages through policies and standards.

As the structure of government bodies was introduced, the administration was the system that put regulation into practice as a regulatory pattern. Multiple government bodies, including their subdivisions at numerous administrative levels, are still responsible for the various areas in the market activity process to which they have been assigned. The local level of regulatory activities is the direct embodiment of the effect of regulation at the central level. Regulators from multiple subdivisions can regulate the quality of products in a coordinated way under one subdivision or regulate them separately, based on their responsibilities assigned to different areas of the market activity. In the case of food safety regulation in China, the local food safety regulation was uneven even after government reform in 2013; some local governments followed the single-department regulation model, while others combined food and drug safety administration with industry and commerce administration, turning them into a market regulation administration and quality regulation administration (Hu, 2016). The local-level food safety administration in the catering business followed the national policies, and local policies could be promulgated based on the FSL and the local situation. Four levels of local governments below the central government – provinces (or municipalities directly led by the central government), cities, townships, and subdistricts – are involved in food safety administration at a local level. Each province has its own regulatory implementation document for food safety, with the support of local food safety policies, in the catering business. There are also municipalities directly under the central government. These municipalities can obtain as many public resources as provincial governments from the central government.

In addition, from the national level and provincial level to the local level (cities, townships, and subdistricts), the national regulatory authorities conduct food safety regulations directly above the provincial administration, and then provincial administrations lead local administrations. Such a structure of administrative power did help unify the food market at the national level and prevented the overprotection of the local food market. However, there were also disadvantages to such a power structure. The discretion of local government above the township level was reduced to a large degree, and the coordination of food safety administration among local administrations was not feasible, because their power was directly given by provincial governments (Hu, 2018; Wang, 2018). Thus, the implementation of regulation based on stages of market activities needs coordination among multiple regulatory bodies, both at central and local levels, but due to limited discretion for local authorities given by the hierarchical power structure, such coordination has undermined the flexibility of regulatory authorities.

Consequently, based on the stages of the market activity process assigned by the central government, the local regulatory authorities administer regulation via an inflexible process. For example, the process of administering food safety in China included checking market entry approval and exit, inspection, enforcement, and penalty. In addition, the special rectifications coordinated by multiple government bodies were also part of the pattern of administration if any food safety accidents occurred. Market entry approval checked only whether catering business owners were qualified enough to run the business. To obtain market entry approval, the owners of catering enterprises were only required to acquire an operating licence for running catering businesses. This licence was issued by the local Administrations of Industry and Commerce (AICs).

Another requirement for market entry approval for catering businesses was the industry entry permit. Before 2015, there were two types of permits issued for proprietors in both the food business and catering business: the food circulation permit and the catering service permit. The food circulation permit was issued by local AICs. The catering service permit was issued by local FDAs. After the new amendment of the FSL in 2015, those two permits were cancelled and replaced by a food business permit, and its issuance was controlled by local FDAs. Such

changes integrated administrative resources and reduced the cost of the market entry approval process for catering businesses (Guo, 2016). To gain food business permits, the owners of the businesses, as applicants, were required to submit proof and accept field inspection of each link in their supply chains.

In China, the market entry approval administration of food safety for enterprises, established by the central government, is based on *Food business operation licence administrative measures*. Such market entry administration refers to international food quality control systems such as HACCP, ISO9000, GMP, etc. This system defines the market entry approval requirements by testing the responsibilities of quality control, the provision of production sources, technical document management, the quality control of procurement, the supervision of process quality, and the inspection of product quality from enterprises (Liu, 2011). These elements are tested according to international food quality control standards, and they demand the self-awareness of enterprises and government encouragement. Furthermore, such a market entry approval system requires a high-level quality control system, which requires considerable funding and personnel training. Based on the *Catering business licence administration measures in 2010* and *Supervision measures for food safety credit management in catering service units in 2011*, catering SMEs in fact could not totally meet the requirements of food safety due to the lack of food safety management in the links of their supply chains. The regulation at the local level, therefore, has required massive public resources to check the market entry approval of the rapidly increasing numbers of market actors in an underdeveloped industry, but such market entry approval is not feasible among SMEs and consequently leads to local regulators being overwhelmed by the number of market entries they need to check. Such difficulty in meeting requirements from market actors means fewer public resources for other aspects of administration.

The reduction of public resources due to an overemphasis on market entry made the rest of the administrative approaches to regulation predictable for the proliferating market actors. For example, inspection, enforcement, and penalties were the other measures used to find the sources of food safety breaches from each link of the supply chain in catering businesses. After market entry, inspection

played the main role in food safety administration, covering ingredients, processing, circulation, and retailing as links in the supply chain of catering SMEs. In addition, the outcome of the inspection was also the basis for enforcement and subsequent fines. If a catering business caused food safety incidents, the food safety administration would require them to rectify the problem and impose an administrative penalty on proprietors. In turn, no food safety level would be given to these non-compliant enterprises for six months, and the food safety administration would increase the frequency of their inspections during this period. If catering enterprises breached food safety rules and needed to be given a warning and administrative penalty, they would not be given a food safety level for two months. The signs of food safety levels would be confiscated by the food safety administration from non-compliant enterprises, and they would receive more field inspections. The process of inspection covered market entry approval, staff, operation site, facilities, procurement, labelling and storage of ingredients, processing, cleaning and disinfection, food additives, tests, and transportation (SFDA, 2012).

Ideally, the market entry approval would be inspected first, especially the food business permits. The inspectors would check whether permits were expired, illegally traded, tampered with, or displayed in the wrong places in stores. Regarding staff, the inspectors would check the health certificates of staff to ensure that no personnel with contagious diseases were employed. Personal hygiene and relevant training were also included. In operation sites, the inspectors would check the layout and cleanliness of operation areas, the sewage system, toilets, the surface of the building, changing rooms, kitchen waste disposal, etc. As for the facilities, the inspectors would check cleansing, disinfection, and sanitation facilities, including equipment, containers, tools, and packaging. When examining the procurement, labelling, and storage of ingredients, the inspectors would check whether enterprises had procured illegal ingredients, kept a record of procurement by maintaining receipts, stored ingredients properly, and examined and cleaned the storage area themselves. In processing, the processing steps and techniques, including rough processing, preparing, cooking, and serving, were checked. In addition, the inspectors would also check the reserved sample catering products. In cleaning and disinfection, the inspectors checked the processes of cleaning,

disinfection, and sanitation of tableware. As for food additives, the inspectors would check records of using additives and their information release, excessive dose, and usage of additives that were not permitted in the food industry. In examination and transport, the inspectors would check whether the examination and transport of ingredients and finished products had met legal requirements in labelling, temperature for transport, and relevant tools.

Each item above was worth ten points, and two inspectors conducted field inspections and gave inspected enterprises food safety levels based on the average of their scores for those items (SFDA, 2012). The rating system and the inspection procedure continued even after the amalgamation of regulatory authorities, with multiple changes. For example, in City A, local food safety agencies followed such a system and inspection procedure for food safety administration (OOS003GOV A, 2019). In addition, the release of the *Measures for the quantitatively classified administration of food production and operation in 2016* specified the risk management of food production and operation enterprises, including catering enterprises. Categories of products, the scale of operation, and consumers were static risk factors. The maintenance of production and operation conditions, the process control of production and operation, and the establishment and running of management systems were dynamic risk factors. Total risk levels were Level A, Level B, Level C, and Level D; of a total score of 100, the dynamic risk score would be 60 and the static risk score would be 40. A total score above 60 would be Level D, 45-60 would be categorised as Level C, a total score between 30 and 45 would be Level B, and a score from 0 to 30 would be categorised as Level A. Such measures would give local FDAs more details on the risk management of catering SMEs and offer a bigger picture for inspectors to find risk resources and ensure the compliance of catering SMEs (CFDA, 2016). However, the process of regulatory activities required expertise, a large number of public resources, and human resource input.

Regulation through multiple stages of the market activity process is meant to control the quality of products from market entry to retailing; thus, any problematic products will not be circulated easily in the market. However, such regulations are designed for developed industries. The establishment of regulatory bodies and

regulatory activities based on these rules are not suitable for the rapidly increasing numbers of market actors to comply with. In an underdeveloped industry where the market actors are growing rapidly in number merely to increase supply, this is stretching and thinning traditional regulation. As seen in the description of the food safety regulatory framework of China, even though the government bodies had been reduced from five to three, the practice of regulation, such as food safety administration, was still limited to public resource input, despite the rapidly increasing catering SMEs. This situation led to a rigid pattern of administration, and consequently, market actors became used to such a pattern and coped with it via their own countermeasures.

In the context of SME market actors growing rapidly, market entry inspections consumed the largest number of public resources. Regarding market entry, issuing market entry approval documents was meant to solve problems such as market failure and the invalidation of credit commitment. For example, in both the FSL in 2009 and the amended FSL in 2015, market actors in the food industry with market entry approval from the government were required to be included in the food safety credit system of local food safety administrations above the county level. This link in the food safety administration was meant to limit market access by excluding unqualified market actors with poor training, so the food safety administration could inspect those market actors with less credit more frequently (People's Congress, 2009; Liu, 2011; People's Congress, 2015). Market entry approval may work when market actors are limited; however, it does not work as well as it should with large numbers of SMEs.

The demand side means there is an incentive to increase the number of suppliers; thus, the rapidly growing number of market actors is unstoppable, and it challenges the inspection of market entry approval by formal regulators. For example, as the need for mass catering consumption still constitutes a large proportion of catering product consumption in China, catering SMEs, especially self-employed catering stores, were the main force of mass catering that offered catering services to meet such needs. In 2014, MOFCOM announced a decision to accelerate the development of mass catering (MOFCOM, 2014). To boost the local economy, local governments would also help catering SMEs meet food safety

requirements or temporarily simplify requirements for their market entry approval, instead of constantly requiring such compliance. Under such circumstances, even though market entry approval standards were rigorous, and the procedure of issuing permits and licences was long, catering SMEs had to proliferate due to the growing need for mass catering (MOFCOM, 2011; Hu, 2016).

Based on a catering business report from MOFCOM between 2014 and 2015, the growth of catering enterprises was significant (MOFCOM, 2014a; MOFCOM, 2015). The number of catering SMEs had rapidly increased to more than 3 million, and it kept growing (MOFCOM, 2009; MOFCOM, 2010; Ma, 2014; MOFCOM and the State Development and Reform Commission, 2014; MOFCOM, 2014; MOFCOM, 2015). In addition, there were still so many catering enterprises running their businesses without market entry approval that their numbers were unclear (Hu, 2016). Given the proliferation of catering businesses, the training of human resources for food safety administration was insufficient, and the number of inspectors was limited because considerable public resources had been put into checking market entry. For example, the FDA was given most of the administrative responsibilities in enforcing food safety regulations, but food safety regulation still needed coordination with other departments due to its stretched public resources. Most public resources in the administration were distributed to check market entry approval due to the growing number of market actors; fewer resources were directed to regular inspection, special rectification, and penalties afterwards (Hu, 2017). Consequently, the requirements of market entry approval attracted most of the public resources to ensure enough catering enterprises complied with the requirements, as the formal regulators had to deal with millions of catering SMEs (Yin et al., 2017; Feng, 2018). Hence, when trying to cope with the rapidly growing SME market actors who were inclined to cut costs in quality control, traditional regulation was overwhelmed by checking market entry. Consequently, public resources for reducing the quality breaches of SMEs were stretched and thinned among multiple regulatory bodies.

Moreover, traditional regulation still had overlapping responsibilities for the links in the supply chain of SMEs. Such a pattern could not improve the food safety of catering SMEs, and it was unacceptable among them. Hence, informal market

entry and exit and the changes of ownership of catering SMEs were frequent, and this situation led to the difficulty for formal regulators in tracing their activities due to such rigid and inflexible patterns in regulation. The chaotic and ad hoc nature of catering SMEs meant more inclination towards food safety breaches, which were concentrated in the developed provinces with a high gross domestic product and major cities such as the capital city of each province and metropolitan cities including Beijing, Shanghai, Guangzhou, and Shenzhen before 2016 (Luo et al., 2013; Guo, 2016). Even though the central government had put massive resources into food safety regulation, such input could not improve the limited expertise and technology of local food safety administrations. What government regulators could do was rely on personal experience and knowledge in the inspection upon market entry approval, hygiene, the health of proprietors, disinfection during operation, etc. The public resources for food safety administration of catering businesses could not cover each catering SME, and the number of well-trained food safety inspectors was insufficient. In other words, the capacity of traditional regulation could not cover enough SMEs in practice.

After the reform in 2013, there were just over 120,000 inspectors of food safety from local FDAs, but apart from those illegal catering suppliers without market entry approval, they needed to check more than 3 million catering enterprises (Hu, 2016). The basic regulatory units also lack human resources. Each basic food safety supervision and administration unit required at least six people to work effectively. These staff members required professional training and technological support to supervise food safety. However, there were not enough staff members for basic regulatory units, and they were not well trained (Hu, 2017; Feng, 2018). These activities, based on the guidance of the food safety administration, were meant to gather food safety information from catering enterprises so that the inspectors could find the source of a problem, the proprietors who were responsible, and then enforce FSL on them (Liu, 2012).

Such unprofessional and limited food safety administration, however, hindered the regulatory system and the rule of law, and fostered opportunistic business behaviour in the catering services, which led to the rapid growth in number of catering SMEs (Guo, 2016). As SMEs had inherent food safety problems, the

traditional food safety regulation had to cover large numbers of non-compliant catering SMEs with a limited capacity for improving food safety. In addition, at the social level, consumers could not provide sufficient evidence or feedback to the food safety administration because it was hard to attain and maintain samples from problematic products in mass catering (Zhao, 2016; Yin et al., 2017; Feng, 2018). Such a complex situation of SME market actors means that traditional regulation needs coordination among multiple regulatory bodies responsible for the links of market activities, which is potentially impossible.

Moreover, the overly complex departmental arrangement, a large set of different laws and guidelines, and policymaking activities have blurred the distribution of responsibilities in the administration of quality control, and the government regulators themselves did not coordinate well in administration due to shifting the blame on each other. For example, between 2011 and 2014, a food safety scandal of mung bean sprouts was exposed. In the process of food safety administration on such issues in Shenyang, the multiple local administrations responsible for such products turned out to be in a situation of passing the blame on the other administrations (Xiao, 2011). Based on the law on agricultural product quality, bean sprouts were administered by local agricultural agencies. Based on the law on consumer rights protection, such issues should be administered by local industry and commerce agencies. According to the law on food hygiene, this product could be administered by a local health agency. In FSL, this product should be overseen by a local quality supervision agency. However, in a meeting with all these agencies, they passed on the responsibility to each other with convincing reasons (Huo and Zhang, 2011). Moreover, in the 6th China Food Safety Forum in 2014 and the FSL Implementation Report in 2016, the central government and the National People's Congress repeatedly pointed out the inconsistent administration of food safety enforcement (Wang, 2014; National People's Congress, 2016; Yin et al., 2017). Thus, the responsibility for enforcing food safety regulations was shifted around among those departments before 2013. Government bodies were reformed in 2013 by extracting food safety functions from five government bodies and incorporating them into three government bodies. Three central departments and their local authorities with subdivisions were administrating food safety regulations led by the NFSC. Even though the structure of the food safety administration was

less fragmented after the reform in 2013, there remained the issue of distributing responsibility to the links of the supply chain in catering businesses; for example, some ingredients were both in the administration of agricultural departments and the administration of food and drugs (Yin et al., 2017). Passing the blame among these regulatory agents still turned out to be a common situation in the administration, in which the regulatory resources could not be unified and enforced efficiently through food safety regulation in catering SMEs (Liu, 2011; Hu, 2015; Hu, 2016; State Council, 2016; Yin et al., 2017). Hence, the unclear responsibility distribution of regulatory bodies has led to a situation in which regulatory bodies shift the responsibility on the others, and there is no coordination between them.

Consequently, in the aforementioned legal system, policies and standards, and department setup, the traditional regulation enforced by multiple regulatory bodies upon the links of market activities fails to cover rapidly growing market actors, especially SMEs. For instance, the food safety administration conducted by multiple government bodies in the catering business was likely to cover each separate link in the supply chain of the food industry in China. In such a context, the catering SMEs were risky and not self-regulated; thus, lengthy official market entry approval and subsequent administration would be impractical for them, and they chose to run their businesses in an opportunistic way, such as shutting down and reopening stores and changing ownership frequently (Yu, 2019). The regulation based on general but rigid rules was too fragmented to cover catering SMEs in structure (Yin et al., 2017; Feng, 2018). Hence, the actual figures of catering SMEs were too large for government regulators to control effectively, and the focus of administration became market entry approval, regular inspection, special rectification on risky links and products in the supply chain, and forfeit of illegal income. Local regulators were outnumbered by those catering to SMEs (Hu, 2016).

Consequently, the risky and unstable catering SMEs could evade food safety administration due to this predictable pattern of administration. As a result, it was difficult for regulatory authorities to maintain and improve the food safety practices of catering SMEs, even though they attempted to do so (Feng, 2018). The record of food safety information gathered by the food safety administration was then

inconsistent due to this dilemma. These were the inherent problems in the food safety regulation of the catering business before 2016, even before online catering services emerged. The inherent limitations in this traditional model of regulation subsequently also had an impact on food safety regulation after online catering services became big market players (this is explored in the next two chapters). The online catering service, as an emerging market, offered a shelter for unqualified catering SMEs, especially self-employed catering stores.

In a report on FSL enforcement in 2016, the central government reported that the food safety of online catering services was difficult to administer (National People's Congress, 2016). For example, after a report in the press, the local food safety administration banned 225 catering suppliers in Beijing. More than 26,000 restaurants encountered problems as they were running their businesses without showing market entry approval files and hygienic operation conditions (Chen and Wu, 2017; Li, 2017). The inadequacy of such a regulation in the face of such a rapidly growing number of SMEs meant that the efficiency of its regulatory activities was not as high as foreseen in the law and the promulgation of regulations and policymaking. This situation put regulators on the horns of a dilemma between the attempt to cover each market actor and the limited capacity of formal regulation. Such regulation has allowed market actors in growing traditional industries to evade regulation and look for a new market, but the inherent service quality problem from traditional industries continues in the new market. This inherent problem in the new market has furthermore impacted traditional regulation in a hierarchical but fragmented structure. Thus, it is hard for formal regulators to comprehend market activities when public resources are stretched thin to cover proliferating market actors; moreover, the information on quality control from those market actors is difficult to obtain.

4.4 The effects of the digital economy on the effectiveness of regulation: The informal development of online catering services in China between 2011 and 2016

The digital economy has further exacerbated the dilemma of traditional

regulation by concentrating market actors from underdeveloped industries on digital platforms. The development of the digital economy has impacted traditional regulation because the complexity of a network of suppliers and consumers on digital platforms is very difficult to regulate. The potential for evasion is high, and firms can easily enter and exit the market, so that many small producers can evade regulation.

For example, given the general situation of the catering business in China, catering SMEs, including micro- and self-employed catering stores, lack funding and training, leading to a poor production environment and a high risk of food safety problems (Liu, 2011; Luo et al., 2013). Due to the growing demand for mass catering consumption, the market entry approval that should have followed the rigorous procedure in the government administrative system turned out to be lax in practice. Consequently, catering SMEs grew faster in number than inspectors of the food safety administration after the reform in 2013. The food safety administration, as the enforcer of food safety regulation on the ground, due to its limited capacity focused merely on market entry approval, special rectification, and forfeit of illegal income as priorities, instead of assisting the optimal cultivation of the catering SMEs. Such impractical regulatory activities have impaired the market activities of catering SMEs (Yin et al., 2017; Feng, 2018). Such a pattern of administration became predictable, and in turn, it made the market activities of catering SMEs unstable when they evaded such predictable food safety administration patterns. Hence, it was difficult for formal regulators to gather food safety information, and food safety risk management did not work as a result of this. Thus, as analysed in the last section, traditional regulation cannot realistically cover each market actor from an underdeveloped industry due to the stretched and thinned capacity of government bodies attempting to cover them.

Under such circumstances, rapidly growing new market actors are looking for a new space to increase their supply instead of competing in traditional industries. The digital economy, more specifically digital platforms, has provided them with an opportunity. For example, in China, catering SMEs, as the main force in the catering business, are less willing to comply with traditional food safety regulations due to overlapping and complex rules from multiple government bodies. To meet

the increasingly varied needs of consumers, online catering services have become a new market to increase supply. Consequently, catering SMEs have become the basis for the early development of online catering services, also called online-to-offline (O2O) catering businesses. These issues of catering SMEs continued after being enrolled in online catering services as online merchants. Hence, the inherent problems from market actors in the underdeveloped industry remain within the new market.

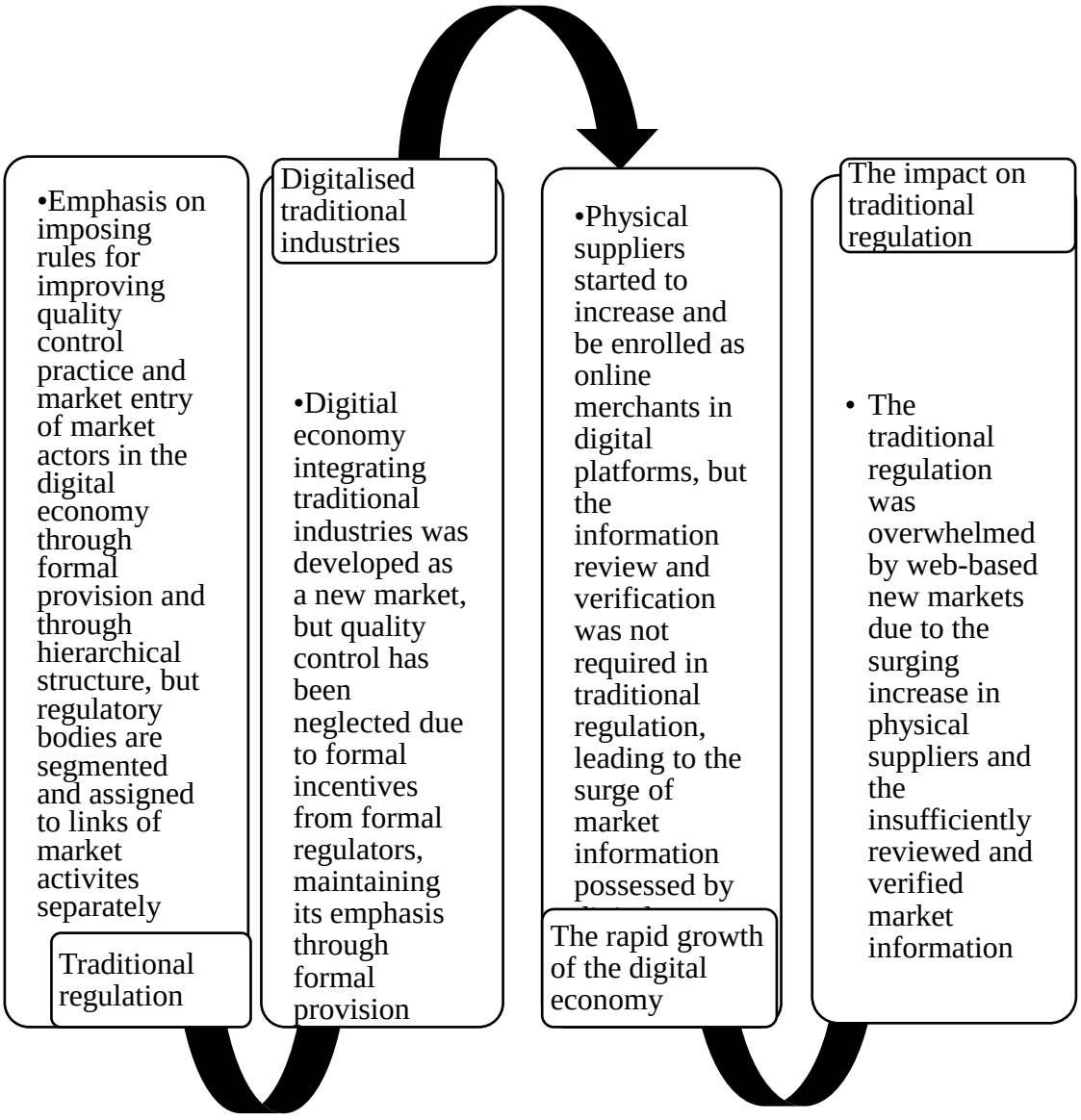

Figure 4 The development process of the digital economy and its impact on traditional regulation

Consequently, the early development of digital platforms exacerbated the quality control problem that formal regulators were already facing. Digital platforms are meant to provide intermediation services, which provide information and service delivery and matchmaking between suppliers and consumers. This intermediation service improves the efficiency of transactions between the supply and demand sides (Montero and Finger, 2021). However, such intermediation has not been given any service quality requirements in such a new market; thus, digital platforms cannot ensure that consumers receive products with the expected quality.

To explain this problem, the business model of this new market needs to be explained first. For example, in online catering services in China, online catering services began as a technological innovation through e-commerce. The original intention of such businesses was to bring an upgrade to the catering business by 'informatisation'. Such a tide of innovation gained encouragement from the central government before the exposure to food safety scandals in online catering services (BBT, 2016; MOFCOM, 2016). The online catering service, also known as the online-to-offline (O2O) takeaway, is composed of two sectors, compared with the physical ordering and consumption in the traditional catering industry. One is an online business, including online ordering systems, online payment systems, point of sale (POS) systems, and customer management systems (CRM). The other sector is a physical business, including physical catering stores that are enrolled as online merchants by online platform corporations, and physical delivery (Qi et al., 2015; Sha, 2015). These online catering services comprise two different groups seeking to benefit from each other. These two groups are consumers and catering SMEs. The catering SMEs, as the sellers, and consumers, as the buyers, can contact each other and make transactions online through information matchmaking and delivery services using online catering marketplaces. Online catering platforms offer a feasible opportunity for this benefit seeking. The online catering services offered convenience for both groups (Lepeintre and Sun, 2018). The operation of online catering services is characterised by a combination of online catering service platforms, POS systems, online payment systems, CRM systems and offline logistics systems. Compared with the traditional catering industry, which is composed only of physical ordering and service delivery, online catering services are more complicated but more efficient in the service process. In this closed loop

of the O2O model, the online catering service platform requires the address of the physical catering stores and pictures of their stores and licences. Hence, transparency, fairness, and the mechanism for redress of such intermediation services are required.

However, in their early development, the digital platforms do not take transparency, fairness, and redress mechanisms of quality control into account, but prefer to enrol many market actors. This enrolment aims to increase supply to maintain the network effect driven by demand. Such behaviour takes advantage of the void in regulation. For example, in relation to food safety, until its 2015 amendment the FSL did not require online catering platforms to review and verify the food safety information of catering SMEs, including their market entry approval, links, and products of supply chain and food safety management. Even though the FSL 2015 amendment did require a food safety review and verification from online platforms, the implementation of FSL did not take effect immediately due to the need for further decisions on statutory policies and standards, a new departmental setup, and an altered pattern of administration (MOFCOM, 2016; People's Congress, 2016). The legal systems created by the 2015 FSL still had not created instruments to handle the nature of online catering services as an overlapping part of both online food businesses and physical catering businesses (Wang and Yin, 2016). The appearance of the digital economy, more specifically, digital platforms, has offered traditional businesses the opportunity to attract more consumers and build an algorithm that tells suppliers the optimised strategies of running businesses to ensure more consumers are attracted to their services.

Due to the temporary absence of regulation during the development of digital economy, such as the development of online catering services since 2011, digital platforms seized the opportunity to enrol as many SMEs as they could. Many of these SMEs are small, and they lack either incentives or funding for quality control, such as the cost of food safety control compressed due to increasing costs in energy, rent, and human resources. These SMEs cannot provide adequate training. Thus, SMEs such as catering SMEs struggle with regulation compliance. The emergence of the digital economy helps reduce their costs in rent and human resource training and allows them to focus on efficient service delivery.

The situation above is the ideal one, premised on a prudent review and verification as the mechanism of discovering and disclosing problems, which is critical in online intermediation services. However, quality control is not in place as digital platforms focusing on increasing supply are not aware of their responsibilities in this area. For example, an online catering service was developed based on catering SMEs. The online platform corporations did help reduce the costs of catering SMEs, and attracted consumers by offering them commercial subsidies, but the market supply had already been outrun by mass catering consumption. Thus, online catering platform corporations started to attract more investment from investors to cover more physical catering suppliers. In exchange, these platforms would gain more market share to sustain their businesses.

Since this began, online catering platforms have started chasing key performance indicators (KPIs) to compensate for the cost of promotion, subsidies, discounts, and logistics by simplifying the checking of the qualifications of catering stores. Such behaviour could cover more stores and enlarge the point of sale (POS) scale, but the platforms neglected the process of food safety reviews and verification for catering SMEs (Ji, 2016). The reason for this can be traced back to the escalating market competition in online catering services. Online catering service platforms, such as Meituan Takeaway and Ele.me, were in intense competition to absorb as many physical catering suppliers as possible. The purpose of such commercial behaviour was to acquire a greater market share, especially when the central government provided incentives for doing so.

In 2014, MOFCOM released a policy to accelerate the marketisation of catering businesses, and digital platforms were part of this policy. Online catering platforms took this incentive from the central government and promoted the marketisation of their services by introducing more catering SMEs to this new industry. The market scale of online catering services grew rapidly from CNY 111.44 billion to CNY 161.55 billion between 2014 and 2015, and it kept growing at a steadily increasing rate. In 2016, this scale had already reached CNY 165.7 billion. By the first half of 2019, the market scale had reached CNY 262.3 billion, reaching CNY 281.5 billion by the end of 2019 (iResearch, 2016; AskCI, 2018; Meituan Research Academy and the Takeaway Committee of the China Restaurant Association, 2019). Online

catering services accounted for more than 10% of the market share in the catering industry after 2016 (Yicai, 2017). Due to the network effect of the O2O intermediation model, which does not have limitations on marginal cost, this new market could involve more catering suppliers as its user base. Hence, the more catering SMEs the online catering platform could enrol as online merchants with little cost, the more profit both catering SMEs and platforms could achieve. As those platforms were fiercely competing against each other, their standards of review and verification of food safety control catering stores became less of a priority compared with profit and improving technologies for matchmaking.

Consequently, digital platforms urgently need to increase the supply of information from suppliers to gain more market information to improve their matchmaking service through an upgrading algorithm. The lack of review and verification of whether these suppliers can control the quality of their services or products provides opportunities for unqualified suppliers. For example, the decline in food safety reviews and verification presents opportunities for certification intermediary agencies (Ji, 2016). This behaviour yielded space for illegal catering SMEs to participate in this new industry and gave them a chance to counterfeit and embezzle catering store information and use uncommercial venues. There were a considerable number of certification intermediary agencies in China, and most of them followed the trend and registered online on Taobao, a well-known e-commerce platform, and other e-commerce platforms. These intermediaries claimed that they could help locate catering stores so that proprietors could register online on those online catering service platforms, but proprietors were often dishonest and illegal, trading without food business licences. The intermediaries specialise in appropriating the legal information of qualified catering proprietors through illegal approaches and fabricating food business licences (Wang and Wang, 2016; Liu, 2017). Under such circumstances, the online catering service platforms, untrained in the review and verification of physical catering stores that had opened during the market expansion, could not determine whether the applicants had physical stores and licences or not (Zhao, 2016). Those platform corporations are, in fact, technological corporations that specialise in e-commerce, and they did not foresee that the capacity of discovering and disclosing problems of suppliers would be the critical threshold for physical suppliers to be enrolled as online merchants

in this new market. Consequently, the digital platforms and enrolled SMEs started to cooperate for profit and market share, but laid aside the issue of discovery and disclosure in quality control.

This cooperation between digital platforms and enrolled physical suppliers has led to a lack of industry standards and critical business information, such as food safety breaches of online catering services in China. Since then, catering SMEs have turned to covert mode, which still includes counterfeit and embezzled food business licences, and even the opening of a shared operating venue with those physical catering stores (CE, 2018; Kuang, 2018). According to a 2015–2016 report taking Beijing as an example, 228 reports about food safety and online catering services were submitted in less than a year. In this report, after food safety incidents concerning online catering services started to occur, the regulators of the local food safety regulatory agencies asked online catering marketplaces to release and share the food safety information of registered catering business operators before the middle of July 2016, but the response from those marketplaces was not positive (He and Zhang, 2016). In Shanghai and Guangzhou, the participation of online catering marketplaces in food safety was not positive, either. Some marketplaces were registered in other provinces and cities and were not within the jurisdiction of local regulatory agencies (*Southern Urban Daily*, 2016; Su, 2017). Consequently, this situation made it more difficult for food safety regulators to trace illegal catering SMEs with limited methods.

As the quality requirements for the digital economy are not prescribed clearly in statutory policies and standards, the procedure of review and verification by digital platforms is simplified at the price of neglecting the service quality of market actors. The complex supply chain of the digital economy has integrated extra links, enrolling market actors as online merchants through oversimplified review and verification, display of service information with deficient management, and delivery service without standards. These problematic links are interconnected with the problematic operation process of market actors with little quality control. Hence, even though digital platforms are concentrating on increasing supply, this increase is attributed to imprudent and loose review and verification in enrolling market actors from underdeveloped industries. Such a failure to discover and

disclose problems of intermediation has exacerbated existing quality problems when regulatory authorities have insufficient capacity and effective policies and standards as tools.

4.5 Conclusion

As discussed in the sections above, traditional regulation focuses on controlling links in the process of market activities. Such regulation is embodied in the legal system as the basic regulatory framework, the policies and standards as regulatory instruments, and the pattern of administration as regulatory activities. This type of regulation has struggled to adapt to a changing market in which the digital economy is integrating market actors of traditional industries, especially SMEs.

In the initial stages of the development of the digital economy, the traditional hierarchical regulatory framework changed very little and focused mainly on improving the compliance of the traditional physical industry, especially large enterprises, as the main source of quality issues. The regulation of the digital economy has taken place slowly, and was based on overlaying new statutory rules, rather than a radical rethink of the whole regulatory framework following the change in the market. Such an approach meant a reduction of interest in the quality issues of large enterprises, yet it excluded SMEs as the main force in the digital economy. The SMEs had an inherent lack of quality control due to the high cost of maintaining it and the subsequent loss of profit.

The digital economy, in the meantime, took in as many SMEs as possible to meet the increased demand for consumption and employment. The digital economy entered a period of rapid growth that benefited from the proliferation of SME market actors, which had insufficient quality control without review and verification from digital platforms. The new links in the process of online transactions and logistics, which worked for the convenience of digitalised traditional industries, were not formalised during the growth of the digital economy. The large degree of participation of SMEs without review and verification, and the non-compliant new links, such as enrolling those catering SMEs online with oversimplified review and verification, service information display, and delivery services, exacerbated the inherent quality issues.

Quality issues in digitalised traditional industries are interconnected by digital platforms and have acted more rapidly and concentratedly on consumers. Furthermore, due to the absence of quality control requirements for the digital economy and the incentives for growth offered by the central government, digital platforms chose not to discover and disclose problems to evade predictable traditional regulations relying on formal provisions. Hence, the traditional regulation missed identifying the fact that the digital economy was integrating traditional industries as a potential factor exacerbating the inherent quality issues of SMEs in traditional industries. The progress of regulation changes has been overtaken by the digital economy's accelerating growth (see Figure 4).

Under such circumstances, traditional regulation still provides formal incentives to ensure that the market develops to meet increasing demand. SMEs benefiting from such incentives are inherently unstable with quality control, and they have reduced the cost of quality control and raised the cost of meeting demand. Furthermore, such incentives also lead to the proliferation of market actors, especially SMEs. In addition, regulatory instruments are not suitable for SMEs. For example, the FSL was revised and amended many times between 2011 and 2016, yet it did not offer practical and rigorous food safety standards for catering SMEs. Furthermore, implementation, enforcement, and monitoring were not rigorous enough, which lowered the requirement for market entry and brought more unqualified catering SMEs into catering businesses (Hu, 2019).

In this context, regulations enforced through regulatory bodies assigned to links of market activities have already stretched and thinned public resources. As proliferating market actors need market entry to deliver services, limited public resources are invested in checking those market entry approvals, and the public resources shared for other regulatory activities have been decreased. Consequently, regulatory activities, such as inspection, monitoring, and fines, have become predictable for opportunistic SMEs. Moreover, traditional regulation is fragmented due to the central government assigning separate responsibilities to regulatory bodies based on the types of market activities. Such fragmentation leads to passing the blame between regulatory bodies when quality issues occur. For instance, without specific policy tools and standards as regulatory instruments, formal

regulators still had to try to supervise millions of catering SMEs. Due to its limited capacity to issue strict market entry approval, test technology, risk management, and professional inspectors, food safety administration was outnumbered by these suppliers (Hu, 2017).

To make matters worse, catering SMEs were unwilling to comply with such impractical and rigorous regulatory activities conducted by the food safety administration. Furthermore, entry into the market by obtaining licences was not considered for the right reasons by catering SMEs, namely as a way of securing food safety in China; instead, the motivation of those catering enterprises to possess licences was usually opportunistic. Consequently, even large catering enterprises were at risk of food safety incidents under such circumstances, with many lacking executive standards and relying on the experience of governmental regulators (Liu, 2011; Liu, 2012a; Liu, 2012b; Xie, 2012; Guo, 2016). Hence, traditional regulation falls into the trap of attempting to cover each market actor, especially unstable SMEs with limited public resources. This difficulty has been exacerbated by the digital economy, which has integrated traditional market actors, including unstable SMEs. Digital platforms possessing information about SMEs, enrolling the rapidly growing market actors, and upgrading algorithms for efficiency have constantly seized the formal incentive from traditional regulation but have not followed it due to the absence of regulatory instruments.

The mechanism of discovering and disclosing problems of suppliers is not in place, and this defect of the digital economy added a greater burden to traditional regulation. Such failure means that traditional regulation in a hierarchical structure has a limited capacity to control quality issues as part of common problems in the change of market, which is also clearly reflected in the risk-based regulatory system for food safety in China during this time (*cf.* Lodge and Wegrich, 2014). As this regulation reacts slowly to identify and specify the problems of the digital economy integrating traditional industries, the regulatory system does not adapt to the new production and supply processes, and it continues to focus on traditional businesses. This is where the change in regulation starts. The next chapter discusses how traditional regulation has been changed in response to quality issues as part of common problems from the digital economy integrating traditional industries.

Chapter 5: The New Regulatory Framework: The Response to the Shared Problems in the Change of Market That Impacts Key Actors

5.1 Introduction

As described in the last chapter, a key problem is the rapid expansion of the market into a new industry with outdated regulatory tools. Consequently, there is considerable weakness in quality control. Quality control has been pushed aside and replaced by an increase in supply, which is achieved by the rapidly growing market actors. A second problem is that traditional regulation has a limited capacity for controlling the new market. Traditional regulation is distributed to various regulatory bodies, each allocated to a different stage of market activities. With a growing market of new actors and weak regulation, there has been a decline in product or service quality, as market actors were able to evade regulation.

With a more complex market based on digital platforms, the concept of co-governance contributes to explaining the structural change of regulatory framework as a response to the quality problems in the change of market in this chapter. Specifically, in the co-governance concept described in the literature review, the shared problems mean that they impact key actors involved in the changing market; thus, they are prompted to gather to address such problems in an open and horizontal arena. The formal regulators then start the change of regulation by establishing a new regulatory framework in the arena to tackle the two factors leading to quality problems in the digital economy. Hence, constructing a new regulatory framework requires new rulemaking and a new structure.

The purpose of constructing a new regulatory framework is to gather key actors into a new arena in which they can address quality problems together. Hence, this new framework is for quality control amid the change in the market, which requires the acceptance of traceable and transparent oversight and guidance while also providing feedback for further adjustment among key actors. Thus, in the process of gathering, key actors, including formal regulators, market actors, and consumers involved in the change of market, are bound to interconnect their diverse capacities,

as none of them can address all of these problems alone. Such a connection is embodied via rulemaking and then put into practice in an arena built by formal regulators to steer such interconnected activities. The new regulatory framework, through the lens of the co-governance concept, ensures that these capacities are prescribed, and moreover, it embodies them in an open and horizontal structure of such a new arena.

This chapter argues that, for the purpose of well-functioning quality control amid the change in the market, key actors impacted together by quality problems interconnect their diverse capacities based on what they lack for quality control, and formal regulators design a horizontal and open arena to prepare these capacities for guiding quality control. This chapter first briefly clarifies the problems the key actors confront, then explains what rules have been made by key actors confronting such problems and how these rules work in a new structure of a new regulatory framework as the response to such problems at the institutional level. By considering the crucial findings made possible through the concept of co-governance, rulemaking and the structure of the new regulatory framework, as the institutional arrangement in the change of regulation, are discussed in the next two sections.

5.2 The rulemaking of a new regulatory framework to clarify the roles and connect diverse capacities of key actors

As discussed in the previous chapter, traditional regulation struggles to deal with issues of quality within a rapidly expanding digital economy. Traditional regulatory authorities regulate service quality by allocating the formal regulators of each regulatory body to different parts that compose the process of market activities. Traditional formal regulators, as the main actors to solve problems, are fragmented and strained when providing the main source of information for consumers and instead disperses problem-solving capacity to multiple authorities. Such an approach indicates gaps in the capacity of regulatory authorities when reacting to problems by merely enhancing and enforcing a rigid and inflexible regulatory framework without changes. The rise of the digital economy has exacerbated this situation. Such traditional regulation cannot adapt to rapidly growing opportunistic market actors and problems in the activities of these market

actors, including market entry, production, operation, transaction, and delivery, interconnected by the constantly upgrading algorithm of digital platforms.

The regulation of such problems, then, requires regulatory governance that can rapidly adapt to a complex and continually changing market. The concept of co-governance, in the category of regulatory governance, assumes that several groups of key actors change economic or social behaviours together, but any problems emerging from such a change also impact these key actors; consequently, the key actors share such problems. These include quality issues when SME market actors are integrated by the intermediation services of digital platforms; more specifically, the food safety of catering SMEs enrolled online through online catering services of online catering platforms in China. Impacted by quality issues, market actors of the digital platforms focusing on expanding the market by enrolling physical suppliers cannot spare the space and time to directly manage quality control from physical suppliers.

Consequently, relying on limited public resources, formal regulators cannot find whether market actors of physical suppliers growing rapidly in new markets can directly control the quality of services or products without the management of digital platforms. Hence, consumers have limited access to reliable services or products due to limited formal regulatory activities and a lack of platform management. Consequently, quality issues in the digital economy impact key actors. The co-governance concept, then, is embodied in key actors changing the regulation together to address such shared problems, and this change starts with a new regulatory framework created and led by formal regulators and participated in by market actors and consumers.

In the new regulatory framework, the impact of such shared problems prompts key actors to mutually depend on each other due to what they lack when confronting shared problems. Based on the presentation of shared problems, for example, regulatory authorities in food safety could inspect and test products and monitor whether suppliers had safe food safety practices, but they lacked information on food safety practices from suppliers due to limited public resources. Suppliers were directly responsible for controlling food safety, but they needed training and management from the online platforms. The online platforms that had

enrolled suppliers online were meant to manage information from such control, but they focused on market share and had less management of the food safety practices of suppliers. Consumers received products and gave their feedback if they suffered food safety problems, but they lacked information on whether suppliers were qualified enough, and the channels to give feedback (OOS001GOV A, 2018). Hence, each group of key actors cannot address shared problems alone, as they need the capacities of others.

Digital platforms are the market actors intermediating the transactions of their users. These platforms possess massive information about users, increase the enrolment of physical suppliers, and upgrade algorithms constantly to improve the efficiency of the transaction. Thus, digital platforms can manage market activities by possessing and processing user information, increasing supply, and upgrading technology to improve service. The market actors of physical suppliers benefiting from this have the capacity for direct quality control. The formal regulators, due to their oversight of the whole process of market activities, inspect and monitor market actors of both physical suppliers and digital platforms and enforce the law when necessary. The capacity of formal regulators, then, aims to prevent market failure by overseeing market actors.

To watch over market activities, formal regulators need the market activity management capacity from digital platforms to discover and disclose errors in the market, while digital platforms need the professional capacity to correct errors in the market that may lead to market failure from regulatory authorities. To ensure a transparent and fair process of finding and correcting errors, both market actors and regulatory authorities need feedback from society, especially consumers. Hence, these capacities are indispensable and irreplaceable for addressing quality problems in the digital economy. This means that the key actors impacted by quality problems depend on each other. Such dependence ensures that key actors are aware of what their capacities are lacking and are willing to gather and share what other key actors need to address problems. This mutual dependence, then, ensures a clearer process of changed market activities caused by the digital economy, which works based on collecting massive information, increasing the enrolment of suppliers and upgrading algorithms for improving the efficiency of

the transaction. Being clear of market activities gives key actors sources of problems to be addressed, and mutual dependence interconnects the diverse capacities of key actors to ensure that the new regulatory framework corresponds to changing markets.

According to such mutual dependence based on the co-governance concept, rulemaking marks the start of creating a new regulatory framework. By connecting the capacities of key actors in rulemaking, the direct quality control of market activities in the digital economy is assumed to be the central task in this framework. These capacities, including the oversight of formal regulators on such control, the management of such control from market actors of digital platforms, and the feedback of consumers about such control, are to ensure that market actors such as physical suppliers control the quality of services or products directly.

Rulemaking that is designed and led by formal regulators and participated in by each group of other key actors, therefore, aims at interconnecting the diverse capacities of key actors to address problems together, based on the co-governance concept. As the dispersed hierarchical formal regulation alone cannot ensure the good functioning of quality control in the new market without clear information about this market, the new regulatory framework requires diverse capacities from formal regulators, digital platforms, physical suppliers enrolled in digital platforms, and consumers to be clear of market activities. This new rulemaking is meant to design a new regulation instead of formal regulators with limited capacity imposing overlapping and complex rules on targets.

Hence, to achieve the interconnections assumed in the co-governance concept, it is necessary to gather the capacities of key actors, but the premise is to clarify the importance of addressing shared problems together among key actors. In the case of regulating the food safety of online catering services in China, as the Chinese central government had been aware of the limited formal regulatory capacity of the regulatory authority that could not directly control the food safety risks of online catering services, the central government had been urging market actors to undertake food safety control in the challenge brought by the new web-based market, and consumers were encouraged to give feedback on food safety problems (Chu et al., 2016; The Standing Committee of National People's

Congress, 2016). Furthermore, in 2017, both the 13th Five-Year Plan of Food Safety Regulation and the guidelines of priorities in food safety regulation introduced by the State Council brought up food safety as a shared issue in which key actors were involved by mentioning the difficulty of the regulatory bodies. This issue required reform by opening the food safety regulatory framework up to other participants and unifying them in the new web-based market. (State Council, 2017; General Office of the State Council, 2017). Such notification implies that each group of key actors impacted by violations of quality control needs to gather their capacity to reduce such quality breaches or crimes in the digital economy.

Thus, under such circumstances, key actors are assumed to be experts with resources, information, and knowledge in their sectors. This situation means that they have diverse capacities amid the changing market. The problems explained in Chapter 4 mean that none of the formal regulators, market actors, and consumers can address problems alone. Thus, the rules based on mutual dependence in the co-governance concept interconnect the diverse capacities of these key actors. Rulemaking concentrating on quality control is composed of the new laws, the new specific policies, and the standards altered for implementing new policies. Rulemaking ensures that key actors impacted by quality problems are clear of their capacities in new laws, are willing to interconnect these capacities through policies, and are informed about how to deploy these capacities to address such problems through standards. Rulemaking, therefore, starts by changing laws for shared quality control problems in certain industries integrated by the digital economy.

New laws, as the start and the basis of rulemaking, clarify the diverse capacities of key actors and assign these capacities to the sectors where they are experts in order to address shared problems. Institutionally, the new laws show the intention of key actors, especially formal regulators, to create a new regulatory framework based on their diverse capacities. Such intentions are embodied in the distribution of responsibilities to key actors in quality control in the digital economy. As discussed in Chapter 4, the digital platforms provide a supply chain from online enrolment review and verification, displaying service information of online merchants, online order and payment, and physical catering suppliers enrolled as online merchants processing orders for service delivery (see Figure 5). This supply

chain, because it failed to review and verify food safety control and manage and report the activities of market actors enrolled in digital platforms, had become one that had exacerbated quality control breaches or violations. Consequently, the rules of conduct of FSL 2015 and FSL 2018 gave the regulatory authority the legitimacy to deal with the food safety issues of online catering services.

In FSL 2015, the National People's Congress agreed to legislate the food safety of online food businesses, including online catering services, requiring them to accept regulations (Standing Committee of National People's Congress, 2015). Thus, the formal regulators are the legitimate designers and executors of the new regulatory framework due to their expertise in preventing market failure, which is based on public resources, information from qualified market actors, and knowledge of formal regulations. For example, in the 2018 amendment of FSL, the regulatory authority responsible for watching over food safety risk control of market actors of online food businesses was changed to the State Administration for Market Regulation (SAMR) (Standing Committee of National People's Congress, 2018).

In the latest rules of conduct for implementing FSL 2018, the online platforms were required to undertake responsibilities in reviewing and verifying suppliers, providing information about transactions, and managing the activities of suppliers enrolled as online merchants (State Council, 2019). In addition, the Law of Electronic Commerce also required digital platforms to provide information on illegal behaviours to the CFDA and, more recently, SAMR, when problems of the digital economy were discovered and disclosed (General Committee of People's Congress, 2018). Market actors of online catering services, as the sources of food safety violations, were then required to control their food safety by building food safety control required by the central government (The Standing Committee of National People's Congress, 2016; State Council, 2017; The Standing Committee of National People's Congress, 2018).

Hence, rulemaking starts with updating laws specifically for the digital economy, or a traditional market upgraded by the digital economy. Apart from enforcing new regulations, the responsibilities of oversight, direct quality control, management of quality control, and feedback to key actors are distributed in new

laws. New laws, then, have prescribed what key actors should do to address quality problems together in the digital economy within their capacities, especially digital platforms.

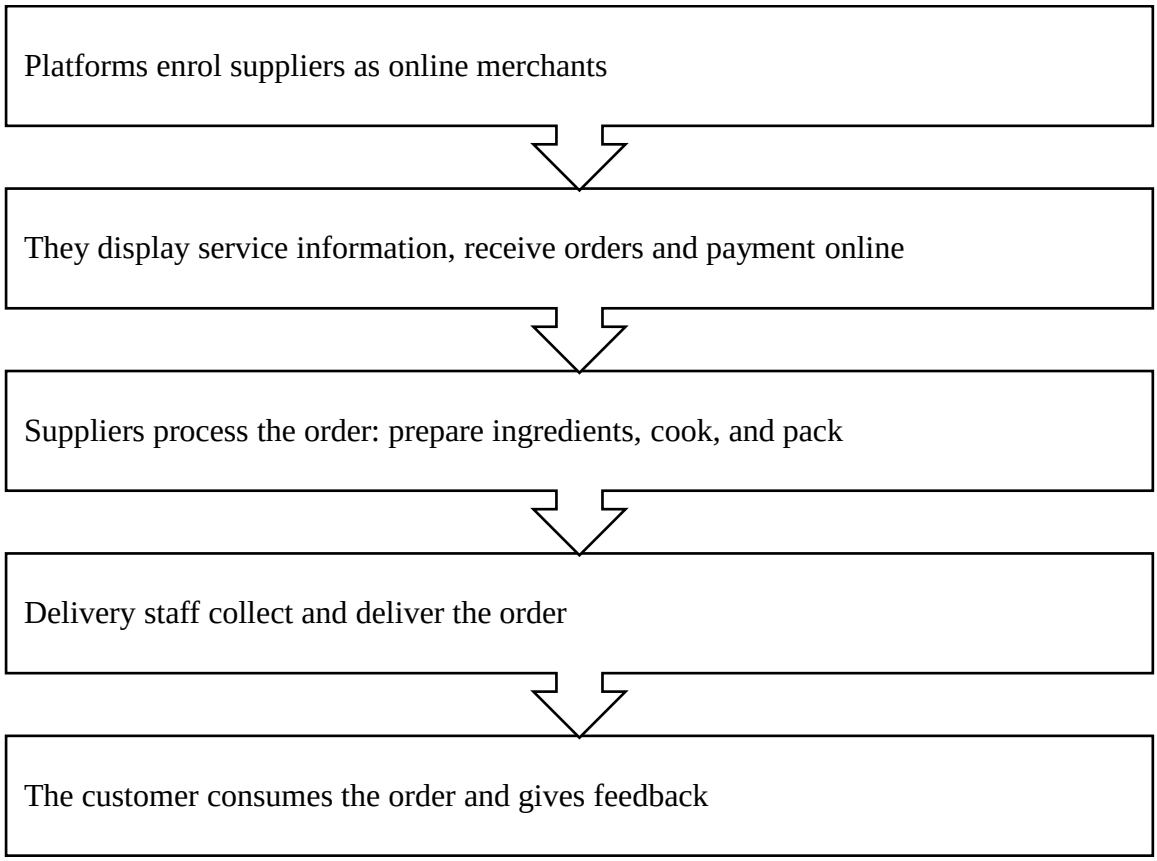

Figure 5 Supply chain of online catering services

Based on the legal requirements updated in the new laws, new policies specific to quality control in the changing market focus on why key actors should be dedicated to interconnecting their capacities to address shared problems. For example, in the case of regulating online catering services, based on the amendments of the Food Safety Law in 2015 (FSL 2015) and then in 2018 (FSL 2018), the China Food and Drug Administration (CFDA) and the recently amalgamated State Administration for Market Regulation (SAMR) attempted to tackle the food safety problems of online catering services with market actors and consumers by releasing specific policies on the food safety of online catering services between 2016 and 2018. Moreover, these policies highlight that information about market activities shared by market actors is critical for such damage control and quality control due to the limited public resources of formal regulators.

Before such interconnections among key actors, the priority of policies aimed at quality control in the digital economy was to control the damage from quality problems in the digital economy by explaining the capacities of key actors further. In China, one policy regarding the punishment of food safety breaches or violations in online food businesses was released in 2016 and came into effect in 2017. This policy was titled *Measures for the investigation and punishment of illegal food safety acts of online food services* and was released by the CFDA. This policy was intended to control the damage from the food safety breach in the early development of online food safety businesses. Moreover, it was released to prevent the market failure of online catering services brought about by food safety problems and to ensure the development of online catering services. The regulatory bodies and their local agencies, hence, had several approaches to enforcing food safety laws on food safety breaches or crimes of online platforms and suppliers enrolled as online merchants. Even though this policy was to remedy damage from food safety problems in the early development of online food businesses, it still clarified the basic responsibilities for food safety that online platforms and suppliers could have undertaken in online food services and the responsibilities of penalties enforced by the regulatory authority. In addition, the regulatory authority and local regulatory agencies were responsible for dealing with food safety breaches or crimes impartially, acquiring records from online platforms for monitoring, inspection, and law enforcement, receiving complaints and reports from consumers, summoning platform managers for respond-on-demand meetings, and imposing penalties (CFDA, 2016a).

As the formal regulators focus on the oversight of quality control, the control of damage from the digital economy, then, has been shared with market actors as the source of quality problems. For example, during fieldwork in China, a local food safety inspector OOS001GOV B (2019) stated, "the number of food enterprises is too large for food safety administration to test whether products are safe. The market actors, however, have the advantages of controlling food safety directly" (p. 2). Hence, in this policy released in 2016, online platforms were required to keep an accurate and reliable record of data open to the public by building their archive, which included market entry approval and service information of food suppliers, review, and verification of those suppliers, checking

enrolled suppliers in the field, managing activities of suppliers and revoking the operation of suppliers in cases of food safety breaches or crimes (CFDA, 2016a). The online platforms were also required to provide data for monitoring and inspection from the regulatory authority and local agencies. Hence, digital platforms do have a high level of information from their management of the supply chain, and by sharing it with formal regulators, it is possible to build and develop better mechanisms for managing direct quality control from physical suppliers. In the field, the local regulatory agencies followed such a policy by comparing the database of catering suppliers who entered the online catering market with the data from catering suppliers enrolled by online catering platforms. The purpose of such behaviour was to find suppliers operating without an officially approved market entry (OOS001GOV A, 2018; OOS03GOV A, 2019).

Consequently, a policy specifically for controlling the damage from the quality problems of the digital economy clarifies what penalties key actors will receive if they fail to address quality problems within their capacities. Under the new regulatory framework, to control damage from quality problems via rulemaking, the information gathered by digital platforms is crucial for developing an effective system.

Another more specific policy is to specify why key actors should interconnect their capacities in addressing shared problems together. For example, in China, a more specific policy regarding maintaining food safety in online catering services was released in 2017 and came into effect in 2018. This policy was to ensure that food safety agents, online catering platforms, catering suppliers, and consumers would address food safety problems in online catering services together. The policy in 2017 did start to require online platforms to manage the food safety of suppliers, but it was a policy for penalising food safety breaches or violations in selling food online and was still not detailed enough for online catering services. A more specific and detailed policy for online catering services was released in 2017 and came into effect in 2018. The new policy was named *Measures for supervision and administration of food safety of online catering services*. In this new policy regarding the food safety problems of online catering services, the first half of the policy document listed the requirements for the regulatory authority and market

actors of online catering services, and it encouraged consumers to report and complain about the food safety issues of online catering services. The penalty terms, if market actors did not comply with the requirements, were also listed in the second half of this policy. The first half is critical, as the food safety regulation capacity has been given a clear redistribution to regulatory agents, market actors, and consumers in regulating the food safety of online catering services.

The regulatory bodies, such as the CFDA and, more recently, the amalgamated SAMR, were responsible for monitoring and inspecting the food safety control of market actors, especially online catering platforms, based on assessment and surveillance of food safety breaches or crimes. These regulatory bodies were also responsible for releasing information from monitoring and inspection to the public to keep in contact with both market actors and consumers. Consumers unhappy with the delivered products were responsible for providing feedback on the service by complaining directly to online merchants or online platforms or reporting food safety issues to the regulatory authority (CFDA, 2017). Hence, the diverse capacities of formal regulators, market actors, and consumers have been dealt with in more detail in the new specific policies.

Market actors in the digital economy were responsible for quality control based on interconnected links from the process of activities between the digital platforms and the physical suppliers. Moreover, as the capacities of key actors are clarified in the new policies, quality control from both the market actors of digital platforms and the market actors of physical suppliers is crucial. In the case of online catering services in China, market actors of online catering services, including catering suppliers and online platforms, are required to undertake more responsibilities in food safety control for catering suppliers in China. For instance, the food safety policy of online catering services included market entry review and verification, ingredient purchase and storage, order processing, delivery, and reports and complaints of consumers after the sale for market actors. As the direct source of food safety breaches or crimes in online catering services, catering suppliers enrolled as online merchants in online catering services were given more food safety control responsibilities when processing and packing orders, including the hygiene of containers, tableware, and wrapping material. Suppliers should also

ensure the stable temperature of products if products need to be refrigerated, frozen, or fresh for delivery. Furthermore, local food safety agents are responsible for inspecting such food safety practices (CFDA, 2017).

Specifically, SME physical suppliers are the main force of physical suppliers in the digital economy. Thus, direct quality control of these suppliers is critical. For example, catering suppliers, such as catering SMEs or micro enterprises, are also responsible for quality control, but such quality control is based on their situations. This control depends on how local governments design requirements that are suitable for SMEs or micro enterprises. For example, in the policy of regulating the food safety of online catering services, small catering suppliers, including small diners, food courts, and vendors, should participate in the online catering services depending on the local food safety regulatory agencies at the level of province, autonomous region, and centrally administrated municipality. These levels should have regulations for managing these small catering businesses (CFDA, 2017). Regarding the market entry of small and micro catering suppliers for online catering services, each province, each autonomous region, and each centrally administrated municipality will have their own measures to record small and micro catering suppliers' actions and will manage them separately (Xiao, 2018). Hence, the rulemaking concerning the quality control of products supplied by these small and micro catering suppliers depends on their situation. The physical suppliers, thus, are directly responsible for quality control in the digital economy. Direct quality control from physical suppliers needs oversight from formal regulators. Being enrolled online does not mean physical suppliers are exempted from regulation or they need another approach to be regulated, but dispersed hierarchical traditional regulation cannot adapt to such rapidly growing enrolment without information on illegal market activities (Lodge and Wegrich, 2014).

Under such circumstances, formal regulators must be aware of the activities of market actors to prevent market failure; thus, they need information about how digital platforms manage the direct quality control of physical suppliers. Digital platforms are the market actors that aggregate information on the market activities of physical suppliers to provide intermediation services. To provide such services, these platforms review the information submitted by the market actors of physical

suppliers and verify their real situation when enrolling these suppliers in platforms. This means they are informed of what physical suppliers are doing in their businesses and are capable of searching for quality problems and sharing these with formal regulators. For example, in the case of online catering services in China, in the first half of the policy about food safety in online catering services in effect in 2018, 12 out of 20 requirements were established for online catering platforms to build a food safety management system to manage the food safety control of catering suppliers. Online catering platforms were required to maintain and manage records of data collected from catering suppliers enrolled online, such as their market entry approval, service information, review, and verification of enrolled suppliers, checking enrolled suppliers in the field, managing the activities of suppliers and revoking the operation of suppliers in cases of food safety breaches or crimes in their supply chain from market entry to service delivery. Online catering platforms must report food safety breaches or crimes to local food safety agents and cease online transactions of problematic suppliers immediately by building food safety management systems. Hence, some of the most important responsibilities in food safety control of online catering services, managing food safety information and sharing it with food safety agents, were undertaken by online catering platforms, as they possessed information and managed the activities of the suppliers enrolled as online merchants. Furthermore, these platforms accept consumers' complaints about food safety (CFDA, 2017).

Thus, digital platforms, which collect and possess information from physical suppliers, are more suitable for managing direct quality control activities from the market actors of physical suppliers. Problems of information can be detected due to the required data exchange between platforms and regulatory bodies. For example, based on the requirements of online catering platforms reporting food safety issues, in the fieldwork, a unit of a local regulatory agency in City A had been in contact with managers from online catering platforms, constantly exchanging data on the food safety of catering suppliers in the supply chain. In addition, consumers have been giving feedback on quality control to both the regulatory authority and the market actors based on the after-sale service of online platforms and the reaction mechanism to food safety incidents of local regulatory agencies (OOS003GOV A, 2019; OOS001CORP A, 2019; OOS002CORP A,

2019).

Consequently, even though digital platforms do not directly control the quality of services or products from physical suppliers, to find quality problems, it is necessary to exchange information about physical suppliers with formal regulators and consumers. This exchange interconnects the formal regulators and consumers to the digital platforms, as the market actors of digital platforms are good at managing information on market activities for intermediation services ascribed to the technology of collecting and processing information. Based on such an exchange, digital platforms can ascertain whether physical suppliers are real and qualified for providing services or products, whether they are providing services or products with credible quality, and whether they can control and correct problems. This interconnection ensures the prevention of market failure in the digital economy by maintaining credible information on the digital platforms; it helps them manage direct control over the physical suppliers.

Hence, digital platforms must manage direct quality control over physical suppliers to report quality problems to formal regulators. This management depends on credible information from the activities of physical suppliers because digital platforms provide intermediation services by increasing the number of suppliers through the network effect, and credible information leads to fewer quality problems. However, as digital platforms provide intermediation services between suppliers and consumers, they enrol physical suppliers online as users, not employees; thus, suppliers have weak affiliations with digital platforms (Ducci, 2020). The intermediation services rely on the network effect, which is achieved by the digital platforms' matching supply and demand among enrolled users, as digital platforms have aggregated information about activities from physical suppliers.

Thus, digital platforms still need to ensure the quality of intermediation services by managing the information about direct quality control from physical suppliers. For example, in the policy of food safety in online catering services in 2017 in China, regarding the relationship between online platforms and physical catering suppliers, the most important food safety control responsibilities of online platforms were the food safety contracts that must be signed between online

catering platforms. According to the policy of penalties for illegal food sold online in 2016, the suppliers must produce food that is the same as their online merchandise and service information displayed by the platforms, which were responsible for transaction and delivery. This requirement continued further in the policy of online catering services released in 2017. This meant that the information, including permits and licences, products, and owners, provided by catering suppliers and then reviewed, verified, and displayed by online catering platforms should conform to the quality of the delivered products (Guo, 2017; CFDA, 2017).

Hence, by binding online platforms and enrolled suppliers to control interconnected links of the supply chain, which aimed at achieving information from consistent activities in online catering services, online catering platforms were required to build their own food safety management systems and train food safety managers (CFDA, 2017). Consequently, in policies aimed specifically at quality control in the digital economy, the requirements of management from the digital platforms listed above could not be implemented without mandatory contracts between physical suppliers enrolled online and the digital platforms. For example, in the field, based on such contracts, local regulatory agencies have been monitoring and inspecting food safety control of online catering services as an integrated supply chain containing interconnected parts. In addition, food safety control responsibilities were transferred back to the market actors themselves, who should have internally controlled food safety risk sources instead of merely expecting local regulatory agencies to monitor and inspect them (OOS001GOV B, 2019).

Market actors in the digital economy are the direct sources of quality problems; thus, they should focus on their role in quality control. In this control, digital platforms collect and manage information about how physical suppliers directly control quality via mandatory contracts with these suppliers. Hence, by interconnecting physical suppliers with management via mandatory contracts from the platforms, the digital platforms gain the ability to manage the direct quality control of physical suppliers. Such interconnections prove that direct quality control from physical suppliers concerns the quality of intermediation services, and digital platforms should manage such control.

Based on the policy released in 2017 for online catering services in China, building a management system based on information collected from physical suppliers is beneficial for digital platforms. Such a system accepts the oversight of formal regulators and collects feedback from consumers to determine whether the direct control of physical suppliers has credible quality. Consequently, to manage such direct control of physical suppliers for better intermediation services, digital platforms are in close contact with local regulatory agencies to communicate about any quality control breaches or crimes. The credible quality of physical suppliers, in essence, leads to better intermediation services on digital platforms. Hence, to ensure the good functioning of the digital economy, digital platforms are bound to manage how physical suppliers should directly control the quality of services or products. The digital platforms, then, gain the capacity to manage direct quality control from the physical suppliers, and such capacity is interconnected with the oversight capacity of formal regulators and the feedback capacity of consumers for better intermediation services.

Hence, the new rulemaking starts with new laws to clarify what capacities key actors have in addressing problems together instead of formal regulators acting alone, and then explains why key actors should build such capacities and depend on the capacities of other key actors in specific policies concerning quality control in the digital economy. Based on the update prescribed in the food safety law system regarding online catering services, digital platforms are critical market actors to reduce quality breaches or crimes. Possessing information and managing activities in the supply chain are the main roles of digital platforms, but this also means that digital platforms need to manage the information from the quality control of enrolled physical suppliers. Formal regulators, then, built oversight capacity by monitoring and inspecting physical suppliers and enforcing quality control laws, but they needed information gathered from the supply chain run by platforms to compare it with the information of qualified suppliers from formal regulators. The formal regulators watch over the direct quality control of physical suppliers through such comparisons. Consumers affected by quality control breaches or crimes provide feedback for formal regulators watching over the direct quality control of physical suppliers and the digital platforms managing such control, but they need to be educated on how to provide such feedback efficiently

(see Figure 6) (Liang, 2019). Thus, such relationships embody the mutual dependence of key actors in the co-governance concept when tackling the quality problems of the digital economy, and all the key actors are involved in regulating quality problems in the digital economy but choose to share what they are good at due to their limitations when tackling such problems alone.

Hence, the policies specific to the digital economy interconnect the capacities of key actors by highlighting the quality control of market activities, which accepts oversight on quality control of physical suppliers from formal regulators, the management of such quality control from the digital platforms, and the channels of feedback from key actors, especially consumers. Formal regulators seek as much information on market activities from the digital platforms as possible to oversee the whole market for quality control of physical suppliers, while digital platforms need formal regulators to guide them in maintaining quality control of intermediation services by providing legally approved information on the activities of physical suppliers. Physical suppliers need information management based on technology from digital platforms and oversight from formal regulators to improve direct quality control. The effectiveness of such an exchange must be tested by the feedback of these key actors, especially consumers. In the mutual dependence suggested in the co-governance concept, key actors impacted by shared problems in the changing market address such problems together by interconnecting their capacities. Key actors impacted by shared problems thus interconnect their capacities to address such problems, not merely to fulfil their responsibilities in rulemaking (Verbruggen, 2015).

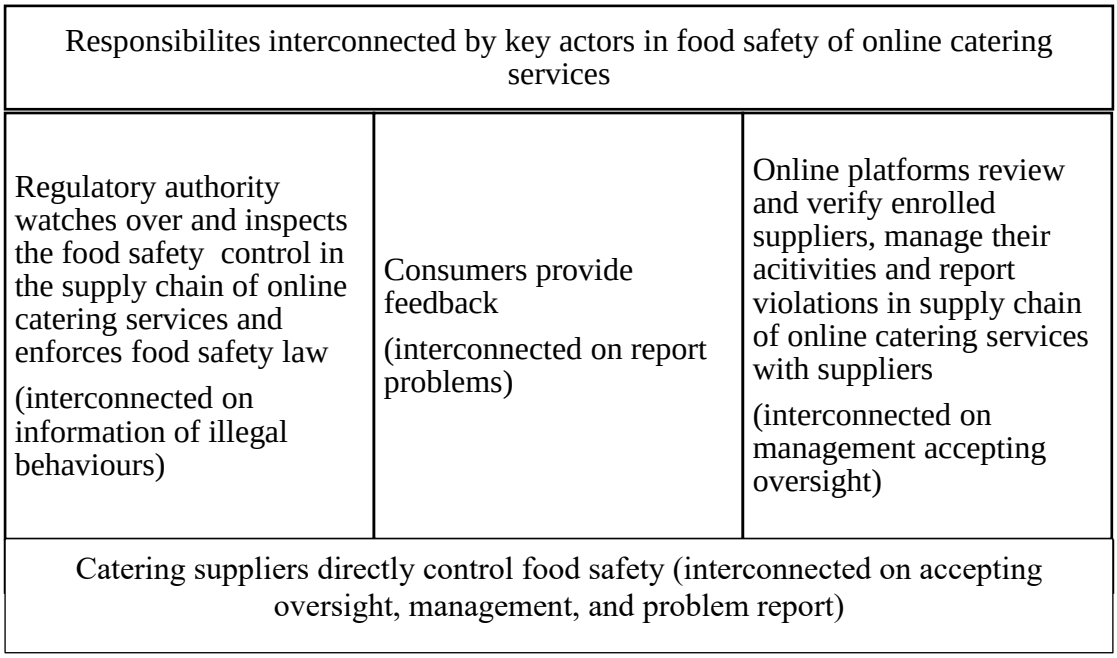

Figure 6 Responsibilities interconnected by key actors in the food safety of online catering services

As the capacities in rulemaking have been clarified, explained, and interconnected, guidelines, or standards for key actors are the next component of rulemaking about how to put their capacities into practice, especially for market actors. To ensure the practice of interconnecting quality control capacities, market actors in the digital economy are the source of quality problems, especially the physical suppliers, who are the market actors that have direct contact with the products and their delivery. These suppliers then require operational standards to maintain quality control. For example, food safety standards in the operation process of physical suppliers determine the foundation of food safety in online catering services (SAMR, 2018).

Later, in 2018, new standards for how to maintain food safety in catering businesses were released to give guidelines to the actors involved in online catering services. The *Operation standards of food safety in catering businesses* were released in 2011 and were too general to adapt to the emergence of online catering services. Hence, SAMR released stricter and more detailed revised food safety standards in 2018 to ensure food safety in online catering services. There were only five sections of standards in the 2011 measures. These sections covered principles, organisation, and staff management, sites with their facilities and equipment,

process control, and supplementary provisions. Compared to the five general standards of 2011, the 2018 standards had 16 detailed sections. Each section had more detailed and stricter guidance directed at the food safety practices of catering services. These 16 sections, including general principles, definitions of terminology, general requirements, sites with their layouts, and food safety management, give formal regulators, online catering platforms, catering suppliers, and consumers clear guidelines on how to control food safety based on their capacities. As the online catering services had integrated multiple interdependent links built by producers and proprietors within them in market activities, the requirements called for strict and detailed standards to be in operation. To ensure food safety in the integrated supply chain of catering businesses, including online catering services, SAMR created these standards to enhance food safety management within each link in the supply chain of market activities.

For instance, SAMR required catering businesses to implement the whole process of food safety control concerning purchasing materials, storage, processing, production, and providing products for consumption. Food safety control looked at the areas that can lead to food safety problems, including the construction of food safety management setups, fulfilment of staff requirements, the maintenance of facilities and equipment, the purchase of materials (including additives and food-related product management), the processing of the food, dining, and delivery, the completion of inspections and tests, cleaning and disinfection, waste management, pest control, the upkeep of documents and records, fuel management, consumption suggestions, and health promotion.

Catering suppliers were required to self-inspect themselves by displaying food safety information, including permits, licences, health certificates of staff, products to be served, and traceability of ingredients and additives. Such information for catering suppliers enrolled in online catering services had to be the same online. In addition, such self-inspections included an annual inspection, a regular weekly inspection, and special inspections. The purpose of self-inspection was to eliminate food safety problems before they harmed consumers. Such self-inspection meant that, in practice, catering suppliers should not use non-food materials, illegal and harmful materials and additives, recycled materials, expired food and additives,

spoilt or contaminated materials and additives, or overuse additives or add medicines (except for those defined both as food and medicines) to the food.

The catering suppliers were also required to have open kitchens so that food production could be seen. In addition, the new food safety standards that were adapted to online catering services provided details for reaching basic food safety standards through risk control (SAMR, 2018). In this way, the formal regulators were told which items should be checked in the administration of formal food safety regulations. Based on these criteria, the local AMR agencies could supervise the progress in maintaining and improving food safety and inform the proprietors about how they might rectify their food safety practices throughout the whole process of their service. Consumers could also have a clear reference to report food safety problems to local AMRs (CNFOOD, 2018; Law and Standards Research Team of Foodmate, 2018). These behaviours give key actors opportunities to participate in the process of making rules. The operational standards of quality control are hence the practical guidelines for key actors in the digital economy, especially for physical suppliers. In addition, these standards are a reference for the administration of regulatory authorities and the feedback of consumers. The standards specified for quality control of the digital economy demonstrate to key actors how they should interconnect their diverse capacities. Furthermore, according to the participants from the group of food safety managers, before the promulgation of new policies and standards, the local government would first release the documents of these policies and standards as drafts of request for comments (RFC) (OOS001CORP A, 2019; OOS002CORP A, 2019; OOS001CORP B, 2019). These drafts meant that the regulatory agents from the local government welcomed suggestions and advice from society, including market actors, consumers, and experts in certain areas such as food safety.

In sum, compared with traditional regulation, rulemaking, as the start of building a new regulatory framework, has clarified the capacities of key actors sharing quality problems of the digital economy and explained that each individual actor's capacity cannot address problems alone. This institutional arrangement has allocated the responsibilities of direct quality control to physical suppliers, information management to digital platforms, and feedback to consumers. Formal

regulators are accountable for oversight of these three responsibilities. Market actors of physical suppliers are required to control quality directly; thus, they need the management of the digital platforms based on their contracts of quality control and the inspection and monitoring of formal regulators. The market actors of digital platforms, in turn, review and verify whether the services of enrolled physical suppliers are qualified enough and then collect and manage the information collected from such practical control.

This quality control of information has interconnected physical suppliers to digital platforms, as the quality control of physical suppliers directly affects the services of digital platforms. Due to the relationship between quality control activities and quality control information, it is reasonable for formal regulators to oversee physical suppliers through inspection and monitoring and enforcing regulation through information shared by digital platforms and feedback from consumers. These capacities thus have interconnections to control the process of market activities in the digital economy via formal regulators watching over direct quality control based on the shareable management of digital platforms and receiving feedback mainly from consumers. Such interconnection has endowed the new regulatory framework with a problem-solving capacity in a coordinated approach.

5.3 The structure of the new regulatory framework in the change of regulation

Rulemaking, as discussed in the last section, has interconnected the diverse capacities of key actors. This interconnection is prescribed by emphasising digital platforms and physical suppliers managing the control of quality through the information management of suppliers, which accepts the oversight of formal regulators and feedback from other key actors to ensure the good functioning of the digital economy. These capacities, mutually dependent on each other, have been assembled into a new regulatory framework to solve quality problems. To coordinate the capacities of the new regulatory framework aimed at quality control of the changing market, the regulatory framework needs a structure to arrange the interconnection of diverse capacities. This section suggests that in the co-governance concept, the structure of the new regulatory framework is a single

authority that amalgamates multiple bodies of formal regulators. To steer market activities for quality control, this authority is built via altered activities to deploy the interconnected capacities of key actors.

The structure of the new regulatory framework depends on how formal regulators design the structure of oversight, which changes with market activities. In traditional regulation, the regulatory authority is fragmented into multiple authorities, and each authority is allocated to each link in the process of market activities without coordination (Lodge and Egrich, 2014). To adapt to the changing market, the regulatory framework is bound to open slots for key actors to prepare the interconnected capacities prescribed in rulemaking for deployment when addressing shared problems. The interconnection of these capacities in this new structure guides what key actors should do in addressing quality problems, but they need a structure to deploy these capacities to steer market activities as the source of quality problems. Thus, based on the concept of co-governance, to endow key actors' positions for solving problems of decreasing quality that impact them, the new structure accepts an open horizontal design. Such a structure deploys the capacities of key actors to share the knowledge, information, and resources gained from their activities. Formal regulators design such a structure, which is embodied by amalgamating multiple bodies of formal regulators into a single regulatory authority. This design is open to key actors impacted by quality problems. In this design, formal regulators deploy the capacities of key actors based on rulemaking while overseeing such deployment.

The oversight capacity of formal regulators includes monitoring and inspecting market activities, coordinating the capacities of key actors in tackling problems of quality control and enforcing regulations based on feedback from consumers. Market actors of digital platforms have strengths in reviewing and verifying the information of physical suppliers and managing the activities of physical suppliers based on data exchange with formal regulators and feedback from society. The market actors of physical suppliers are capable of controlling quality directly, based on the information management of digital platforms. Consumers who receive services or products have the ability to give feedback. These capacities have been interconnected in rulemaking based on what they need to address: shared quality

problems. Furthermore, the oversight of formal regulators requires the capacity of multiple key actors to find and correct errors, such as quality problems, in market activities. Hierarchical formal regulators cover rapidly growing market actors merely by deploying limited public resources, which leads to fragmentation in regulations. Every single regulatory body was used to control every single type of market activity assigned to them. This approach had limits in deploying public resources to impose multiple overlapping and complex policy tools and limited and predictable administration on targets (see Figure 7). Thus, in structure, the traditional fragmented formal regulators need to be amalgamated to ensure that such interconnections correspond to the links of the market activity process. Instead, the new formal regulators are interconnected with the changing market and the feedback of consumers due to such change. Such a tendency to interconnection, which means that key actors are addressing problems together, as assumed in the co-governance concept, changes regulation into a more horizontal design.

Consequently, formal regulators amalgamate their multiple bodies into a single authority to arrange and coordinate the interconnected capacities prescribed in rulemaking to oversee and steer their activities. The new structure needs to be understood from two dimensions as multiple layers in an annular shape that are interconnected based on the interconnected capacities of key actors, and these layers change constantly by encircling and guiding the process of market activities. The first dimension is how key actors should interact with problems in the process of activities. The outer layer of this structure is set by a single authority to prevent the failure of the market; the inner layer, on the other hand, is filled with social actors, especially consumers. Social actors can give feedback to formal regulators in the outer layer to report problems in time and to the market actors in the centre. Such feedback prompts formal regulators and market actors to improve product or service quality (see Figure 8). These layers do not just address problems in one part of the process of market activities, but trace along the whole process of market activities from market entry and operation to the market exit or correction of misbehaviours in operation (see Figure 9). These interconnected multiple layers in an annular shape, then, determine how the interconnected capacities within the new regulatory framework are structured.

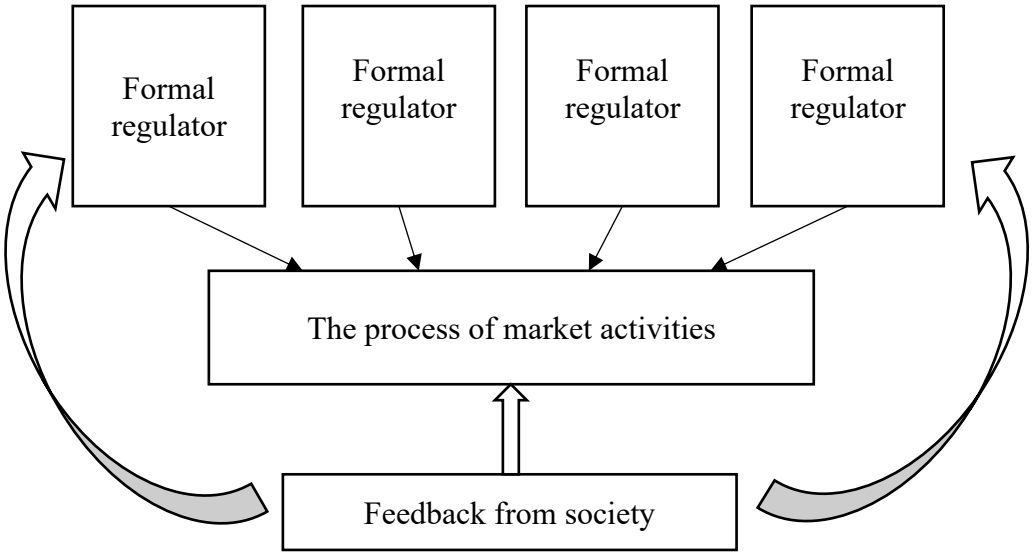

Figure 7 The hierarchical structure of traditional regulation

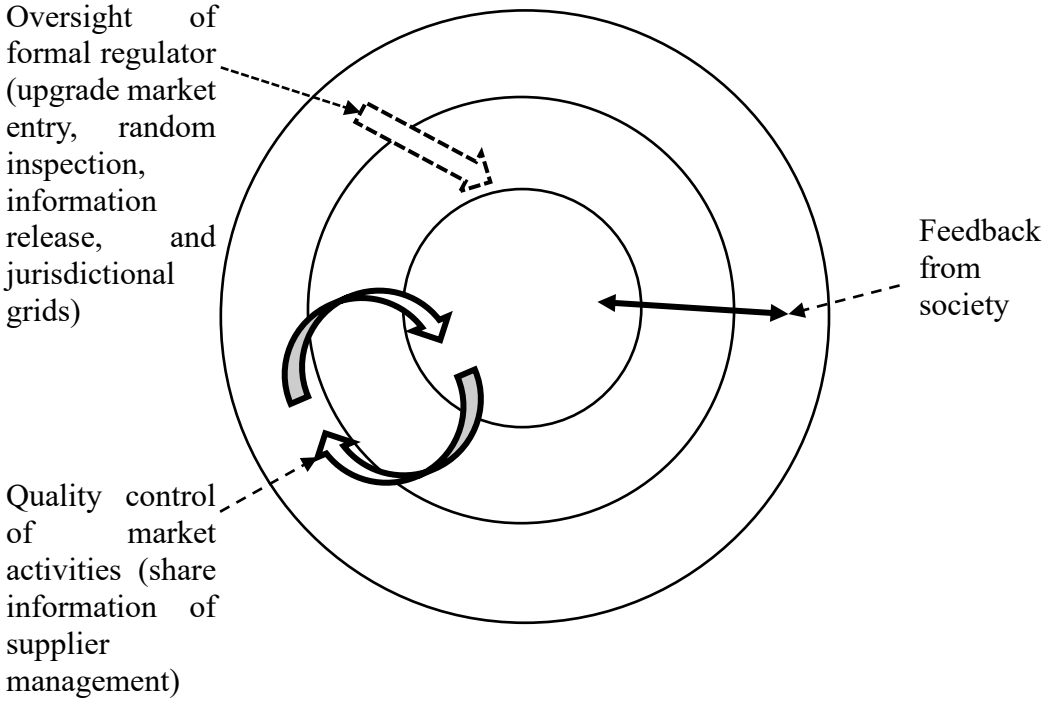

Figure 8 A horizontal and open structure of the new regulatory framework

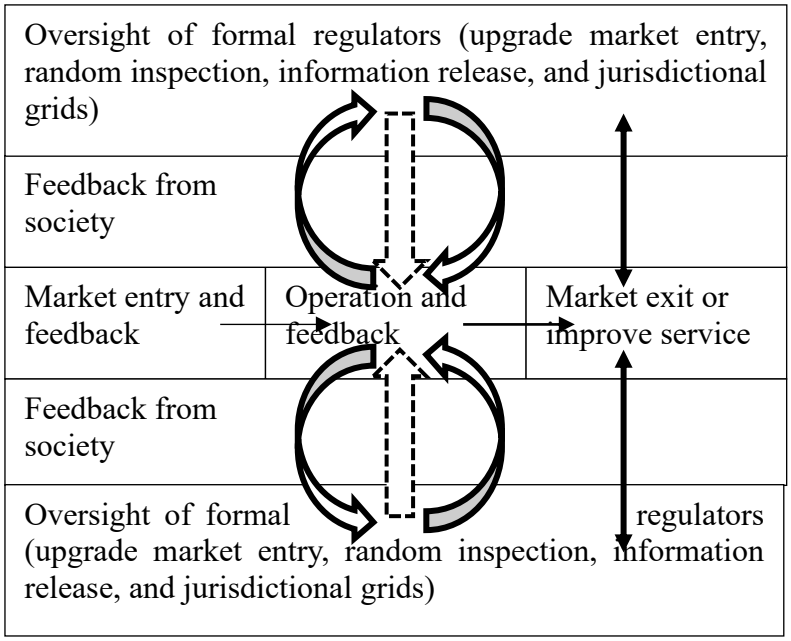

Figure 9 The cutaway of the new regulation structure changed based on the co-governance concept

This structure requires several components. The first is the oversight built by the formal regulators. Based on this design, the single regulatory authority has amalgamated multiple regulatory bodies for the whole process of market activities. This authority watches over the process of market activities without gaps by monitoring and inspecting market actors and receiving feedback from society. For example, in China, to implement responsibilities for addressing food safety problems in the interconnected links of online catering services in the field, an amalgamated regulatory authority designed to take responsibility for monitoring and inspecting online catering services were indispensable.

The state needs a plan for the design of a single regulatory authority. For example, in the 13th Five-Year Plan of Food Safety Regulation, the central government was expecting to tackle the food safety problems of this new web-based market through a holistic structure in which local governments would be given more discretion to administer food safety regulation on food safety control of online catering services (State Council, 2017; Wan, 2018). The central government urged the regulatory bodies again to gain a holistic structure so that government regulators could watch over the whole supply chain of this new web-

based market later in 2018 (State Commission Office for Public Sector Reform, 2018). Thus, to watch over the quality control of the whole supply chain in the digital economy, the state needs reform to ensure that formal regulators can act as a single body, especially its local regulatory agencies, and should coordinate resources, such as expertise, training, and technology, within one holistic structure instead of spreading them thinly across multiple regulatory bodies.

Consequently, the design of a single regulatory authority is undertaken by the state. For instance, in 2018, the Central Committee of the Communist Party of China (CCCPC) introduced a plan to amalgamate the previous government bodies related to food safety, which the National People's Congress had approved and the State Council had conducted (Central Committee of the Communist Party of China, 2018). This amalgamated regulatory authority, named the State Administration for Market Regulation (SAMR), began to oversee a set of integrated but complex supply chains, including online catering services. SAMR has begun to take responsibility for monitoring and inspecting online platforms and catering suppliers and enforcing food safety laws when market activities fail (State Council, 2018; Central Committee of the Communist Party of China, 2018; State Commission Office for Public Sector Reform, 2018). The establishment of the SAMR covered the regulatory gaps among the former government bodies in food safety regulation, and it was led by the Food Safety Commission of the State Council. In the SAMR, several divisions started to work as a whole to oversee food safety control within the complex supply chain of online catering services.

The local administrations for market regulation (AMRs) also shared the same division arrangement led by the general offices of the food safety commission from the local governments (State Commission Office for Public Sector Reform, 2018). In addition, the local AMRs, as local regulatory agencies, had the same structure as the SAMR, so they received the directive from the SAMR, but as the local government had been given more discretion after reform, local AMRs implemented it based on the local situation (OOS003GOV, 2019; The General Office of the CCCPC and The General Office of the State Council, 2019). A single authority, therefore, has filled the vacancies of oversight capacities left by the traditional structure run by fragmented multiple regulatory bodies.

To prepare key actors in positions of deploying interconnected capacities, this new single regulatory authority convenes information and feedback from other key actors to oversee the process of market activities. Such oversight is achieved by connecting subdivisions within such a single authority to the diverse capacities of these key actors, such as the information shared from the supplier management systems from digital platforms and feedback from consumers. To ensure that multiple subdivisions within a single authority connect to the capacities of other key actors, such oversight requires information on supplier management from digital platforms and the direct quality control of physical suppliers. For example, inspecting and monitoring the food safety control of complex supply chains integrated by online platforms was coordinated within SAMR.

In SAMR, the division of food safety coordination, led by the Food Safety Commission of the State Council, was responsible for making policies and their subsequent implementation, coordinating major food safety issues, and establishing and promoting the mechanisms of both trans-regional and trans-departmental coordination and linkage. Under the coordination of the division of food safety coordination and based on the complex supply chain of online catering services, multiple divisions could monitor and inspect the food safety control responsibilities of online catering services from market entry, production, operation, and retailing to consumption. Thus, the division of food safety inspection and surveillance could sample food products on the market (State Commission Office for Public Sector Reform, 2018). Their job was to find food safety problems so that the SAMR could inspect, dispose of, or recall unqualified products.

Based on such inspection and surveillance, the division of the supervision and administration of internet-based transactions could oversee and direct the supervision of online transactions. Online catering platforms were the supervisory focus of this division, and through information exchange with these platforms based on the Electric Commerce Law, online platforms have become the channel of this division to monitor physical suppliers (People's Congress, 2018). Following such online monitoring, to watch over food safety control at market entry, the registration office (also known as the office for the special markets of small and micro enterprises and private businesses) was responsible for establishing the

system of registration and issuance of business permits for market actors. The division of the supervision and administration of food safety in production was responsible for overseeing food safety control in production. The division of supervision and administration for food safety in operation was responsible for enforcing food safety control in physical operations, especially among catering businesses (State Commission Office for Public Sector Reform, 2018). Hence, in the new regulatory framework, the new regulatory authority focuses on monitoring and inspecting market activities as a whole and acquiring information to adjust policy tools and administration; thus, the subdivisions of prior multiple regulatory bodies have been amalgamated and then coordinated by a single regulatory authority. Such a single authority coordinates functions corresponding to market activities to oversee the whole process of activities about market actors.

A system of oversight records that ensures the structure of the regulatory framework constantly guides the activities of key actors comes second. Formal regulators compare formal data with information from other key actors and then inform these key actors by monitoring and inspecting market actors or processing feedback from consumers to enforce the law and prevent market failure. In addition, monitoring and inspecting market actors means that the formal regulators will inform market actors to meet requirements in the laws of relevant industries in addition to enforcement. To maintain and update the record of activities from market actors, the new regulatory authority needs a shared record system of quality control to surveil illegal behaviours.

For example, in China, the division of credit supervision and administration of SAMR registers and records the activities of market actors. This record will be categorised as A, B, and C (from good, mediocre, to bad) according to a food safety risk grading system (Figure 10) and managed by this division, and then released to the public through food safety grade notifications for feedback from consumers. The measures of administering such a grading system in 2012 and then the measures of administering food safety grades in production and operation in 2016 made by the CFDA were continued in SAMR. Market actors who had low credits due to the violation of food safety law would be inspected more frequently based on such a credibility system of their food safety control responsibility. The

activities of credit control from market actors and feedback from consumers meant that they accepted monitoring from the regulatory authority (CFDA, 2012; China Food and Drug Administration, 2016c; State Commission Office for Public Sector Reform, 2018; The General Office of the CCCPC and The General Office of the State Council, 2019).

Based on the requirements of the policy released in 2017, such gradings and legal market entry information are compared with information from the management of suppliers on online catering platforms. When the local food safety agents find errors, they inspect and monitor suppliers and platforms, and correct errors through the outcome of such comparison. In the field, local regulatory agencies base monitoring and inspections on such food safety credit grades and comparisons of data. The local regulatory agencies of City A have also increased the frequency of monitoring and inspection of suppliers with lower credits and lower food safety risk grades (OOS001GOV A, 2018; OOS003GOV A, 2019). The grading based on the record of quality control of market actors gives the single regulatory authority a clear system to input public resources and deploy the capacities of other key actors reasonably. So far, the regulatory authority has established its capacity for oversight and penalty, but it still needs tools to build a structure for deploying such capacity and interconnecting it with the capacities of other key actors.

Figure 10 Two samples of food safety grade notifications

Based on the oversight capacity and the system of oversight records of a single

regulatory authority and the amalgamated local regulatory agencies, the regulatory activities are the next to be changed. Such activities are intended to assure the interconnected capacities in positions ready for deployment prescribed in the rulemaking of the new regulatory framework. For example, in China, to ensure that the amalgamated local regulatory agencies implement shared responsibilities on the ground, the regulatory authority needed a series of innovative techniques for them to monitor and inspect the food safety control responsibilities of online catering services, gather information on their activities, receive feedback on food safety from consumers, and enforce food safety law. Consequently, based on the FSL, the general offices of both the CCCPC and the State Council enhanced the responsibility for the distribution of regulatory authority on the assessment, surveillance, monitoring, and inspection of food safety control and enforcement of food safety law if necessary (General Office of CCCPC and General Office of State Council, 2019). The leadership of the administration of food safety regulations, interconnected with market actors and consumers, becomes the source of delivering new strategies for new regulation.

New administrative methods ensure that formal regulators, as the source of overseeing market activities; market actors, as sources of quality problems in their activities; and consumers, as sources of feedback to these problems, are interconnected more specifically. Redesigned by formal regulators amalgamated into a single authority, these methods shape the structure of a new regulatory framework, which is composed of multiple interconnected concentric layers representing the interconnected capacities of key actors. These layers, following the change in the market, guide the process of market activities towards the direction of fewer quality problems in the changing market. In other words, how the market is changing by choosing a path with fewer problems depends on the feedback from society, especially the consumers, and the oversight of formal regulators (see Figure 7, Figure 8, and Figure 9).

The new single regulatory authority, then, is embedded in the structure of such multiple interconnected layers of rings, and it is the critical outer layer for preventing market failure. Furthermore, the layer of preventing market failure

follows and watches over market activities by collecting information on how suppliers control quality, which is collected and managed by digital platforms. This layer is embodied in new administrative methods. In the case of food safety regulation of online catering services, the central government released four methods and one system to put the capacities of market actors and consumers in their positions, overseen by SAMR and its local AMR agencies. The premise of such methods is the control of market entry. New administrative methods, including upgrading services of market entry, random inspection, transparent and traceable information release, and putting physical suppliers in jurisdictional grids, have new regulations that emphasise watching over the whole process of market activities with the support of technology. The single regulatory authority applies these methods to oversee each link of market activities without gaps, and this oversight starts with market entry as the first critical link.

Hence, to regulate quality problems in the market entry as part of market activities in the digital economy, market actors need to be qualified to enter the market to provide services; thus, their entry needs an upgrade in qualifications and acceptance of oversight from the new regulatory authority. In terms of food safety at market entry, SAMR, as the regulatory authority, is dedicated to reforming by optimising the procedure of market entry approval for enterprises and improving the efficiency of their review. Market entry approval, as ex-ante regulatory behaviour, has cut unqualified proprietors out of the market. In addition, the digitalisation of the market entry approval record has reduced the level of counterfeiting and the fraudulent use of permits and licences (OOS003GOV A, 2019). Consequently, the procedure itself has been simplified, but the criteria for market entry are stricter than before. Furthermore, this procedure is transparent enough for proprietors in catering businesses, and it brings fairness to the process of market entry. Each item is reviewed carefully according to the requirements of food operation permits and the business licences in the application by the catering suppliers (CFDA, 2017; General Office of the Central Committee of Communist Party of China and General Office of the State Council, 2019).

Moreover, to oversee such an entry, the new single regulatory authority archives market entry attempts from those actors and the information of market

actors who have already entered the market. For example, in the process of issuing market entry approval, the local AMRs archive the market entry approval of physical catering suppliers in a unified database and constantly share this data of approval documents with the online catering platforms. In addition, due to e-commerce, such as online catering services, local AMRs issue digitalised permits and licences to physical catering suppliers. The service scope of these suppliers is clarified and updated on both digital and physical permits and licences. To detect violations of market entry approval, the local AMRs themselves check the market entry approval through the data captured or shared from online catering services and regularly compare it with the database of the local AMRs (OOS001GOV A, 2018; OOS003GOV A, 2019). As for catering suppliers who violated the law of holding licences and permits due to using fake licences and permits or using them for fraudulent purposes, the local AMRs require the online catering platforms to take those suppliers offline and revoke contracts with these suppliers. Both online catering platforms and illegal catering suppliers are then severely penalised (OOS003GOV A, 2019). In addition, as catering SMEs are the main force in the marketisation of online catering services, SAMR has started to control the market entry of small catering enterprises or individual catering suppliers in practice. Such information on market actors in the archive of formal regulators is constantly exchanged with the digital platforms, and then compared with the supplier data of digital platforms, which includes the suppliers attempting to be enrolled online and those already enrolled online.

The operation of those market actors after entry needs to be overseen by the local units of regulatory authority based on the policies and standards specific to the digital economy. Furthermore, such oversight requires a structure to ensure its effectiveness. For example, in China, those suppliers who have been in businesses legally receive inspection and monitoring from local AMRs. After the reform of the regulatory administration, the food safety committee offices of local governments led the local AMRs, and the leaders of local governments took full responsibility for such leadership (CCCPC and the State Council; OOS003GOV A, 2019). The work of the local AMRs focuses on inspecting and monitoring both the online catering platforms and the local physical catering suppliers.

The prior segmented structure of government bodies in the regulatory administration left voids regarding the distribution of responsibility for supervision and inspection. These voids allowed the local catering suppliers to violate the FSL as they were able to implement flexible methods to cope with the segmented local regulatory units. As the regulatory authority has now been amalgamated into a single one, it is the same for the local AMRs as it was with multiple segmented local regulatory divisions. Instead of multiple districts being inspected and monitored by segmented regulatory units led by multiple local regulatory divisions, local AMRs have started to divide their administrative regions into multiple districts and designate them to their AMR units for monitoring, inspection, and law enforcement. Thus, local AMRs can designate each unit to their oversight district for inspection and monitoring without voids. These units have the same organisational structure as the local AMRs to oversee the whole supply chain of online catering services, and each unit is held accountable for their inspection and monitoring of food safety issues (CCCPC and the State Council; OOS001GOV, 2018).

Such a designated oversight district for each unit that a local AMR is held accountable for is named a ‘grid’ by the central government. The central government officially started directing local governments to divide local administrative regions into grids in 2017, and the system came into effect once all local AMRs established their grids. Such grids at the local level require professional law enforcement officers and inspectors, and their inspection and monitoring cover catering suppliers within the grids for each accountable unit. Within these grids, catering suppliers have fewer opportunities to take advantage of the regulatory gaps when dealing with amalgamated local AMR units physically. The development of technology also supports the practice of such a grid, which is a jurisdiction built through monitoring technology that receives information from online catering platforms.

Because of the requirements of specific policies and standards, online catering platforms have developed their food safety database to store critical food safety information of the physical suppliers enrolled online, and these platforms are required to exchange the resources, knowledge, and information they have

gathered from risk control (State Council, 2019). The digital platforms, then, are embedded in the layer as the core of the multiple-layer structure in the new regulatory framework to inform the single authority and the consumers on how suppliers control quality directly and accept oversight. Through this exchange, the local food safety administrations can have their remote alert systems to detect food safety breaches or crimes based on feedback from consumers and the information exchange with platforms (see Figure 11 and Figure 12). For example, in City B, such a system can monitor the activities of catering suppliers in the districts for which local food safety administrations are responsible, and it shares live video feed from those suppliers based on a transparent kitchen project (Shu, 2018). Both market activities and regulatory activities receive feedback from society, especially consumers, to alter their paths. Social actors, then, are embedded in the layer between the outer layer of oversight from formal regulators and quality control as the core managed by the digital platforms and physical suppliers. Through a comparison of this feedback, the decision-making of the regulatory administration could be a robust, fair, and professional process, one which would guide online catering platforms and suppliers towards their food safety control.

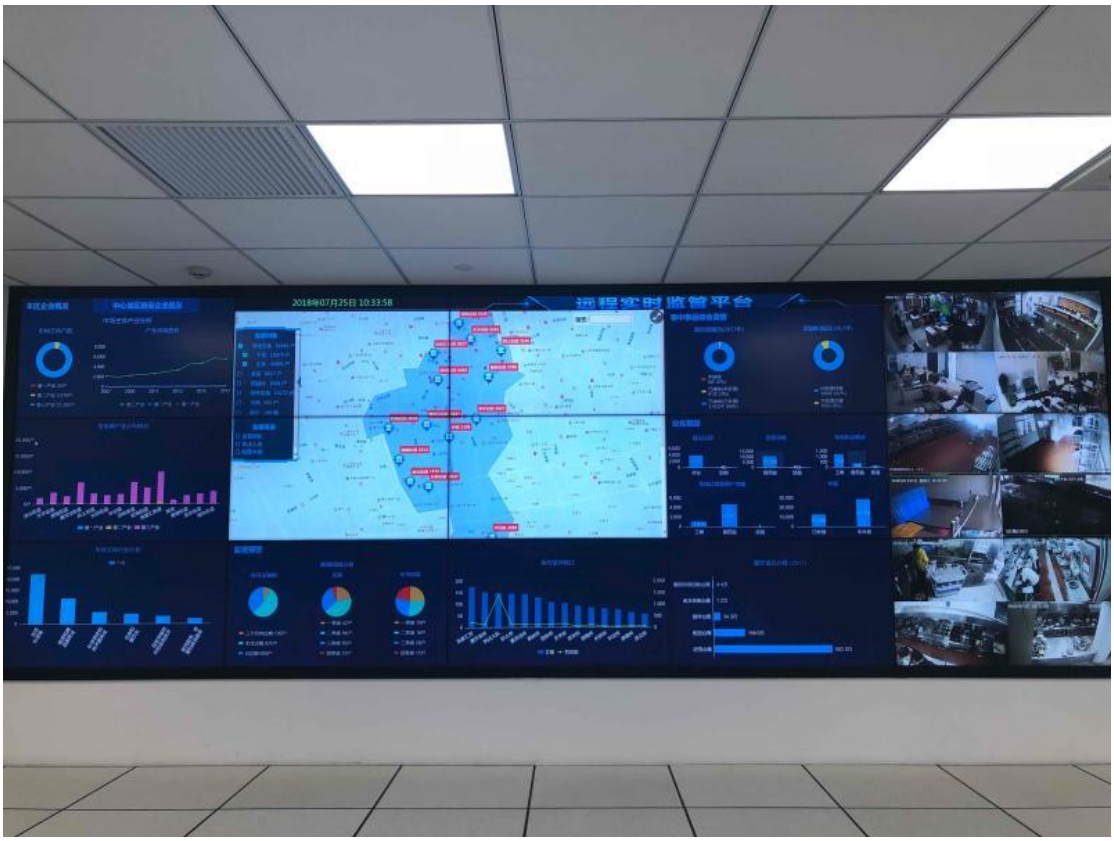

Figure 11 One of the online food safety monitoring system terminals in City B (photograph from *JFDaily*)

Figure 12 Live video feed from local catering suppliers in City B (photograph from *JFDaily*)

To maintain the structure of multiple layers, from the oversight of formal regulators and the feedback from society to the quality control of market actors, the formal regulators need to ensure that regulatory activities cannot be evaded by market actors. For example, in the jurisdictional grids set by the local AMRs, new methods of inspection and releasing the results of such inspections to the public are in use by local AMR agents. Random inspection and promptly released results are methods designed to reduce such opportunistic behaviours of market actors. Random inspection means that the AMRs of local governments make lists of the items for inspection, and then send inspectors or law enforcement officers at random to check these items (CCCPC and the State Council; OOS001GOV A, 2018). Based on the grids for inspection and supervision, the SAMR and the provincial AMRs can determine the mandatory items and then other optional items for inspection. The mandatory items include risky and illegal products, products reported with quality and safety problems, and products from enterprises on the blacklist. Enterprises that used to have food safety breaches are also randomly checked more frequently.

The provincial AMRs can add more optional items based on their situation, and then implement the inspections based on the risk rating of enterprises. For instance, in practice, some local AMRs will inspect physical catering suppliers according to their food safety grade notifications. The frequency of inspecting suppliers at different food safety levels is also different. In practice, suppliers with C-grade notices are inspected more often (CFDA, 2016c; OOS001GOV A, 2018; OOS003GOV A, 2019). Based on these grades, a list of items for inspection is sent to the AMRs of local governments. The provincial AMRs can build and update a database of food enterprises and inspection personnel and keep records for inspection. For the efficacy, strictness, fairness, and standardisation of law enforcement and inspection concerning food safety, each provincial AMR can also specify the number and the proportion of suppliers at different grades, and the methods and procedures used for the random inspections.

The FSL enforcement officers and inspectors are sent out in their own grids to inspect the items in random combinations. Once these regulatory personnel receive a notice for random inspection, they should check the designated items thoroughly because the database of items and personnel for inspection will put their inspection on record accurately. If any food safety issues occur, that inspector is held accountable. Hence, the local AMRs of each region can keep track of inspections and ensure the accountability of regulatory personnel. As the inspection is traceable, the release of inspection results should be prompt, so that the public can respond and give feedback on the problems highlighted in the inspections.

In addition, the SAMR records the results of the random inspections in the social credibility record file, the penalty of lost credits is recorded, and the enterprises with poor records are blacklisted (CFDA, 2016c; State Council, 2017; Zhang, 2018). A unified information system supports such methods. The regulatory authority, following the reform, has already started online platforms, including China Market Regulation News (CMRN), China Food Safety Net (CFSN), China Trace (GS1N), and China Food Safety Standards Network (CFSSN). These platforms were the sub-systems of the unified information system required by the 2018 Food Safety Law. The CFSN releases general information about food safety news. The CMRN is responsible for tracking the development of market

regulations, including food safety. The GS1N is responsible for the traceability of food safety and product quality. The CFSSN is the archive for storing national food safety standards and updating newly released standards. In addition, each city had its food safety net websites to release news and trends related to local food safety regulations. These sub-systems are part of the state-owned food safety information system, and they depend on the exchange of feedback from other actors. If catering suppliers and online catering platforms break the FSL or act illegally in food safety practices, their market activities are limited, and they might even proceed to a permanent market exit accompanied by serious sanctions.

In sum, the single regulatory authority and the application of those methods mean that the new regulatory authority is actively monitoring and detecting any quality problems based on interconnections with the information management capacity of digital platforms and the feedback of consumers. These key actors are assigned their roles based on their capacities, and they have been placed in the positions of the new regulatory framework that ensures the maximum and optimised deployment of these capacities. This interconnection, arranged within the structure designed by the impartial and transparent regulatory authority, officially gathers key actors impacted by shared quality problems in the digital economy. These capacities consequently compose the total problem-solving capacity of the new regulatory framework through a more horizontal design instead of the hierarchical structure of formal regulation, controlling risks solely with passive participation from other key actors.

Furthermore, for the good functioning of quality control, digital platforms interconnect information management capacity with formal oversight. To demand solutions to quality problems, consumers interconnect feedback with formal oversight. Such interconnections give these key actors a counterbalance in the new regulatory framework. In exchange, the impartiality and transparency of the oversight of the new regulatory authority are assured. This problem-solving capacity in the new regulatory framework, achieved by gathering key actors to solve shared problems in changing markets, launches a change in regulation, which conforms to the concept of co-governance as the process of regulation. Through a more horizontal structure following the specific policies and standards to adapt to

the changing market, the new amalgamated regulatory authority oversees these positions of key actors and penalises them impartially for any misbehaviour. Hence, the purpose of building such a structure in the new regulatory framework is to ensure that the activities of key actors can be steered based on their diverse capacities interconnected in rulemaking, and this structure ensures that the new regulatory framework guides market activities.

5.4 Conclusion

The change in regulation starts with formal regulators redesigning a new regulatory framework for quality control in the process of market activities. This redesign is participated in by key actors impacted by shared problems in digitalising traditional industries by connecting their capacities for rulemaking and arranging these capacities in a new structure. This change enriches the capacity for problem solving in the new regulatory framework.

Rulemaking is critical as the first step in the change of regulation, as it turns the regulatory framework from a hierarchical structure into a more horizontal one open to key actors. Moreover, this new regulatory framework, shaped by rulemaking, has shared responsibilities with digital platforms and physical suppliers enrolled in the digital economy. Essentially, these responsibilities are based on the main capacities of key actors impacted by quality issues in digitalised traditional industries. The regulatory authority excels at inspection, monitoring, and enforcing the quality control law of relevant industries. Consumers are the actors who receive services and give feedback to both regulatory authorities and market actors. Market actors in the digitalisation of traditional industries are the sources of quality problems, but they can spare resources for direct quality control. To specify these capacities and interconnect them, policymaking becomes the next step.

Furthermore, the digital platforms possess massive amounts of information about physical suppliers of traditional industries enrolled as online merchants, increasing demand by enrolling as many suppliers as possible and upgrading algorithms to improve efficiency. These platforms are capable of discovering and disclosing problems by possessing massive amounts of information about suppliers

and reporting these problems to both regulatory authorities and consumers. Market actors, as physical suppliers in such conditions, then put their efforts into direct quality control. The physical suppliers and the digital platforms enrolling them online are linked because the quality control of suppliers matters to the quality control of their information possessed by digital platforms. The regulatory authority, then, links to digital platforms to access information possessed by digital platforms in exchange for removing problematic suppliers by comparing their data. Consumers, in turn, link their feedback capacities to both regulatory authorities and market actors. The linkage of these actors means that the new regulatory framework is open to key actors impacted by quality issues from digitalised traditional industries.

To ensure that these capacities enrich the overall problem-solving capacity of new regulation, as the designer of the new regulatory framework, the regulatory authority forms a holistic structure by amalgamating segmented regulatory bodies and new instruments to run the new regulatory framework. Prior segmented regulatory bodies are amalgamated into one regulatory authority, as its subdivisions accept coordination. These subdivisions correspond to the links of market activities as a whole and keep a constantly updated record system. This record system ensures the deployment of capacities from key actors in new regulations, contrary to the reliance on formal provisions in traditional regulations.

Furthermore, the amalgamated regulatory authority needs instruments to concentrate on the capacities of the key actors in practice. Such new instruments are based on watching the whole process of market activities supported by technology. The new instruments are designed to ensure that each market actor is overseen through technology and that the public is aware of the outcomes of such oversight. As the capacities of key actors in new regulations have been linked via the exchange of data on quality control, key actors gain channels to ensure that their capacities are concentrated by the new regulatory framework. The basic units of amalgamated regulatory authority become the critical pivots to embody this concentration through a grid structure. Through this structure, the problems in the process of changing market actors are covered in the jurisdiction, as key actors are informed through data exchange.

The next chapter analyses how key actors impacted by the quality issues of digitalised traditional industries deploy these interconnected capacities of key actors by interacting through different modes to exchange data.

Chapter 6: The New Regulation in Practice for the Changing Market

6.1 Introduction

Based on the co-governance concept, to regulate a complex and fast-changing market of the digital economy, regulation is changed via a new regulatory framework with a new set of rules, including laws, policies, and standards, and a new structure. This new regulatory framework is discussed by describing how the central government in China rebuilt a new food safety regulatory framework for online catering services between 2016 and 2019. As discussed in Chapter 4, this framework aims at addressing the quality problems that impact key actors in the new market changed by the digital economy, and with which formal regulators cannot cope alone. The formal regulators gain authority in overseeing quality control by inspecting and monitoring market actors, receiving feedback from consumers, and enforcing such oversight through legislation. Such a capacity requires massive information about market activities from digital platforms. The direct quality control capacity of physical suppliers and the management capacity of supplier activity information from digital platforms need the expertise of formal regulators. Physical suppliers need both capacities to guide their direct quality control. These three capacities also need feedback in society, especially from consumers. Furthermore, in the co-governance concept, to address a shared problem, gathering the capacities of key actors is acceptable in an open arena.

Thus, interconnected capacities need a structure to steer the activities of key actors as well as market activities. This is different from merely enhancing traditional regulation, which invests public resources to merely require market actors to build self-regulation. This new regulatory framework has been designed in a structure that steers market activities through a more horizontal design and new regulatory activities. Such a tendency means that formal regulators, as the designers of new regulatory frameworks, are becoming another larger platform that enrols key actors as its users. Such a design arranges the diverse capacities of key actors into a structure corresponding to changes in the market. Thus, such interconnected, diverse capacities offer greater problem-solving capacity than

fragmented formal regulators dispersing public resources.

To address shared problems in the changing market, a new regulatory framework needs practice. The concept of co-governance suggests that quality problems caused by the changing market are impacting the key actors involved in such a market; thus, these key actors are willing to address such problems together. Co-governance concept, then, contributes to explaining how key actors address quality problems by choosing interaction modes suitable for them. As discussed in Chapter 5, the capacities of key actors have been interconnected through new rulemaking, and these capacities are ready to be deployed through the new structure designed by formal regulators. To address such problems in the quality control of the digital economy, based on the interconnected capacities and the new structure designed for them, key actors must interact through a process of problem-solving to put the new regulatory framework into practice together. Hence, through the lens of the co-governance concept, this chapter will analyse the process of addressing quality problems in the changing market. In this process, the interaction of key actors to change regulation in practice will be discussed, based on the new rules and the new structure of the regulatory framework.

To address problems in the process of market activities, key actors require a specific process focusing on quality control in the market activities of the digital economy. The change in the market results from the activities of market actors attempting to meet the demands of consumers, but such attempts may contain factors leading to problems that impair the quality of service delivery. Such problems or factors leading to problems may exist in the process of market activities, from market entry and operation to service delivery. Hence, a problem-solving process is composed of problem discovery and disclosure, problem management, and exchangeable problem feedback. In this process, key actors deploy their interconnected capacities by choosing strategies of interaction that are suitable to check whether problems or factors may lead to problems, as well as to tackle breaches or crimes. Collaboration is the basic strategy, as key actors have been impacted by service quality problems as one of the problems in industries integrated by the digital economy. Nonetheless, interactions within the concept of co-governance need more than a collaboration mode to deploy the capacities of key

actors.

The capacities of key actors are not static; they are interconnected among key actors to supplement their weaknesses, allowing them to comprehend how the market is changing, and the problems or the factors that lead to problems in such change. Hence, besides collaboration, the options of interaction are chosen by key actors but are not limited to cooperation, competition, and communication to improve their own capacities and further interactions. The key actors themselves even have internal interactions, such as coordination, to improve their capacity to face the challenges of a changing market. Formal regulators, by receiving updates on market activities, coordinate the constant improvement of a regulatory framework and regulatory activities. Market actors, including digital platforms and physical suppliers, compete to find better methods of improving services. Consumers seek better approaches to understanding and reporting problems they have encountered. Such self-enhancement of capacities helps key actors communicate efficiently when they need access to interact with other key actors within the new regulatory framework.

On the premise of interconnected capacities prescribed in rulemaking and arranged in the new horizontal structure of steering market activities in the change of market, this chapter argues that, through a process of addressing quality control problems together, key actors choose strategies of interaction to share what they need and improve their capacities. The next three sections discuss and explain the process of changing regulation through the dimension of interaction modes and the dimension of the problem-solving process in the co-governance concept. Key actors share authentic information based on their capacities to ensure that they can discover and disclose problems from market entry to service delivery. Managing problems also requires interaction, and such interactions focus on the operation of the market. Consequently, key actors will interact on the outcome of such problem management to adjust further interactions for problems or factors leading to problems in market activities. The linkage and concentration of capacities through interaction provide key actors with the dynamic of market activities within a unified regulatory framework.

6.2 The interactions of key actors on discovering and disclosing quality problems in the change of regulation

The digital economy is making the market more complex, efficient, and rapid in providing services or products to customers. The resulting quality problems are impacting formal regulators, market actors, and consumers as key actors involved in this change. To find such problems from the direct control of physical suppliers and the supplier management of digital platforms, these key actors need to comprehend market activities, and such behaviour requires authentic information derived from market activities. Digital platforms, as mentioned in Chapter 2, possess massive amounts of information about market activities, increase the enrolment of traditional physical suppliers, and constantly upgrade algorithms to improve the efficiency of transactions. This means that digital platforms have the strength to discover and disclose problems due to the possession of information about market activities.

However, digital platforms still need to establish supplier management, which focuses on the quality control of market activity information. This is not just to manage suppliers, but to share authentic information with formal regulators to ensure the quality of service of suppliers that enter the market legally. Formal regulators of multiple regulatory bodies have been amalgamated into a single authority to correspond to the whole process of market activities, but they still need digital platforms to discover and disclose problematic suppliers enrolled in platforms to improve regulatory activities. Thus, both such a single regulatory authority and the digital platforms gather, share, and deploy their capacities to ensure they can find problems in the market. The interaction in the redesigned regulatory framework, then, is to connect the information of digital platforms to the information of legal suppliers possessed by the amalgamated regulatory authority. Furthermore, how both these key actors arrange these interactions in policies and following agreements is important as the institutional basis for the interaction on discovering and disclosing problems in market activities amid the change of market.

Based on the process of market activities, from market entry, market operation, and service delivery, to redress mechanisms if quality problems happen, such

interactions start at market entry. In addition, the market entry mentioned here has two meanings. One is about the market entry approved by formal regulators via issuing permits and licences, the other is about physical suppliers applying to be enrolled online by digital platforms to enter the market of the digital economy as online merchants. For example, in China, since online catering platforms possess increasing information about service processes and market activities from enrolled suppliers, they have the advantage of building food safety control of information. According to the *Measures for supervision and administration of food safety of online catering services* released in 2017 (which came into effect in 2018), as the specific policy was developed mainly for online platforms, the online catering platforms are required to have their own internal food safety management with relevant sectors and personnel and to update their food safety data regularly to food safety administrations, especially market entry information. Physical catering suppliers seeking to be enrolled as online merchants into online platform corporations must submit information about market entry approval documents, evidence of ownership, real addresses, pictures of dining areas and kitchens, and contact details to online catering platforms. Based on the food safety management system of online catering platforms released to the public, these platforms then review and verify this information and decide whether to accept the application of these suppliers, check these suppliers in the field, and then decide whether to enrol these suppliers online and display their online merchants (CFDA, 2017).

Based on the requirements of sharing information, digital platforms deploy their capacities to manage the quality control of enrolled suppliers, especially the quality of their market activity information. For example, the two main online catering platforms in China, Meituan and Ele.me, have launched their own whole-process food safety information control and put it into practice based on legal requirements and specific food safety policies concerning online catering services. In addition, such interaction is also a kind of competition. This control covers food safety review and verification of catering suppliers, management of the information gathered from food safety practices, the imposition of internal sanctions on food safety violations and crime, and the practice of reporting to local AMRs (Ele.me, 2016; Metituan, 2019).

The amalgamated SAMR from the central government and its local administrations of market regulation (AMRs) of local governments had information on approved suppliers and temporarily recorded suppliers running businesses. Such information was the capacity of the amalgamated SAMR from the central government and local AMRs of local governments, and it was critical for them to prevent food safety breaches or crime in online catering services. Online platforms need such formal information to compare with the information of suppliers applying to be enrolled online (Standing Committee of National People's Congress, 2015; Standing Committee of National People's Congress, 2018).

In practice, in the research conducted in City A, in the link of market entry, catering suppliers provide permits and licences as the market entry approval issued by local AMRs. The online catering platforms compare these materials with the AMR database and then review the addresses and operating sites of their physical stores online (OOS001CORP A, 2019; OOS002CORP A, 2019). Once the review of these materials is complete, the food safety staff of the online platforms go to the operating sites of the enrolled suppliers to verify whether they are real or not. OOS001CORP A stated that "food safety staff of platforms will check suppliers applying to be enrolled online in the field and send the collected information to headquarters and release the outcome to the public" (p. 1). Moreover, OOS002 CORP A said that "we send the update of information about licences and permits to suppliers and ask them to renew their permits and licences" (p. 1). OOS001CORP A also stated that "the local AMR does not update the data of suppliers in time and browsing websites of local AMR is not easy" (p. 1). Digital platforms, then, filter unqualified suppliers, but they still need the capacity of the amalgamated regulatory authority to provide authentic information about qualified suppliers.

Consequently, to arrange such interactions with more detail, the amalgamated regulatory authority and the digital platforms share the information through further agreements to achieve such interaction. For example, in City A, in the process of food safety control, the online catering platforms also cooperated with local AMRs by signing enforceable memoranda, which meant the establishment of regulatory partnerships between the regulatory authority and online catering platforms. These

enforceable memoranda imply that sharing quality control information between formal regulators and digital platforms helps to find quality problems in the digital economy. The information quality control requirements, based on the capacity of information technology from digital platforms and the cooperative protocols between the amalgamated regulatory authority and the digital platforms, have practically allowed them to share information within their capacities (Weng, 2017; OOS001GOV A, 2019). In the interviews with local regulatory agents, the amalgamated regulatory authority possessing formally approved authentic information of physical suppliers correspondingly collects information about suppliers possessed by digital platforms. In City A, the local AMR gathers data on suppliers through online catering platforms. The local AMR contacts online catering platforms to share supplier data to check whether platforms have enrolled any suppliers without reviewing and verifying permits and licences. OOS001GOV A (2019) said:

"After the promulgation of the new food safety law and specific food safety policy for online catering services, the local AMR discuss with online catering platforms to share data of catering suppliers. Those platforms will make a list of illegal suppliers and send it to the local AMR, then we can inspect these suppliers and send feedback to these platforms to ensure they can penalise these suppliers and take them offline" (p. 2).

Another interviewee also mentioned that the local AMR had been screening information from online catering platforms (OOS002GOV A, 2019). According to OOS003GOV A:

"[The local AMR] monitors the local online catering platforms by exchanging data with them and sends data to AMR stations of each district. AMR stations then inspect the suppliers provided through these data and update the inspection with platforms" (p. 2).

Similar methods have become common in other major cities in China. For example, in 2019, City B had already been watching over the operation of online catering services by sharing data with online platforms (Food Safety Commission Office of City B and Administration of Market Regulation of City B, 2019). Hence,

this quality control process, which focuses on the quality control information gathered from the market activities of platforms and enrolled suppliers, corresponds to the oversight process of formal regulators, including inspection, monitoring, and law enforcement. Information quality control, then, has practically interconnected digital platforms with the amalgamated regulatory authorities for assuring the quality of physical suppliers. This interconnection also ensures that the management of links to market activities in the digital economy corresponds to the regulatory activities of the regulatory authority on these links. Market entry is the start.

The outcome of such an interaction is significant due to the focus of market actors and formal regulators on quality control information. For example, before the special rectification of food safety in online catering services between October 2018 and January 2019, the SAMR had already met with representatives from the main online catering platforms in China in September 2018, and they agreed to collaborate with the SAMR through risk control (Dong, J, 2018; SAMR, 2019). Consequently, in the reports from the SAMR, several local AMRs, and the online catering platforms themselves, the number of unqualified or illegal suppliers has fallen significantly. For example, in the rectification of food safety problems among online catering services between 2018 and 2019, the regulatory authority took 185,000 unqualified and illegal catering suppliers offline and banned 9,375 suppliers without market entry approval (SAMR, 2019).

In City A, 14,000 catering suppliers were registered on the online catering platforms in 2016, and this number had increased to 71,000 by August 2019. The local AMR investigated and rectified 191 suppliers and disqualified 455 among 2,368 suspected suppliers. The online platforms themselves have intercepted 4,629 unqualified suppliers and taken 4,050 problematic registered suppliers offline (City A Administration of Market Regulation, 2019). According to one of the local AMR officers, as the local government was given more discretion on food safety administration, this discretion meant more accountability. Thus, food safety administration on online catering services, especially on food safety information, has become stronger than before, and proprietors of online catering services, especially local managers of online platforms, have become more cooperative in

food safety administration (OOS003GOV A, 2019).

The local AMR of City B has also banned catering suppliers without permits and licences 1,231 times, and 470 food safety cases concerning online catering services and online food businesses have been investigated and prosecuted, with the penalty on these cases amounting to CNY 7,753,000 (more than GBP 855,000) in total (Food Safety Commission Office of City B and Administration of Market Regulation of City B, 2019). Hence, sharing market entry information is the basis of sharing information within the capacities of digital platforms and the amalgamated regulatory authority, and it prevents unqualified market actors from entering such a market without approval. Digital platforms and the amalgamated regulatory authority have started to discover and disclose quality problems in the digital economy by sharing information about market entry.

The prevention of unqualified suppliers and the removal of illegal behaviours of enrolled suppliers in the market entry are the first steps in discovering and disclosing problems. Hence, the information on quality control shared between digital platforms and the amalgamated regulatory authority helps key actors to prevent unqualified suppliers and remove the illegal behaviours of enrolled suppliers. The capacity of processing massive information and discovering and disclosing problems in such processing of digital platforms helps the amalgamated regulatory authority to filter illegal suppliers, while the amalgamated regulatory authority helps digital platforms to improve internal quality control when enrolling suppliers. Both amalgamated regulatory authority and digital platforms, then, start to focus on the legal suppliers reviewed and verified by platforms. Thus, the constant improvement of the internal control capacities of digital platforms and the market entry information processing capacities of formal regulators are important in further activities.

Even qualified legal suppliers may still have poor quality control, indicating that discovering and disclosing problems in managing physical suppliers still requires the interaction of key actors. Digital platforms, then, still need to manage the operation of enrolled suppliers via internal control, which still shares the disordered behaviours of suppliers with the amalgamated regulatory authority. Such management that reports the problems of suppliers corresponds to the

inspection and monitoring of the amalgamated regulatory authority. For example, in the policy of food safety in online catering services released in 2017, which came into effect in 2018, food safety management for those online merchants must be built into the operation of online catering platform corporations, including internal control, personnel training, and food safety breach reports to local authorities (CFDA, 2017).

In City A, to manage the food safety of the physical catering suppliers enrolled online, online platform corporations and local AMR agencies indeed do regularly share data of enrolled suppliers and compare the information on market entry approval and conditions of online operation. After the review and verification, these suppliers who are enrolled online are required to sign their enrolment contracts and food safety protocols, both of which are mandatory. Based on these requirements, when managing enrolled catering suppliers, the food safety management staff of online catering platforms supervise the process of a transaction from its order to receiving and processing the order, packaging it, service delivery, and consumption. If there is any deviance in the data, the online catering platforms are required to report it to the local AMRs, and the local AMR agencies inspect problematic suppliers in the field (OOS003GOV A, 2019; OOS001CORP A, 2019).

To ensure a stable record of sharing information about managing physical suppliers, digital platforms compete to improve their system of managing physical suppliers. For example, to capture illegal activities or food crime in the review, verification, and management stages, Meituan, and Ele.me have developed their own systems. Ele.me was the first to start its own supplier review and verification system called Xuanyuan to filter out unqualified and illegal suppliers (Ele.me, 2016b). Ele.me has gathered each detail of their physical suppliers applying for online services in their review and verification process, including the names of the stores, the qualifications of the staff, the settlement, contact information, identification, and the permits and licences, all of which are mandatory when applying (Ele.me, 2016b). Such information is reviewed and assessed both manually and by computer. To improve the efficiency of the review and verification procedures for checking uploaded information, optical character

recognition technology is employed. As for the manual review, the local management teams of Ele.me assess the applicants three times online, and then continue the assessment by visiting the physical sites of the suppliers. The food safety control teams also revisit these suppliers. The applicant information from 10% to 15% of the suppliers is sent to a third-party testing agency named Intertek for further assessment. In addition, the headquarters of Ele.me have access to the review and verification process, while the local market managers of platforms are only allowed to access the online store-opening applications. The system assesses the food safety risks of the uploaded information submitted by applicants and turns it into a report for reference for manual review and verification. The illegal information uploaded in previous applications is archived on a blacklist, and the system alerts the platform if such information is uploaded again (Ele.me, 2016b). OOS002CORP A also mentioned that "our online catering platform has taken factors including showing permits and licences, training, health certificate, and food safety grading into consideration on the assessment and ranking of suppliers" (p. 2).

Meituan has a similar digital review system to review catering suppliers enrolled online (also known as Sky-net) to compete with Ele.me. The system builds digital files for those catering suppliers. Such a system, composed of platform entry review, online enrolment, and platform departure tracking, prevents dark kitchens or fake stores from entering online catering services (see Figure 13) (Meituan Research Institute and The Takeaway Committee of China Hotel Association, 2019). Both Meituan and Ele.me have their own internal control policies, which were based on the exclusive policy of the regulatory authority but with more details. In addition, the food safety contracts signed between suppliers and platforms require formally registered suppliers to display food safety information at each link in the transaction chain in their online stores. The service content of these online stores is also under surveillance by the platforms. If there are products beyond the scope of the service content, online catering platforms can detect these through data capture. In addition, Meituan has built a tracing system named "Sky-eye". OOS001CORP A (2019) stated that "this system can locate the real addresses of suppliers, watch over them, and trace the transaction process from consumers placing orders and suppliers accepting orders to delivery" (p. 1). Such internal

control has given digital platforms their own capacity to exchange their data with the amalgamated regulatory authority to ensure authentic information about market activities. Hence, discovering and disclosing problems also matters in managing the operation of legal suppliers in the digital economy, and it needs to share data between digital platforms and the amalgamated regulatory authority.

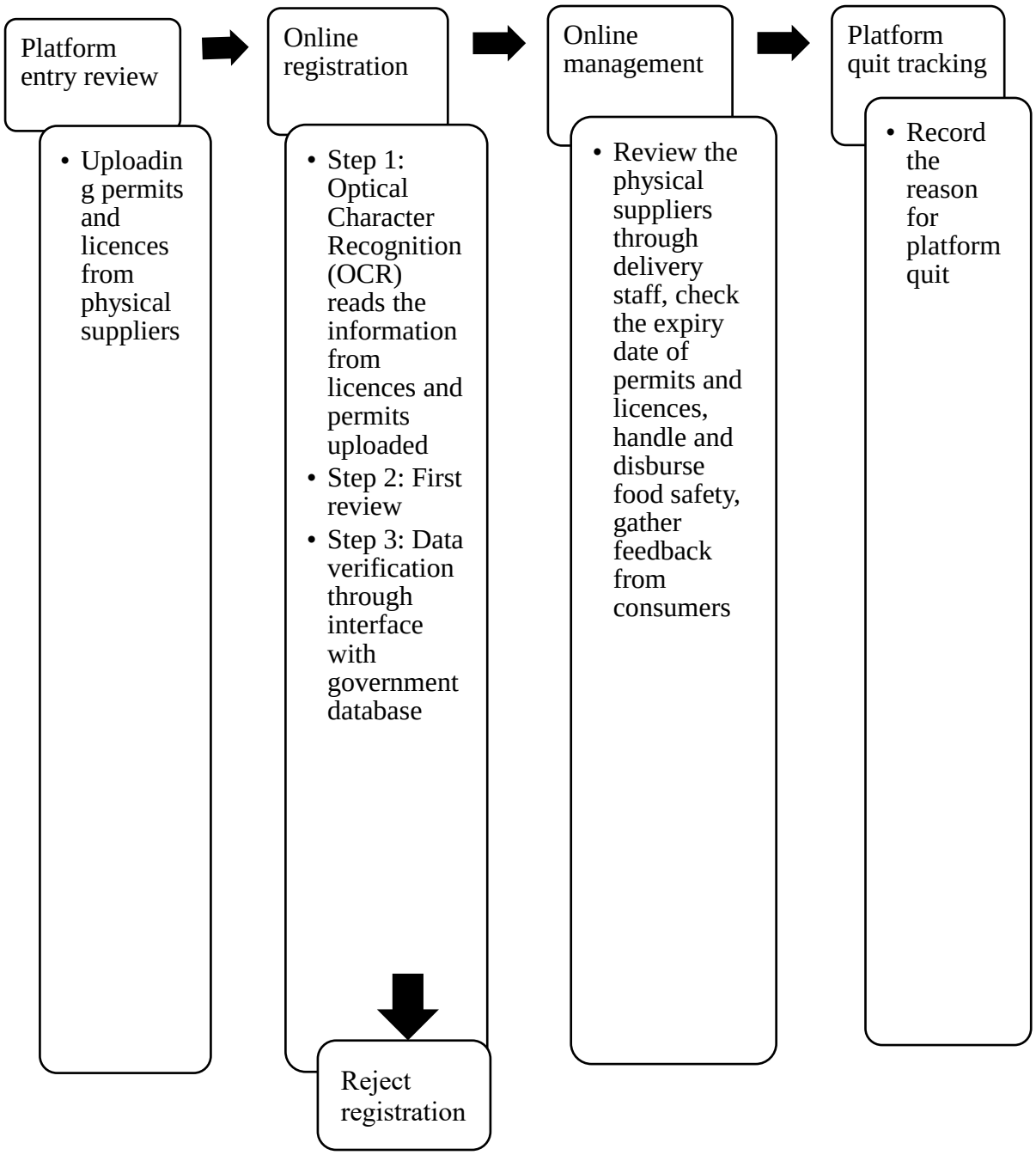

Figure 13 The structure of the Meituan digital file system of catering suppliers

Information continues to be shared between digital platforms and the amalgamated regulatory authority to highlight problems in service delivery. In the case of online catering services in China, before service delivery, the online catering platforms shared information about food safety explicitly through labelling that seals packed food for delivery. According to detailed local standards, these food safety seals could be manufactured and distributed to catering suppliers by platforms or catering suppliers themselves. Such actions have been promoted in cities including Nanking, Shanghai, Guangzhou, Hangzhou, etc. (Liao, 2020). For example, in City B, more than 22 million online catering product seals have been produced and dispatched. During the delivery, the route of service delivery starts to be tracked by the quality control management system of the online catering platforms with the sealing of the package of catering products. Such information has also been shared by platforms. (Food Safety Commission Office of City B and Administration of Market Regulation of City B, 2019). Moreover, the delivery staff are required to disinfect their delivery equipment, including delivery cases, regularly, and keep the products they deliver clean and intact. In the feedback after consumption, if consumers find any food safety issues, including the intrusion of foreign matter or contamination, they can complain and report them to online catering platforms and ask for compensation. The online catering platforms have introduced their own industry standards regarding the hygiene of service delivery in cooperation with the China Cuisine Association (China Cuisine Association, 2017; OOS003CORP, 2019; OOS004CORP, 2019).

Digital platforms also interact with the amalgamated regulatory authority, including their local branch agencies, and consumers at quality breaches or crimes in the digital economy through complaints and reports. In this step, problem discovery and disclosure need feedback based on sharing information among key actors. Online catering platforms can force catering suppliers to remove unqualified products or take catering suppliers offline without allowing re-enrolment. In the meantime, these violations and crimes are updated to the local AMRs and the consumers who report them. Both Ele.me and Meituan have their own consumer protection systems to receive complaints and reports from consumers, which can also be updated to local AMRs as required (Ele.me, 2018; Meituan Research Institute and The Takeaway Committee of China Hotel

Association, 2019). According to interviews with the local managers of those online catering platforms in City A, some consumers also reported to local AMRs. The professional people who are dedicated to cracking down on food safety issues of online catering services as consumers also report to local AMRs (OOS001GOV A, 2019; OOS003GOV A, 2019; OOS001CORP A, 2019; OOS002CORP A, 2019).

The outcome of the interaction in tackling violations or breaches in quality control is significant. For example, in the report of the food safety rectification project on online catering services, the SAMR affirmed what online catering platforms have done to improve food safety (SAMR, 2019). These platforms also had their own system of categorising keywords from consumer comments and finding food safety breaches. For example, Meituan developed a consumer comments data system (as part of Sky-eye) in cooperation with the local AMRs. It identifies negative comments and classifies them into four categories that contain over 30 items. Meituan shared negative comments with local AMRs to help them detect food safety breaches by registered catering suppliers (Han, 2018; Lin, 2017). This system has also been applied in other cities. Apart from their ranking based on consumer preferences and comments, the catering suppliers enrolled on online platforms received or lost points based on consumer feedback on food safety. If consumers suffered serious food safety incidents, the online catering platforms removed those stores permanently and recorded them on a blacklist, which can also be updated to local AMRs (OOS001CORP, 2019; OOS002CORP, 2019; OOS003CORP, 2019; OOS004CORP, 2019).

Hereby, as digital platforms have interacted with the amalgamated regulatory authority by sharing and comparing their information on quality control of market activities related to service quality, they discover and disclose problems in the information about market activities from market entry, managing quality control of market actors and service delivery, to the report of service quality. Such sharing and comparison of information do not just give both digital platforms and the amalgamated regulatory authority capacities to maintain the authenticity of market activity information, but ensure that they can enhance their own capacities for further interaction of sharing information.

6.3 The interactions of key actors on managing quality problems in the change of regulation

Discovering and disclosing problems in the whole supply chain of the digital economy is the basis for the interaction of key actors in the new regulatory framework. Such problem discovery and disclosure, which excludes unqualified suppliers through comparison of data from the amalgamated regulatory authority and digital platforms, ensures the authenticity of quality control information. However, the authenticity of information is rooted in the authentic activities of key actors, especially the operation of market actors, as the source of quality problems or factors leading to these problems. In the food safety regulation of online catering services in China, food safety problems can be discovered and disclosed in online catering services due to the shared information between online catering platforms and local AMRs. Online catering platforms could prevent most illegal catering suppliers via food safety reviews and verification of suppliers before enrolment and food safety contracts with suppliers after enrolment. This action is based on a data comparison between service information possessed by online platforms and market entry approval information from local food safety administrations. However, this data comparison was not always effective, as local managers of online platforms had told local AMRs that the update of data legalising suppliers did not mean that their operation process had fewer food safety risks; thus, food safety training was necessary (OOS001CORP A, 2019). In this way, key actors, especially formal regulators and market actors, interact substantially to manage quality problems after the market entry of suppliers.

The management of quality problems aimed at dispelling the problems of suppliers before they affect consumers is critical, and it requires the interaction of key actors impacted by quality problems by overseeing and training physical suppliers together. Managing problems or factors leading to problems in the digital economy, then, concentrates on the operation of the market, especially on physical suppliers as the main source of problems. Hence, for example, in the food safety regulation of online catering services in China, besides the problem of discovery and disclosure in market entry, food safety problems rooted in real operations in catering suppliers need management. Food safety problem management has

concentrated on the operation of online catering services. The physical catering suppliers enrolled by online platforms are the main sources of food safety problems or factors leading to such problems that could directly cause food safety breaches or crime. Thus, improving the practice of direct quality control through the interaction of managing problems is critical.

Based on the shared information of problem discovery and disclosure, physical suppliers enrolled online need to interact with both the digital platforms and the formal regulators. Digital platforms deploy their capacities through internal quality control overseen by formal regulators to ensure such interaction. For example, in China, the management of food safety work via training is based on food safety contracts in the internal control of online catering platforms and the legal requirements of local AMRs. In City A, the online catering platforms require that each store with an operational area of more than 50 square metres should have its own food safety control staff, and the owner of the store and their food safety staff should receive mandatory food safety training and tests organised by the local AMRs (OOS003GOV A, 2019; OOS001CORP A, 2019; OOS002CORP A, 2019). Specifically, OOS001CORP A (2019) stated:

"The food safety control staff and owners are required to participate in 40 learning hours of training by taking online tests. They can earn ten learning hours if they score 80% on a test, whereas 60-80% can only help them earn five learning hours. They fail a test if their marks are less than 60%. In addition, the platform will also remind enrolled suppliers through their online store pages of the platform and save terminals for them on the official channel of the platform on WeChat app" (p. 2).

Ele.me and Meituan have also competed to introduce their own food safety training programmes for the purpose of compliance and better services. Ele.me has food safety workshops for catering suppliers, while Meituan has started the Kangaroo Academy (the mascot of Meituan is a kangaroo) to let catering suppliers take online classes in food safety training. Online catering platforms have also improved the supply chain of ingredients and food-related products for catering suppliers to purchase, so the food safety risk can be reduced considerably from the start of the operation process (Ele.me, 2016b; Meituan Research Institute and The

Takeaway Committee of China Hotel Association, 2019). Such training, according to interviews with local food safety agents and food safety managers of online catering platforms in City A, is the outcome of cooperation between local AMRs and online catering platforms (OOS003GOV A, 2019; OOS001CORP A, 2019; OOS002CORP A, 2019). The suppliers in the digital economy, especially SMEs, rely on the education of formal regulators and the internal management of digital platforms in their direct quality control.

Furthermore, formal regulators have deployed their capacities by enhancing coordinative regulatory activities. For example, OOS003GOV A said that "we record the grades of owners and food safety staff in the online training system and award them a certification of food safety to prove that they have passed the online test" (p. 2). In addition, the districts of City A have been divided into multiple minor jurisdictional grids (or blocks), and the officers of each AMR station are assigned to these jurisdictions to ensure that each supplier has completed annual training (OOS003GOV A, 2019). Hence, direct quality control of physical suppliers is ensured based on the cooperation between the digital platforms and the formal regulators on the training of direct quality control.

The training of direct quality control from physical suppliers still requires oversight from formal regulators. Thus, the amalgamated regulatory authority still needs to inspect and monitor physical suppliers and enforce the law when necessary. Based on the shared information between the amalgamated regulatory authority and the digital platforms as the basis for their interaction, these groups of key actors still need to manage problems in the operation of physical suppliers in the digital economy. In the case of City A, the local AMR still inspects the operation of catering suppliers in the field besides applying the technologies in monitoring jurisdictions. Just one AMR station is responsible for inspecting and monitoring more than 3,200 catering suppliers. More than 70% of these have been enrolled as online merchants on online catering platforms. The level of inspection by local AMRs cannot reach the huge level of market activities carried out by local catering suppliers (OOS003GOV A, 2019). Hence, physical suppliers are required to control the quality of their products or services directly, and they start to normalise such control.

For example, in the observation of ten local catering suppliers enrolled in online catering services in City A conducted on 6 March 2019, they could directly control their food safety by cleaning and sanitising cookware regularly. For instance, one particular pizza store was cleaned and sanitised each day; the cleaning device was changed every hour during the operation; and fresh ingredients were disposed of if they were stored for more than four hours. The other nine stores, whose businesses include egg pancakes, pastry, rice noodles, Hangzhou cuisine, fish dishes, Hong Kong-style cuisine, pan-fried buns, beef noodles, and Chongqing spicy noodles, also cleaned and sanitised their cookware regularly and ensured a stable temperature of ingredient storage. In addition, these suppliers cooperated with both local AMRs and online catering platforms to take online food safety tests (H Du, 2019, personal communication, 6 March).

Due to the internal control of physical catering suppliers, these platforms received fewer complaints about food safety. Other major cities in China chose similar internal food safety controls. For example, according to official statistics, there are 109,377 catering suppliers in City B. Apart from public canteens and central kitchens, 79,077 of these are restaurants, fast-food stores, snack bars, and beverage stores, including 12,448 medium suppliers, 52,864 small suppliers, and 10,948 other suppliers, such as fast-food stores, snack bars, and beverage stores. There are also 7,494 small suppliers who are temporarily recorded and filed in local AMR records. These suppliers are still running their businesses without permits or licences, but they have gained a temporary market entry record. Beyond effective online surveillance, such a large number of suppliers is too large for the local AMR in terms of inspection, supervision, and law enforcement (Food Safety Commission Office of City B and Administration of Market Regulation of City B, 2019).

In the observation of 13 restaurants conducted in City B on May 21, the Hong Kong-style restaurant was cleaned and sanitised each day separately by a dining area team and a kitchen team. The staff of this restaurant also took food safety training under the supervision of the owner. The Thai cuisine restaurant used a similar method for cleaning and sanitising. The ingredients were delivered through an independent supply chain. New ingredients were labelled, and expired or spoilt ingredients were disposed of. In addition, the local AMR station inspected this

restaurant two to three times a week. As the owner of this restaurant, the catering management company also sent staff to check internal food safety control. Other restaurants, including services for desserts, pizza, rice noodles, Sichuan cuisine, Japanese food, Italian bistro, curry, pastry, Hunan cuisine, and Shanghai cuisine, shared similar methods in internal food safety control, and they were supervised not just by themselves but by the catering company as their owners (H Du, 2019, personal communication, May 21). These catering suppliers were not just complying with food safety requirements from the local AMRs, but controlling food safety to improve their services. However, these actions can mostly be seen in branded restaurants or chain stores.

Since 2018, there have been more than 4 million catering suppliers in China, and catering SMEs still account for the majority. Stores run by fewer than five staff members still made up 82.4% of the total catering suppliers. As for the suppliers, the small catering suppliers were the main force in online catering services, but after the reform of regulatory administration and the food safety management of online catering platforms, their market activities became limited. Whether small suppliers could join online catering services depends on the local filing or recording database containing temporary market entry approval from local AMRs. The food safety training of these suppliers was limited due to growing costs. In a survey of 15,569 catering suppliers conducted by Meituan Research Institute, food safety became part of the core competence of catering suppliers. In addition, according to the feedback from suppliers enrolled online, online catering platforms provide them with useful data, knowledge, and industrial information to help them improve service quality. However, of the issues that needed improvement in catering suppliers, food safety was not their priority. Reducing the cost of catering suppliers was still the top priority of online catering services (Meituan Research Institute and The Takeaway Committee of China Hotel Association, 2019).

Hence, whether physical suppliers are well trained in direct quality control needs to be examined. Digital platforms and the amalgamated regulatory authority interact with technologies that can ensure the oversight of market activities, especially the operation of physical suppliers. For example, in City A, to reduce food safety problems in the operation of catering suppliers enrolled in online

catering services, the digital platforms aimed at the visual oversight of this process by physical catering suppliers through closed circuit television (CCTV) cameras. Such visual oversight became the outcome of another cooperation of both local AMRs and online catering platforms, which had been promoting transparent kitchen projects nationwide. Consequently, the physical catering suppliers upgraded their own stores by equipping surveillance cameras in their kitchens and connecting the video feed to online catering platforms. Both Meituan and Ele.me have established the online video streaming channel of a transparent kitchen in their mobile software. Such services had been applied in 43 cities in China by 2019. In City A, based on these projects, online catering platforms could then send account executives to cooperate with local AMR officers to examine the food safety of suppliers and adjust their rankings of platforms based on the outcome of such an examination. OOS001GOV A stated that "one of the standards of grading catering suppliers is whether they join a transparent kitchen project. I have also learnt that catering platforms even have their own internal standards in grading the kitchens of enrolled suppliers. The better performance of these suppliers means that they have higher rankings and then have more orders" (p. 2). OOS003GOV A also mentioned that "we cooperate with local catering suppliers to ensure more of them can join the transpar200trategtchen project" (p. 3). Suppliers with better rankings would be displayed on platforms as examples of good food safety practices.

On the other hand, enrolled suppliers with illegal or non-compliant behaviours would be warned by deducting food safety credits given by online platforms until they were taken offline and sanctioned by local governments. The record of examinations is updated on both online platforms and data based on local AMRs (OOS001CORP A, 2019; OOS002CORP A, 2019). For example, in City B, 1,182 stores have installed monitoring cameras so that both platforms and consumers can watch over the operation process of catering suppliers and discover issues. If there are any food safety breaches or crimes, the videos can be saved as evidence for consumers asking for compensation (Xinhuanet, 2018; SAMR, 2018; Meituan Research Institute and The Takeaway Committee of China Hotel Association, 2019). Hence, watching over how physical suppliers operate in the digital economy is not achieved without technological support, and in such a change of regulation

through the lens of co-governance, technology also interconnects key actors to maintain a consistent record of market activities.

Based on the measures of managing quality and technology deployed by digital catering platforms on physical suppliers enrolled online, digital platforms initially gained internal control capacity through the resources of market entry approval shared by regulatory authorities and local branches and quality tests shared by third-party test institutions or enterprises. Combining these resources with information gathering and management, digital platforms can reduce quality problems from market entry to operation and service delivery. The purpose of such interactions among the amalgamated regulatory authorities and digital platforms is to generate a consistent process for examining suppliers. Such a process ensures the impartiality of regulatory activities and internal quality control to improve the service quality of suppliers.

Hence, in sum, the interaction for managing quality problems in the digital economy stems from managing the operations of physical suppliers. Such management needs cooperation between the internal control of digital platforms and the amalgamated regulatory authority to ensure the stable operation of physical suppliers. In addition, to ensure stable management of direct quality control from physical suppliers, the competition between digital platforms is unstoppable. The application of technology gathers the capacities of both digital platforms and the amalgamated regulatory authority to ensure that the operation of physical suppliers can be overseen. Moreover, enhancing the direct quality control of physical suppliers themselves is the core of managing quality problems, as suppliers are the sources of problems or the factors leading to problems. Professional management corporations have also given these suppliers accessible and feasible opportunities to manage service quality.

6.4 The interactions of key actors on giving feedback to quality problems in the change of regulation

The regulatory framework changes to ensure greater effectiveness in regulating the quality control of the digital economy. Consequently, to prompt suppliers to control their quality directly, digital platforms gain and deploy the capacity to

control the quality of the information of physical suppliers. Such capacity accepts the oversight capacity of amalgamated regulatory authority via the exchange and comparison of supplier information and partnerships when training and examining these suppliers. Even though these capacities have been interconnected in practice from problem discovery, disclosure, and management, they still need key actors to interact. This interaction ensures that key actors give feedback to test whether the discovery, disclosure, and management of problems are in effect. This feedback comes from key actors who interconnect and deploy their capacities practically in the new regulatory framework. Furthermore, consumers are the direct recipients of quality problems; therefore, they are the main force in providing their feedback on quality breaches or crimes.

The role of consumers in this interaction, then, becomes critical, as they constitute a much larger population than the formal regulators of amalgamated formal regulators and the management staff of digital platforms. In the transaction of choosing and buying products, payment, service delivery, and receiving service in the digital economy, consumers have insufficient capacity to identify the problems of massive suppliers. Consumers mostly prefer to rely on personal experience. For example, even though several local AMR officers have made efforts to spread food safety knowledge to residents, the channels they offer are still not among the priorities that consumers will consider for feedback. Consequently, based on the answers from interviews with consumers, food safety education regarding online catering services has not spread widely enough. Consumers still need personal experiences, such as information from their family members and friends and checking the physical stores around them in the field, before ordering takeaways through online catering platforms. Consumers also regularly do not check food safety information concerning permits, licences, and the food safety ratings of catering suppliers due to their time being limited when choosing products. Thus, in the process of consumption, consumers already have their own ways of telling whether the food from online stores on online catering platforms is safe. These methods are not based on official food safety education, including service information, pictures of dishes and stores, food safety level certificates, and the market entry approval of suppliers, because what consumers need is to see directly how suppliers are processing orders (Law Research Society

of Beijing Food and Drug Safety, 2019). Such a transaction process implies that reliance on the personal experiences of consumers is insufficient in providing feedback on quality problems in the digital economy. This insufficiency is embodied in the process of consumers, from choosing and paying for products to receiving products and giving feedback.

In choosing and paying for products, access to quality control information is important, as it helps consumers to reduce the number of problems they encounter from the start of the service process in the digital economy. In the case of regulating the food safety of online catering services in China, at the step of accessing food safety information in online catering services, the consumers had multiple sources to look up the online merchants, such as addresses and pictures of their stores, market entry approval, operation permits and business licences, food safety risk levels given by local AMRs, and comments. Checking physical catering stores was also an option, but it depended on the distance that consumers could reach (OOS011CON B, 2019). Only a few interviewees considered food safety gradings and market entry approval issued by local AMRs (OOS013CON A, 2019; OOS014CON A, 2019; OOS017CON A, 2019; OOS022CON A, 2019; OOS004CON B, 2019; OOS008CON B, 2019). Just a few consumers went to the addresses of those stores registered online and checked whether they were genuine (OOS001CON A, 2018; OOS004CON A, 2018; OOS007CON A, 2018; OOS026CON A, 2019; OOS017CON A, 2018; OOS019CON A, 2018; OOS021CON A, 2018; OOS022CON A; 2018; OOS006CON B, 2019; OOS008CON B, 2019; OOS010CON B, 2019; OOS011CON B, 2019).

Most interviewees still chose products based on their or their friends' personal experiences, pictures, and comments about those online merchants (Hong, 2014; Yin et al., 2017; Dong, 2018; OOS009 CON A, 2019; OOS016 CON A, 2019; OOS017 CON A, 2019; OOS018 CON A, 2019; OOS009CON B, 2019; OOS011 CON B, 2019; OOS012 CON B, 2019). In addition, checking market entry approval and food safety levels cost time (OOS003CON A, 2019; OOS004CON A, 2019; OOS005CON A, 2019; OOS006CON A, 2019; OOS015CON A, 2019; OOS005CON B, 2019; OOS006CON B, 2019; OOS007CON B, 2019). The market entry approval and food safety levels of those online merchants were also

difficult to find (OOS011CON A, 2019; OOS018CON A, 2019).

A few interviewees even doubted whether the files displayed by online merchants were real (OOS001CON B, 2019; OOS006CON B, 2019; OOS020CON B, 2019). Conversely, some consumers tacitly approved of the safety of those online services (OOS008CONG, 2019; OOS013CON A, 2019; OOS016CON A, 2019; OOS009CON A, 2019; OOS011CON B, 2019; OOS012CON B, 2019). Those interviewees with concerns about the food safety of online catering services also showed more interest in accessing food safety information. For example, OOS011CON A (2019) said, "It is necessary to access food safety information due to concern about food safety, but I found some of the media are merely exaggerating food safety incidents to attract readers" (p. 1). Some interviewees, on the contrary, said, "I am concerned about food safety of online catering services, but due to little experience of food safety incidents, I have less interest in accessing food safety information" (OOS007CON A, 2019, p.1). Another interviewee, OOS011CON B (2019) said, "I have received some food safety education, but admit it was not useful in the circumstance of online catering services" (p. 1).

Such consumer feedback tends to blame the inaccessible channels for recognising market entry approval or similar quality ratings issued by formal regulators and consumers' doubts about such information. Consequently, when choosing products in the digital economy, it is difficult for consumers to access quality control information. For example, in the observation of catering suppliers enrolled online, when reading the information offered by online catering platforms, food safety grade certificates were not shown prominently or directly in each slot of every online merchant, and it might take several clicks to find them in the files of the suppliers. This was not convenient for consumers wishing to ascertain whether the service from suppliers is safe. According to exclusive policies on the food safety of online catering services, online platforms were required to show critical food safety information to online merchants, but the policies did not specify where to show such information to consumers. In Figure 14, consumers had to click on the first red circle to check whether this store was qualified and legal, and the food safety sign was not on the top line or explicit in the store link. After clicking on the first red circle in Figure 14, as shown in Figure 15, the first red frame was

the food safety commitment, and the second was the qualification file of the same store. Figure 16 displays the licence of the same store after clicking on its qualification file. In the prevention of food safety risks, the online catering platforms had benefited from the review and verification process, but the management of this food safety information was still not clearly displayed to help consumers to recognise food safety risks.

Figure 14 A link to a local hotpot restaurant. The first red frame indicates the information about this store, and the second one shows that this store is safe because of daily disinfection, body temperature tests, and scattered dining tables

Figure 15 Food safety commitment and the qualifications of the same store

食品安全档案

商家资质信息公示

Figure 16 The qualification file of the same store

Hence, in the process of choosing products in the digital economy, customers' personal experiences still play a key role. As consumers will not spend much time

checking market entry approval and quality control information or cannot find such information when choosing products, they participate in quality control through the choices they make when purchasing takeaway food. This means that access to quality control information displayed by online merchants is not easily found, and consumers do not have reliable criteria for choosing safe products in the digital economy.

Receiving products and giving feedback is the step by which consumers can find out whether the received products are safe enough for them and worth ordering again from the same online merchants in their next orders. In the interviews with consumers from City A and City B, more than half of the interviewees expressed concern about food safety in online catering services. Some interviewees had little or no concern about food safety in online catering services. As for those who had experienced food safety issues themselves, some wanted to give negative comments or complain to online merchants through online catering platforms (OOS012CON A, 2019; OOS010CON B, 2019). Such a method would be risky. Proprietors of online merchants or deliveries would argue with consumers because negative comments would lower their ranking on online platforms and, hence, their income (OOS006CON B, 2019). Some interviewees, however, preferred to leave no comments or complaints but chose to never order again from those problematic online merchants (OOS004CON A, 2019; OOS020CON A, 2019; OOS021CON A, 2019; OOS006CON B, 2019; OOS009CON B, 2019; OOS010CON B, 2019; OOS011CON B, 2019; OOS012CON B, 2019). Reasons behind this reaction included the difficulty in maintaining evidence, reporting issues to online merchants, platforms, or local authorities, and personal judgement (OOS004CON A, 2019; OOS020CON A, 2019; OOS017CON A, 2019; OOS021CON A, 2019; OOS021CON A, 2019; OOS006CON B, 2019; OOS009CON B, 2019; OOS010CON B, 2019; OOS011CON B, 2019; OOS012CON B, 2019). Some interviewees simply did not believe that physical catering stores could have good food safety practices; thus, they only ordered from online catering services when they were in a rush (OOS020CON A, 2018; OOS001CON A, 2019; OOS002CON B, 2019; OOS006CON B, 2019; OOS007CON B, 2019). Conversely, most of the other interviewees still maintained confidence in online catering services, though some showed a slight concern about food safety. Some consumers would tacitly

approve of the safety of those online services (OOS008CON A, 2019; OOS013CON A, 2019; OOS016CON A, 2019; OOS009CON A, 2019; OOS011CON B, 2019; OOS012CON B, 2019).

Consequently, the report of quality problems that consume both the time and resources of consumers does not encourage them to give feedback. In addition, it is difficult for consumers to ask for compensation from suppliers because it takes too much time and effort. Moreover, if consumers suffer from quality incidents (such as finding foreign matter in their food or experiencing food contamination), they can rate these suppliers negatively and leave negative comments. However, some suppliers still do not value ratings and comments; thus, this action is not fully effective, and switching to other suppliers with similar products is common (OOS001MEDIA, 2019). Such behaviour leads to consumers excluding problematic suppliers before or after service, and it is the most common but tacit method for consumers to give feedback on quality control in the digital economy. However, this behaviour cannot send clear feedback to the amalgamated regulatory authority and digital platforms so that they can adjust regulatory activities and internal control.

On the other hand, this behaviour does rule out problematic suppliers from the digital economy, as OOS001MEDIA suggested that "if suppliers fail consumers in food safety, they will lose their competitiveness in the market" (p. 1). Apart from this, consumers also have personal experiences of choosing their suppliers online or leaving their comments, which may influence the market activities of suppliers. Through these actions, those suppliers offering unsatisfactory services will also leave the market for online catering services of their own accord (OOS001MEDIA, 2019; OOS001SCHOLAR, 2019). Hence, feedback here means it includes, but is not limited to, reports to both the amalgamated regulatory authority and the digital platforms and comments on social media. Consumers can also skip over suppliers that have a record of misbehaviours, breaches, or crimes in quality control, leading to unsatisfactory service. Such behaviour is also part of the feedback.

Consumers can report quality problems, but this capacity cannot be deployed without support from the capacity for oversight and education of the amalgamated regulatory authority and the capacity for internal control of digital platforms. Based

on the feedback from consumers, the feedback from other key actors, including the amalgamated regulatory authority and the digital platforms, is one further response to the change of regulation. In the case of regulating the food safety of online catering services in China, in City A, the local AMRs worked hard constantly to ensure that they could cover the activities of online catering services through internet monitoring. In an interview with officials from local AMR stations, OOS001GOV A (2019) explained:

"Watching over the whole process of market activities is not easy, and we cannot inspect every store in our jurisdiction every day. Thus, we arrange for random officials to randomly inspect stores. Additionally, we advise online catering platforms to give those safe and hygienic stores a higher ranking to attract more consumers. This is an opportunity for those stores with better food safety performance" (p. 3).

OOS001GOV A (2019) also admitted that "the new administrative methods in food safety regulation still need more time and resources. Some stores will not last very long. I hope that there is also an authoritative platform that can tell them how to produce safe food" (p. 3). Local AMRs of City A also increased their formal capacity to watch over the activities of suppliers online by extracting data from consumers' comments (OOS002GOV A, 2019; OOS001GOV B, 2019).

In City B, OOS001GOV B (2019) shared a similar view: "We have received 43,000 food safety problem reports from consumers and revoked market entry approvals of more than 30,000 suppliers. Although we claim that we can conduct millions of inspections, the actual number is less than this. We still need a better rule of law to ensure that consumers can provide feedback." (p. 2)

OOS001GOV B (2019) also highlighted that "the local AMR as part of local government should release authoritative information on food safety to the public to provide a right channel for consumers to access" (p. 4). In some cities in China, such as City B, local AMRs have increasingly set up physical sites for citizens to receive food safety education (OOS001GOV B, 2019). The local AMR of City B has also built an official public commentary system related to online catering services to introduce consumers to supervision. In the process of such oversight,

the local AMR has received and processed 10,686 cases of consumer complaints and reports related to online catering services, supervised suppliers 18,000 times online, and inspected suppliers registered on online catering platforms 62,000 times. As a result of these regulatory activities, over 5,000 suppliers were inspected, of which 923 received rectification and 184 were banned because they were not approved by local AMR and were operating without permits and licences (Food Safety Commission Office of City B and Administration of Market Regulation of City B, 2019).

The amalgamated regulatory authority also promotes education to recognise quality problems in their own ways, but in practice, this may not fit into the scenario of a digital economy, as consumers are increasingly receiving information online. Hence, the participation of consumers is not limited to personal experiences. Those consumers who commented, complained, and reported gave local AMRs the space to ensure their further participation. In the case of food safety regulations on online catering services in China, consumers were the group that could benefit from the FSL and the Law on the Protection of Rights and Interests of Consumers. Consumers have the right to receive food safety education and protect themselves by starting civil suits on food safety issues (State Council, 2017; State Administration of Market Regulation, 2019). Such feedback depends on educated and responsible consumers not choosing risky suppliers or reporting them. To ensure the food safety education of consumers, local AMRs in China launched their own campaigns on food safety education. In City A, the local AMR arranged education campaigns in schools, enterprises, residential areas, stores, and public institutions (OOS003GOV A, 2019). OOS003GOV A said that “We have been promoting food safety education to consumers” (p. 3).

The feedback from the digital platforms is also necessary for further adjustment in the change of regulating quality problems in the digital economy. The internal control of digital platforms, built amid interaction with the amalgamated regulatory authority, still needs to solve problems in the relationship between the enrolled suppliers and the digital platforms. In the case of regulating the food safety of online catering services, even though there are enforceable food safety contracts between online platforms and suppliers, some suppliers do not have a strong

affiliation with online platforms. In other words, online platforms cannot enforce food safety laws directly on those restaurants, but can only limit the activities of enrolled suppliers and update their behaviours to local governments as formal actors for law enforcement. Hence, in the process of collaboration between online platforms and the suppliers they enrol online, the discretion that online platforms have to impose on suppliers, especially in internal punishment on them, is not easy to implement. Even though the internal rules of those platforms have already been established, the managers of those platforms admitted that it was hard to find the next potential risk source from the operation process of enrolled suppliers (OOS001CORP B, 2019).

In addition, the internal food safety control of online catering platforms has started to work, but not yet significantly enough. The local managers of online platforms suggested that transparency might intensify the conflict between platforms and suppliers (OOS001CORP B, 2019; OOS002CORP B, 2019). OOS002CORP B also explained that "The food safety control of ingredients was also difficult for platforms as catering suppliers, especially those small and medium-sized suppliers, purchased ingredients from different sources, which might be unstable. Thus, it was hard for platforms to trace where ingredients were from, but the platforms themselves would not stop exploring to achieve the traceability of such ingredients. For example, we have cooperation with local universities and research institutes to innovate in food safety training" (p. 4).

The interaction of key actors on the feedback of quality problems, then, has shown that consumers are the group receiving products and giving feedback directly. This group of key actors still needs further education to stay away from problematic products and immediately report to both digital platforms and the amalgamated regulatory authority. In turn, the amalgamated regulatory authority and the digital platforms still need to work on their relationships with physical suppliers and promote education, not just to consumers but also to suppliers. In addition, the innovation of technology in the change of regulation is indispensable (OOS001GOV B, 2019).

Through interactions among these key actors involved in the new regulatory framework on the quality problems of the digital economy, each group of key actors

gathers and shares unique information and expertise based on their knowledge, experience, and resources to deploy their capacities. The amalgamated regulatory authority shares data on approved market activities, administration for the food safety breaches or crimes reported by digital platforms, and food safety education for consumers. Moreover, digital platforms and regulatory authorities also work together on projects to ensure the management of the operation processes of physical suppliers based on transparency. The digital platforms themselves also collaborate with professional test enterprises or institutions. In addition, digital platforms collaborate with industrial organisations to introduce training courses and industrial standards to physical suppliers to improve food safety. Through these interactions achieved through collaboration, cooperation, and competition, the digital platforms gain internal capacity, initially under the oversight of the amalgamated regulatory authority, and feedback from consumers.

Consumer participation means that the recipients of quality problems help digital platforms to testify to the effect of internal control based on the aforementioned interactions among other key actors and find, manage, and treat potential problems. Hence, the new regulatory framework, designed and led by the amalgamated authority in response to the quality problems of the digital economy, required implementing joint responsibilities. Digital platforms, as technology intermediaries, already had their own inbuilt advantages in gathering, possessing, and processing information from the market due to their network connected to suppliers and consumers. Thus, these intermediaries were naturally the suitable option for gaining internal control capacity, and joint responsibilities prompted their interactions with other key actors. In exchange, the key actors involved in interactions can then gather and share information from digital platforms to strengthen their own capacities. In other words, authentic information based on market activities helps the enhancement and growth of capacities from key actors in the change of regulation. The exchange of resources among key actors also means that the digital economy discloses its information on quality control to other key actors and is bound with them for the development of such capacity. This binding generated by interactions results in the exchange of information, which unites key actors to develop a total quality control capacity for problems like food safety. This process of building capacity to address quality problems as a common

goal participated in by key actors conforms to the concept of co-governance as defined in Chapter 2 of this thesis. Quality control of market actors in the digital economy, then, has become the core of the change of regulation based on the co-governance concept, which is guided and watched over by the amalgamated regulatory authorities and consumers empowered with the ability to make complaints in a new web-based market (see Figure 17).

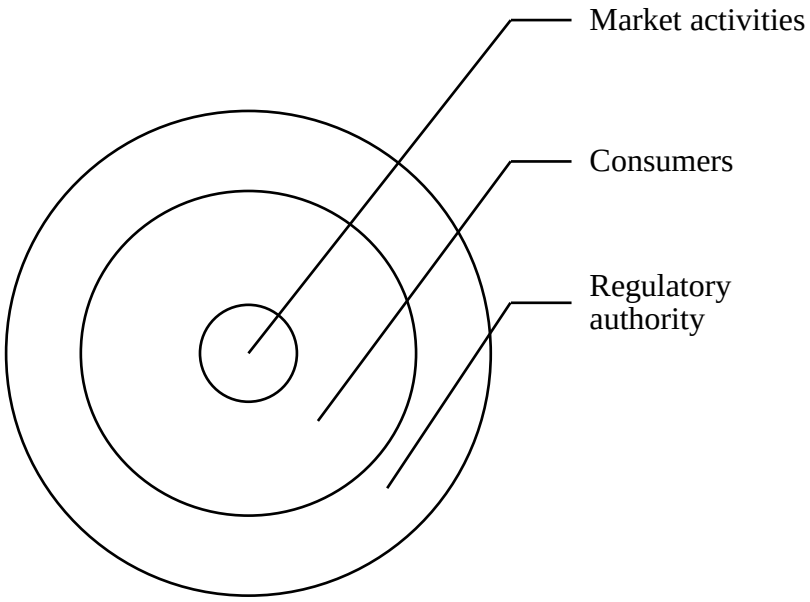

Figure 17 The horizontal and open structure among the interactions of key actors involved in the change of regulation in the digital economy

6.5 Conclusion

The research conducted for this chapter has empirically shown that digital platforms have been gradually building their control of the quality of market activity information to manage the suppliers they have enrolled.

Each key actor in the change of regulating quality problems in the digital economy via the concept of co-governance is exploring, settling, possessing, and improving their particular capacities through interactions. The interactions as the deployment of interconnected capacities prescribed in the new regulatory framework are in progress towards a total capacity for problem solving in the changing market.

Thus, through the co-governance concept, as described in the case of food

safety regulation on online catering services in China, quality problems in changing markets impact key actors involved in this market; thus, they are in the process of addressing such problems together. Quality control in this process has become the regulatory objective, and none of the key actors is capable of coping with this alone in the complex and rapidly changing market. Consequently, this process necessitates a change in the method of regulating quality problems in the digital economy. Key actors whose capacities have been interconnected through rulemaking within a horizontal structure interact to share the strengths of their capacities with the other key actors to complement their weaknesses. These key actors, then, interact through modes of collaboration, cooperation, and competition overseen by the single holistic authority that redesigns the structure of the regulatory framework for deploying, overseeing, and guiding these capacities.

In the process of control, digital platforms have started to be proactive in exchanging feedback, including sharing resources, knowledge, and information, through partnerships with regulatory authorities, suppliers, industry associations, and professional testing and quality enterprises. The regulatory authority and its local agencies, as formal regulators, provide information about qualified suppliers to digital platforms and physical suppliers and put them in jurisdictions through technology. The formal regulators then deploy their capacity of oversight and penalty to ensure that market actors of the digital economy improve quality control.

Other actors related to quality control, such as industry associations and professional test and quality enterprises, have started to participate in this process by providing their share of inspection and standards implementation. The customer service of digital platforms is starting to come into effect to process and react to consumer complaints and reports on food safety breaches. Digital platforms are also upgrading their technology in cooperation with other key actors to proactively control quality problems or factors that may lead to quality problems and maintain innovation in self-inspection and the dissemination of quality control values.

Consumers, as the source of public supervision, still need to improve their capacity in the education of quality problem reports. For example, food safety education has been included in the national education system through the regulatory authority (Standing Committee of National People's Congress, 2018).

Even though the feedback has reflected slight flaws, such as the ambiguous relationships of physical suppliers with other key actors, the guidance of consumers on reporting quality problems, and further development of oversight capacity from formal regulators, the key actors are constantly integrating their capacities into the process of addressing quality problems. This integration means the change of regulation conforms to the co-governance concept, and it is still developing and improving.

In sum, as the digital economy is expanding, the key actors involved in such an economy are impacted by quality problems from this economy redesign and the exercise of the regulatory framework along with such expansion. This is because the problem-solving process requires massive amounts of information on market activities to be compared with information on oversight in the era of the digital economy, which may contain factors leading to potential problems. This comparison provides references to decision-making to rearrange further regulation changes. Consequently, as suggested in the co-governance concept, although key actors are impacted by the problems of the changing market, none of them can cope with such problems alone due to weaknesses in their diverse capacities. Formal regulators need market activity information to build better oversight, digital platforms need to compare their data on market activities with formal regulators to maintain the good functioning of their market, physical suppliers desire direct quality control requiring new standards in the changing market, and consumers need education to test the effectiveness of quality control. Hence, the interconnections of the capacities among key actors address the problems in the market change, as they need a transparent, traceable, and authentic trace of activities by comparing information based on their mutual dependence on capacities amid the innovation of market activities.

Chapter 7: Conclusion

7.1 Summary

This thesis aimed to examine how regulation has changed in order to adapt to the new problems of a complex and fast-changing digital economy via the co-governance concept.

This thesis suggests that in order to cope with a new market, the traditional hierarchical regulation has shifted towards a horizontal structure that is open to key actors involved in the complex and fast-changing market of the digital economy to address emerging quality problems. This chapter will attempt to summarise my answers to the research questions based on the findings of this thesis. In theory, the co-governance concept refers to the process that gathers key actors impacted by the problems resulting from the change of economic or social behaviours to address such problems within a shared and open arena designed and led by a scientific, credible, and accountable authority. In addition, this authority changes as economic or social behaviours change, and such a change is attributed to the influence of key actors on problem solving. The new authority determines the new structure in which key actors gather to address the problems, such as the change of regulation for addressing quality problems in the digital economy. To ensure that the change of regulation works in practice, the key actors involved in the new web-based market need to identify which capacity they have that needs to be shared to meet others' needs and then interact. Through these collective behaviours, key actors will be able to discover, disclose, and manage quality problems and share feedback on this process. Ideally, these behaviours can form a closed and developing loop of problem solving.

7.2 Findings

My analysis from the standpoint of the co-governance concept has focused on the development of regulation of the quality problems resulting from the digital economy. Regulation in the concept of co-governance means that regulation is not just carried out by state organisations, but involves key actors affected by the quality problems attributed to the change in the market. This regulation accepts an open structure to ensure that these actors are included, in order to guarantee the oversight of market activities and then to guide such activities. To ensure clarity in the process of market activities, none of the key actors affected by quality problems is left out; rather, they share their capacities to help each other. Such

interconnections mean that they are bound to exchange their capacities and remedy what they lack via the other key actors. This means that key actors also need an open structure to be horizontal for their interaction. Through the interactions of key actors, regulations are changed to address problems of quality control in the complex and fast-changing supply chain of the digital economy. The empirical findings from my analysis have demonstrated such an interpretation of the change in regulation based on the co-governance concept.

The analysis of how key actors comprehend the quality problems in the digital economy and the factors that lead to these problems comes first. Based on the analysis of the case of online catering services in China, quality problems in the digital economy are attributed to several factors.

The first is the inherently poor quality control of rapidly growing SMEs as physical suppliers. The service quality of suppliers is not consistent, due to many very different types of suppliers who could easily enter and exit the market. In addition, these suppliers often had insufficient funding or profits to ensure adequate training of proprietors in quality control.

Second, the overstretched formal regulators remain fragmented and hierarchical structures. The growing needs of consumers have led to the rapid growth of market actors, especially SME physical suppliers. However, formal regulators in traditional regulation retain their hierarchical structure by splitting public resources into multiple bodies, such as agriculture, health, food, drug, quality assessment, and commerce departments responsible for food safety in China, to different stages in the process of market activities. Each of these departments does not have enough public resources to cope with such problems alone. Such an inflexible and fragmented hierarchical structure of traditional regulation cannot adapt to the fast-changing market, and SME suppliers can easily evade regulation.

Third, digital platforms, by focusing on increasing profit by pushing aside the management of suppliers in quality control, create space for these SMEs to evade regulation. Digital platforms have integrated SME physical suppliers into a complicated supply chain by adding a process of enrolling these suppliers as online

merchants, a process of online transactions, and delivery services. This supply chain, built up by digital platform corporations, depends on the matchmaking process going from the service information supply of suppliers enrolled online to the physical delivery service. Digital platforms incentivise a rapid increase in SMEs enlisted by platforms. In addition, with incentives from the government, increasing profits, and massive investment, there is a rapid growth of suppliers, especially SMEs, in the digital economy. This situation implies that large numbers of physical suppliers have been enrolled in the new market created by the digital economy. These platforms initially prioritised an increased market share over quality control. As a result, they paid little attention to the management of direct quality control from suppliers. This resulted in a large increase in quality problems, such as the food safety incidents of online catering services from 2016 onwards in China. Consequently, digital platforms, which are the actors building a complex and fast-changing market, have made this situation more complicated and difficult for traditional hierarchical regulation. The formal regulators with a hierarchical structure had difficulty adapting fast enough to keep up with a complex market with rapidly growing suppliers.

The quality problems have triggered the question of how regulation is changed to adapt it to the changes in the market brought about by the digital economy. To develop some control of the market, it is necessary to include digital platforms, physical suppliers, and consumers in the regulatory process.

Consequently, there was recognition of the need to redesign the regulatory process. Based on the case in China, the new regulatory framework includes new rules and a new structure based on the diverse capacities of key actors from formal regulators and market actors to consumers, which have been designed to mutually depend on each other. Thus, based on the concept of co-governance, no key actor involved in the digital economy is left out. The new rules are based on the new laws regarding quality control. Formal regulators, then, share the quality control responsibilities, including the direct quality control of physical services and the management of suppliers of digital platforms, with market actors and the feedback responsibilities of consumers and other social actors. Formal regulators retain the oversight responsibilities of inspecting and monitoring quality control in market

activities, receiving and processing feedback, and enforcing the law related to quality control. The new policies and standards in the case of China imply that key actors are adept in the areas they should be responsible for. These areas are their capacities, including resources, information, and knowledge, but they still have weaknesses when addressing quality problems on their own. Hence, key actors share what they are good at and remedy their weaknesses in addressing quality problems together. Formal regulators are professional in overseeing market activities, but this oversight requires information from the process of market activities. Digital platforms have expertise in collecting and processing information about market activities through technology, but they need guidance for managing suppliers, which is provided by formal regulators. The physical suppliers control the quality of the services or products directly, but they need guidance based on cooperation between formal regulators and digital platforms. Consumers are the actors who give feedback directly to other key actors, but they need scientific education and information about quality control, which are provided by formal regulators and digital platforms. All these capacities have been interconnected with the new laws, policies, and standards as the new rules.

In addition, formal regulators have also changed the structure of the regulatory framework. This framework is changed from a fragmented hierarchical one relying on formal regulatory activities but influenced by the change of market to a more horizontal one in which formal regulators and consumers form outer layers revolving around the change of market and guiding it. Instead of a fragmented hierarchical structure of traditional regulation overstretched by a rapidly growing new market, the new regulation accepts a horizontal structure overseeing and guiding market activities by surrounding them. This structure of the regulatory framework accepts a horizontal design, which follows the expanding complex and fast-changing market more flexibly via the interconnected capacities among market actors and other actors affected by the change in the market; thus, this structure opens to the interconnected capacities of key actors to prepare them for addressing quality problems by guiding the whole process of market activities. For example, the Chinese central government amalgamated multiple regulatory agents into a single authority named the State Administration of Market Regulation (SAMR) to oversee the whole process of market activities carried on by market actors in online

catering services. New methods, including the upgrading of the market entry procedure, random inspections, the prompt release of inspection results, and jurisdiction in the grid structure were also implemented. These methods imply the establishment of a new structure of regulatory framework that follows changes in the market by including other key actors affected by such changes. In addition, new methods specify and maintain what regulatory agents should do to oversee quality control in market activities, what market actors should do to control quality directly and manage such control to make it transparent and traceable, and what consumers should do to give their feedback more efficiently. These behaviours mean that formal regulators are following the change in the market via a kind of rulemaking that interconnects the capacities of key actors and redesigns the structure for deploying these capacities.

The third finding of this thesis concerns the interaction of key actors within the new regulatory framework for quality control. In the case of regulating the food safety of online catering services in China, as mentioned in the findings from the new regulatory framework, the responsibilities that should be entailed by market actors and consumers are shared by formal regulators and then interconnected based on the diverse capacities of formal regulators, market actors, and consumers. Consequently, to ensure such a framework is exercised, formal regulators, market actors, and consumers interact with each other via different modes that suit them through institutional arrangements and various forms of communication using the advantages of information technology. Digital platforms are the critical actors to build the capacity of managing quality control of suppliers, but they lack resources in problem prevention, discovery and disclosure, problem management, and feedback on solving problems, which are possessed by government regulators and consumers. As explained in Chapter 6, through formal and informal projects, digital platforms have received critical resources to build quality control through collaboration with formal regulators, and have started to share information on quality control with formal regulators. The management of quality control by physical suppliers, which is conducted by digital platforms, has been overseen by formal regulators through cooperation. Digital platforms also compete to improve such management. Consumers are educated on how to give feedback on quality control in collaboration with formal regulators. For example, in China, the local

administrations of market regulation collaborated with the local food safety regulation to receive information on food safety control from digital platforms and coordinated within the administration via technologies and new methods to enforce the regulation. Online catering platforms cooperated with local administrations of market regulation and catering suppliers on the Transparent Kitchen Project and provided training courses for suppliers. Online catering platforms also competed to improve supplier management. Food safety education in the national education system for consumers was in collaboration with SAMR (Standing Committee of National People's Congress, 2018; Shu, 2018; Meituan Research Institute and The Takeaway Committee of China Hotel Association, 2019). As they are affected by quality problems, however, consumers rely mostly on personal experiences and lack pertinent information about quality control; hence, their feedback about quality problems has not been fully effective, even though regulatory authorities have encouraged them to report incidents. Consumers, in turn, say that they do not have enough time to report problems to both platforms and the government. Even though consumers would like to report issues, their methods are still traditional, such as making phone calls. These methods cost them effort, time, and expense. Furthermore, consumers are not aware of the legitimate service information provided by digital platforms. In feedback from key actors involved in the food safety of online catering services in China, the most positive outcome was transmitted by the report from the new regulatory authority. Illegal suppliers had been banned from online catering services due to a breach of food safety regulations or crime related to food safety, and misbehaving platforms had been punished and required to rectify the breach in their food safety risk control. In addition, consumers were confident in the work of the regulatory authority and their local agencies. However, there were still food safety incidents and illegal suppliers in online catering services that led to dissatisfaction among consumers, who lacked effective measures due to their limited resources such as time, effort, and funding. Consumers, then, chose to ensure food safety based on mixed methods, especially personal experience.

Based on these empirical findings, by choosing quality control as the target, the new regulation is, in practice, based on the interconnected capacities of key actors. To oversee the holistic and complex supply chain of the digital economy without

gaps, formal regulators are amalgamated into a single regulatory authority for regulating the market; for example, in the case of China, this is called the State Administration for Market Regulation (SAMR). Moreover, the formal regulators within such a new structure are designed, led, and coordinated by a single authority which is horizontal and open to other key actors. With those bases, key actors then interact through a process of discovering, disclosing, and managing quality problems and then providing feedback to each other. Consequently, key actors collaborate to address the quality problems impacting them. Formal regulators cooperate with digital platforms on how to ensure the management of direct quality control from physical suppliers, and both cooperate with physical suppliers on ensuring that physical suppliers comprehend and exercise direct quality control. Market actors, including digital platforms and physical suppliers, compete to provide better supplier management and direct quality control. These key actors, especially consumers, seek to give feedback via more efficient approaches, such as a complaints system of digital platforms, reporting quality issues to formal regulators, and coordinating themselves to improve their capacities for better further interactions.

To endow the new regulation with a structure, key actors need to co-develop the quality control capacity through digital platforms as the critical hub, as they possess and manage the information from activities of physical suppliers lacking experience of such control. Market actors in the digital economy gather for making group standards and management systems to ensure that they manage the quality control of physical suppliers, which is required by the formal regulators, and they also receive more professional support from quality tests and accreditation institutions. These key actors can provide their opinions on reporting problems in such a process; thus, government bodies can redesign regulatory processes based on this information, such as legislation, policymaking, standards, enforcement, and monitoring, and then repeat the problem-solving process with other key actors to ensure such constant interactions.

However, compared to the interactions among formal regulators and market actors, consumer groups have a relatively heterogeneous structure and do not have the incentives to provide information. Consumers, as social actors, still maintain a

rather scattered structure due to their limited time, effort, and funding to provide food safety reports, and they have other service options. Fortunately, the consumer group that receives services from the digital economy, more specifically online catering services, is nonetheless aware of protecting their legal rights to quality control as they are still impacted by these issues. Furthermore, the relevant education and the satisfaction rate of consumption, based on the reports of local governments in the case of China, show promising progress. Hence, the findings of my analysis partially conform to the process of how regulation is changed from the standpoint of the concept of co-governance. This process proposes to key actors to comprehend problems in quality control affected by the rapid growth in the market caused by the digital economy and the incentives of the state and the diminished capacity of formal regulators. Key actors then prepare to address quality problems together by interconnecting their capacities within a more horizontal and open structure. Based on interconnected capacities and a horizontal and open structure, formal regulators and market actors interact in a problem-solving process. However, the findings from the feedback of consumers are less promising, as this group still needs education support and to receive reliable information on quality control from both formal regulators and digital platforms.

7.3 Contributions

The operation of the new web-based market and its network structure has led to the rapid growth of this new market. In addition, this new market has gathered resources from multiple industries to form a complex and ever-changing supply chain, and it has challenged traditional regulation (Shapiro and Varian, 1999; Eisenmann et al., 2006; Shang, Shari, and Yanga, 2015; Johnson and Moazed, 2016; Ducci, 2020). From enforced self-regulation, meta-regulation, and co-regulation to regulatory enrolment, traditional regulation has maintained its hierarchical structure, following inflexible strategies, such as command and control, harnessing the market, and incentives. These models studying regulatory strategies that are exercised cannot be revised frequently and give less space for making rules on controlling problems of market actors directly. Thus, in the encounter with new problems, formal regulators can just stack up existing regulations with new rules, which may render regulatory processes ineffective. The regulation explained in

these models, consequently, will end up being imprecise when solving problems brought by new markets (Kagan, 1982; Baldwin, 1995; Baldwin et al., 2012). In addition, such a structure of regulation cannot gather enough information from the growing but risky activities of market actors; thus, traditional regulation models are cumbersome (Breyer, 1982; Ogus, 1994). Even though in enforced self-regulation, meta-regulation, and co-regulation, the regulatory authority can allow corporations to make their own internal rules or delegate part of regulatory functions to private actors, or allow regulated firms to innovate internally, accepting monitoring from citizens and formal regulators, the responsible relationship in the hierarchical structure of traditional regulation has not been changed. Corporations with traditional hierarchical regulation would make their internal rules beneficial to them and still be approved by formal regulators, thus evading responsibilities for risk control. Formal regulators have also transferred the cost of formal regulation to corporations, which makes internal compliance more difficult, as the regulated firms face internal pressure between complying with rules and making profits or making compliance rules based on their own interests.

Compared with new web-based markets, traditional regulation models show their limitations in explaining problems in this market and the process of changing regulation. Growing heterogeneous consumer needs have pushed traditional industries into the era of the digital economy. The technology intermediaries have gathered, analysed, reintroduced, and gained possession of information about products or services from physical suppliers. These intermediaries upgrade traditional industries in market activities by integrating the physical economy and redividing their labour to provide convenient services to the public. The volume of the transactions has vastly surpassed that before the digital economy. Consequently, digital platforms, as information technology intermediaries, have boosted the growth of physical services by directing their operations to what consumers really want or can be attracted to. However, the sole pursuit of providing convenient services or products has led to an excessive increase in service information to meet the growing heterogeneous needs of consumers. This pursuit leaves managing the direct quality control of physical suppliers aside.

The consequence of such a pursuit is that consumers may find that the quality of products or services they receive is not consistent with the information on products or services displayed by the physical suppliers as online merchants enrolled by digital platforms. Due to the experience of regulating such a new market with a network structure and limited public resources divided among multiple regulatory bodies, formal regulators still lack the capacity to adapt to new problems. Furthermore, SMEs benefiting from such a new market also have insufficient experience and funding to establish an internal compliance system, and the platforms themselves, as technological intermediaries, take advantage of the absence of formal regulation (Ayres and Braithwaite, 1992; Fairman and Yapp, 2005). Such a dilemma leads to misinformation in the digital economy and information without verification and approval by authorities. Thus, traditional hierarchical regulation has not been able to adapt to the new web-based market, either. As the targets of regulation, market actors change their behaviours to meet the growing and ever-changing needs of consumers. The formal regulators, consequently, cannot attempt to control a rapidly developing market due to growing and ever-changing consumption. Hence, the hierarchical structure of regulation needs a horizontal and dynamic system as an alternative to following the development tendency of the market, and then it needs to establish and maintain a new regulation.

The contribution of this research is to show how the co-governance concept explains a new approach to regulation, including key actors involved in the change of market, especially the web-based market, built through a more horizontal system. Such a concept examines emerging problems and the process of how regulation has changed in response to the emerging problems brought by the new market without leaving key actors out. In view of the co-governance concept, a new regulation with a more horizontal structure may be capable of maintaining and improving the framework to reduce quality problems. Instead of the state supplying incentives without a compatible regulatory framework following the change in the market, the significance of co-governance research explaining the process of reducing quality problems is to keep regulation improving or even to guide the change in the process of market activities by including new key actors, especially market actors possessing and managing information, and social actors providing feedback to the

new regulation. Consequently, the co-governance concept interprets how key actors, affected by the problems resulting from the market change, address emerging problems via activities within a new structure.

This research, then, may have the potential to change the perception of the relationship between the state and the market. The market continues to evolve to meet the growing and ever-changing needs of society. The redundant models within a traditional framework created by the state may maintain an adversarial relationship with the market. Such conditions cannot help to address problems resulting from changes in the market. In practice, such conflicts can be embodied as being between the state and a market changed by technology. The emergence of a web-based market pervading the daily lives of citizens by offering convenience has broken the balance between the state and the market because the possession and management of information resulting from market activities have started shifting the balance in favour of technology intermediaries in China. The increase in information from the physical economy, possessed and managed by online platforms, has surpassed the capacity of regulation. Traditional regulation could not adapt to such a change, and therefore, the state and the market had conflicts regarding how to treat such information and how to guide the behaviour of key actors in the development. Such information imbalance leads to a rivalry between the state and the market in the hierarchical structure of a traditional regulatory strategy instead of communicating with each other to address common issues concerning the development of the economy.

Rather than such regulation as a process of hierarchical imposition of state rules on market actors, this approach sees regulation working through interactions to solve the problems that impact them both. Indeed, with such a large, changing market, market actors must ensure its smooth function for better development, and this purpose is shared by the state as well. The market based on information technology has upgraded the supply chain by integrating certain industries and guiding their actors to fulfil consumer needs, and then has motivated and developed such needs further. This integration of the supply chain to meet the growing and ever-changing consumers' needs has led to the emergence of new problems, embodied in conflicts between economic development and the regulation of such

new problems or the potential factors that may lead to problems.

To ensure further growth in the market, intermediary technological corporations have been gathering and managing more information than regulatory authorities. Such corporations may have a better view of the development due to such advantages in possessing and managing information, but this view cannot be comprehensive enough to explore the ground of growth due to the corporations' limited funding at an early stage. The fierce competition caused by the change in the market can also turn their exploration into pursuing profit, and such behaviour without risk control can take market actors in the new supply chain closer to encountering risks. The government seeking growth and the upgrade of the economy may also permit such exploration by providing incentives.

As problems start to emerge in development due to the pursuit of profit from technology intermediaries, conflicts concerning quality control may occur between the regulatory authority and the technological intermediaries. As critical market actors, technological intermediaries concentrate funding on integrating and guiding the physical economy in the direction of the growth they have affirmed based on their comprehension of development, but such action also means insufficient input on quality control. If technological intermediaries in further development understand that the lack of quality control may impede development, they can choose to address such an issue with formal regulators.

However, the requirements from formal regulators of compliance for technology intermediaries are not the only purpose of regulation. Both the state and the market seek to stabilise development by controlling problems amid changes in the economy or society. Thus, digital platforms as technological intermediaries cannot just temporarily comply with formal regulators out of reckless self-interest, or the issues in the change of development may still exist due to the expansion of the market ahead of the change of regulation, and impede further development. Under such circumstances, formal regulators may fall behind in the course of development brought about by technology intermediaries while still maintaining a hierarchical structure and its fixed methods in tackling emerging problems. Such a situation may lead to a rivalry between the technological intermediaries and the traditional hierarchical regulation guiding the course of development. Hence,

traditional regulation based on a hierarchical structure has turned corporations into targets instead of interacting with them to address problems or reduce factors that may lead to problems in development. My research, then, has the potential to explore the reconciliation of the rivalry between the state and the market in the contest for digitalised information as new capital.

The co-governance concept provides an alternative perspective because each key actor involved in common issues brought about by the change in the economy cannot handle the problems of development alone. To address problems or factors leading to problems in the development of a complex market such as online catering services, co-governance has the potential to explain the reconciliation of such conflicts through the change of regulation and to transform the contest between market actors and formal regulators into interactions seeking the tendency of well-functioning development. Such transformation requires the oversight of the state and the information about market activities, both of which are shared and assembled for decision-making and the exercise of problem reduction during the development of a complex market.

Development in the digital economy, including online catering services, means that for the regulation process to be effective, it needs to be horizontal and open rather than hierarchical, partly because of the complexity of the market and the increasing information asymmetries. Hence, the co-governance concept can by its nature explain how various key actors involved in changes, not limited to markets but affected by problems from such changes, gather to design a new system adapted to such a change and address problems. Key actors will be interconnected by learning what they are good at and weak in concerning the comprehension of problems, and then sharing strengths to remedy and improve their capacities, create a new structure, and interact together within this structure to solve these problems.

Hence, based on such a nature, the co-governance concept is not limited to China but can be applied to problems in similar scenarios of a developing digital economy in other countries. The literature on regulation used to focus on how the regulatory authority came up with new models to ensure that corporations, as targets in the regulation, could control problems. The co-governance concept may provide a different perspective based on the problems in the process of

development that may impact both the state and the market. Whether the state provides incentives to encourage development or the market orients development to meet the growing and ever-changing needs of society, development itself may fail if any key actor does not understand the emerging problems well. In addition, each key actor cannot possess total advantages against emerging problems or even changes in economic or social behaviours. Thus, aside from either formal or informal regulators renewing regulation models within the existing regulatory framework, the co-governance concept may contribute to interpreting how key actors involved in the change of development are integrated into a new arena to reach an agreement on a process of changing regulations aimed at addressing common issues in development to renew the regulatory framework.

7.4 Limitations

The analytical framework of the co-governance concept focuses on the change of regulation among the key actors involved in the common issues caused by the change in the market. This concept is still being developed in the context of explaining the change of regulation for adapting to the change of market; thus, there are still limitations in the co-governance concept.

The first limitation comes from the process of how the market is changed. By analysing relationships among key actors in shared responsibilities and their capabilities in problem identification, and addressing them and feedback first, as the new web-based market can concentrate as many resources as possible, the corporate power may challenge the legal force of the state power in order to increase its provision. Quality control from physical suppliers and the management of such control from the technology intermediary corporation are the core steps in the process of addressing problems within the new regulatory framework. The capacity to manage quality control from technological intermediaries can grow due to the advantageous resources exchanged with formal regulators and consumers.

However, as the market keeps evolving, intermediary technological corporations cannot afford to lose comprehension of development in the future. Thus, due to such advantages of comprehension benefiting from information gathering and management, technology intermediaries may spend more on growth

for more profit and on investment for searching and securing the next growing ground, rather than on spending extra resources to manage quality control. On the other hand, even though the formal regulators can follow the trend of development in the market with more investment in public resources and can just maintain the order of the market, the problems or factors that may lead to the problems created by the change of market may still be ahead of the formal regulators and social actors. Thus, the co-governance concept still has limitations in explaining how the change in the market happens. It is important to ensure that formal regulators and consumers can follow and even guide changes in the market, and how to achieve this needs further study.

Another limitation comes from the identification of information among the interactions of actors in the fast-changing market. The authenticity of information gathered from market activities is also critical, as market actors exchange information with formal regulators for comparison between market activity information provided by market actors and qualified information provided by formal regulators. Moreover, formal regulators and market actors may also contest each other about the use of information in the process of market activities. In the interest of the private sector, market actors, especially digital platforms as technology intermediaries, may not provide truthful information about market activities to formal regulators and consumers. Digital platforms do need professional support from formal regulators in managing the direct quality control from physical suppliers, but when they have built their management system of suppliers and learnt the routine of building such a system, they may become monopolies and tamper with the information. Such behaviour may in turn cause damage to the public's trust in formal regulators. Formal regulators, however, may also abuse oversight if they attempt to possess total control of the market instead of guiding it. More research into how to ensure truthfulness in the information provided is needed.

The third limitation concerns how to instruct social actors to identify problems or factors that may lead to problems in choosing services instead of merely letting them choose what attracts them in a web-based complex market. Social actors can also participate in the development by providing their own opinions instead of

being oriented by the narrative of the market. Gathering social actors from different backgrounds is also a challenge, especially for consumers, who lack time and funding, and have highly diverse experiences with the quality of services or products.

The last limitation is the improvement of SMEs in the practice of direct quality control and their liquidity in the web-based market. This group needs a precise and applicable regulatory process tailored to them. Fortunately, the central government in China, for example, has started an improvement project for catering businesses beginning in 2020 (SAMR, 2020). These limitations imply that, in the change of regulation, the state is still leading in designing and running a new structure of regulation and making new rules to prompt market actors to share activities in quality control and encourage consumers to participate. Based on these limitations, the changes in regulation in practice still need the state to design and lead the whole process, and social actors, especially consumers, are still stable in providing feedback. Thus, the change in formal regulators and market actors conforms to the co-governance concept, but social actors still need more research. These elements need further study to improve the analytical framework of the concept of co-governance.

Concerning the methods of gathering data about decision-making and incidents, due to limited personal connections, the procedure of enquiry from a regulatory authority, enterprises and other organisations, and the limited skills in research design, gathering and analysing data from the decision-making process and working process of the regulatory authority and the operation of catering suppliers and online platforms needs support from relevant institutions, such as universities and research institutes. Obtaining such support is difficult for individual researchers, including collecting information that may raise concerns about security and interdisciplinary cooperation with scholars in law studies, food engineering, journalism, computer science, management studies, psychology, sociology, history, etc. Hence, the analytical framework of co-governance in the context of politics is limited, and it still needs improvement from other disciplines to find the logical framework that can make the co-governance concept acceptable.

Abbreviations

AIC	Administrations of Industry and Commerce
AMR	Administration for Market Regulation
APP	Application program
AQSIQ	Administration of Quality Supervision, Inspection and Quarantine
BSE	Bovine Spongiform Encephalopathy
C&C	Command and Control
CCCPC	Central Committee of Communist Party of China
CGR	Collaborative governance regime
CFDA	China Food and Drug Administration
CFSN	China Food Safety Net
CFSSN	China Food Safety Standards Network
CMRN	China Market Regulation News
CNY	Chinese Yuan
CRM	Customer relationship management
EU	European Union
FDA	Food and Drug Adminsitration
FSCO	Food Safety Commission Office
FSL	Food safety law

GFDA	Guangdong Food and Drug Administration
IGR	Intergovernmental relations
KPI	Key Performance Index
MLG	Multi-level Governance
MOA	Ministry of Agriculture
MOFCOM	Ministry of Commerce
MOH	Ministry of Health
NFSC	National Food Safety Commission
NHC	National Health Commission
NHFPC	National Health and Family Planning Commission
NPC	National People's Congress
OGS	Outcome-generating system
PPP	Public-private partnership
POS	Point of sale
RIT	Regulator-Intermediary-Target model
SAIC	State Adminsitration for Industry and Commerce
SAMR	State Administration for Market Regulation
SFDA	State Food and Drug Administration
SME	Small and medium enterprise
TRIPS	Trade-Related Aspects of Intellectual Property

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