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**Organisational learning and food safety crises: A
critical case study of the Sanlu and Fonterra crises**

A thesis presented in fulfilment of
the requirements for the degree of Doctor of Philosophy

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ABSTRACT

This study explores crisis-induced organisational learning in the Chinese and the New Zealand food safety authorities, or CFSA and NZFSA. While many crisis management scholars have sought to examine food safety crises, including the 2008 Sanlu melamine infant formula scandal and the 2013 Fonterra botulism scare, from the perspective of business organisations, food safety government agencies' role in handling such crises, especially crisis-induced learning in the food safety authorities to prevent or better prepare for future crises, has been neglected. This thesis seeks to address this research gap by examining the two food safety crises under the lens of crisis-induced organisational learning to investigate changes in CFSA and NZFSA triggered by the biggest-ever food safety crises happened in China and New Zealand. Qualitative content analysis approach is employed to analyse the data corpus consisting of news articles and government documents recording the dairy food safety incidents and their socio-economic and political contexts and ensuing policy changes.

A comparison between the two cases offers a deep understanding of the dairy food safety landscapes in the two countries and approaches employed by the government agencies in handling the dairy food safety crises. It also provides insights into dynamics of internal and external factors facilitating or inhibiting crisis-induced organisational learning in the two dairy food safety authorities. Though the two crises in this research have different socio-economic and political roots, they both caused unprecedented reputational damage not only to the dairy industries but to the whole food sectors in China and New Zealand. This research identifies multiple loopholes and underlying problems in the two dairy food safety regulatory systems leading to the incidents in question. It also finds systemic changes in the food safety authorities and the dairy food safety regulatory systems to address the loopholes. Political pressure and

social emotion provoked by the dairy product crises are found to be the main factors facilitating learning in the public organisations. Conflict of interest incorporated into the dairy food safety system is seen as a key factor inhibiting deep learning in the two food safety authorities. This study therefore argues double-loop learning needs to happen in CFSA and NZFSA to uproot the underlying problem that led to lax regulation and other dairy food safety regulatory problems.

Key words: dairy food safety crisis, food safety authority, food safety crisis management, crisis-induced organisational learning, single/double-loop learning

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LIST OF ABBREVIATIONS

Abbreviation	Definition
APA	Animal Products Act
APQSL	Agricultural Product Quality Safety Law
AQSIQ	Administration of Quality Supervision, Inspection, and Quarantine
BSE	Bovine Spongiform Encephalopathy
CCP	Chinese Communist Party
CDC	Centre for Disease Control and Prevention
CDIA	China Dairy Industry Association
CEIQA	China Entry-exit Inspection and Quarantine Authorities
CEO	Chief Executive Officer
CFDA	China Food and Drug Administration
CFIA	Canadian Food Inspection Agency
CFSA	Chinese Food Safety authorities
CIMS	Coordinated Management system
CNKI	China National Knowledge Infrastructure
CSR	Corporate Social responsibility
DEFRA	Department of Environment, Food and Rural Affairs
FA	Food Act
FBD	Foodborne disease
FDA	Food and Drug Administration
FHL	Food Hygiene Law

FIRP	Food Incident Response Protocol
FRDC	Fonterra Research and Development Centre
FSLRA	Food Safety Law Reform Act
FSSAD	Food Safety Standard and Assessment Division
FSSRC	Food Safety Science and Research Centre
GAC	General Administration of Customs
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis Critical Control Points
ILS	Information and library science
MAF	Ministry of Agriculture and Forestry
MAFF	Ministry of Agriculture, Fisheries, and Food
MARA	Ministry of Agriculture and Rural Affairs
MOA	Ministry of Agriculture MPI: Ministry for Primary Industries
MOH	Ministry of Health
NCFSRA	National Centre of Food Safety Risk Assessment
NHFPC	National Health and Family Planning Commission
NPC	National People's Congress
NVSL	National Veterinary Service Laboratory
NZ	New Zealand
NZFSA	New Zealand Food Safety Authority
NZMP	New Zealand Milk Products
OECD	Organisation for Economic Co-operation and Development
PQL	Product Quality Law

PRC	China/ People’s Republic of China
RMP	Risk Management Program
RSL	Response Strategic Leadership
SAIC	State Administration for Industry and Commerce
SAMR	State Administration of Marketing Regulation
SASAC	State-owned Assets Supervision and Administration Commission
SFDA	State Food and Drug Administration
SOE	State-owned Enterprise
SPA	Sanitary and Phytosanitary Agreement
SRC	sulphite -reducing clostridia
TRP	Trade Response Protocol
UK	The United Kingdom
USA	The United States of America
WHO	World Health Organisation
WPC	whey protein concentrate
WTO	World Trade Organisation

CHAPTER 1 INTRODUCTION

Food safety is fundamentally a human right. However, together with food security, it is a big challenge for all national governments across the world on the way to achieving sustainability of socio-economic development (Käferstein & Abdussalam, 1999; Umali Deininger & Sur, 2007; Vos, 2000; Zhou, 2017). To secure food supply for a fast-growing population in the world, the agricultural sector has increasingly used agrochemicals, in forms of fertilizers and pesticides, to increase crop yields. These practices at the same time create various threats to food safety hazards (Carvalho, 2006). A study commissioned by the World Health Organisation (WHO) found toxic chemicals and disease-causing organisms from foods were one of the major threats to human health (WHO, 2020, April 30). The study also indicated food contamination was the most widespread transmissible health problem and culprit of economic unproductivity in the world. Biological and chemical contamination was found to be a substantial risk in developing countries as well as Organisation for Economic Co-operation and Development (OECD) countries (Käferstein & Abdussalam, 1999). Nearly 10% of the population in the OECD countries suffers from Food-borne Disease (FBD), and the percentage is much bigger in developing countries (Käferstein & Abdussalam, 1999). Take the year 2010 for example, a WHO-commissioned study found a total number of 31 foodborne hazards worldwide caused 600 million illnesses and 420,000 deaths (WHO, 2020, April 30). The researchers identified approximately 76 million medical cases and 5,000 deaths in the United States of America (USA). The numbers were 2 million and 700 respectively in the United Kingdom (UK) against a population of 58 million (Havelaar et al., 2015). In addition to its cost to human life and health, FBD results in a high financial burden on governments. In 2000, five FBD pathogens generated \$6.9 billion medical expenses, loss of productivity, and premature death in the USA (Umali Deininger & Sur, 2007).

Between the 1980s and the 1990s, the outbreak of Bovine Spongiform Encephalopathy (BSE), or Mad Cow Disease, in the UK dropped consumer confidence in food safety.

The WHO defines FBD as illnesses caused by consuming food products contaminated with bacteria, viruses, parasites or chemical substances (WHO, 2020, April 30). However, there have been debates on what constitutes food safety due to differences in food traditions and national standards (Zhu et al., 2019). In this study, food safety is widely defined as any harms affected by ingestion of food products due to the presence of bacteria, viruses, parasites, or chemicals caused by nonstandard manufacturing practice, food fraud, or adulteration.

1.1 Statement of the problem

The statistical figures of global casualties and financial costs levied by food safety crises are staggering. Governments and food safety authorities pledged to address the problems by developing rigorous regulatory frameworks to ensure food safety in their jurisdictions (WHO, 2020, April 30). A rigorous food safety regulatory system is necessary to put food safety hazards under control. The question here is: can a rigorous regulatory system alone ensure food safety? If not, as demonstrated in this case study, what can food safety authorities do to improve food safety management and crisis response? To answer this question, it is important to find out, in a certain socio-political and economic context, how food safety has become a thorny issue, what underlying problems lead to food safety crises, and how food safety authorities can learn from past crises and get better prepared for future food safety incidents.

When food operators depart from good practice, competent food governance can make a difference between life and death. It can prevent such crises from happening or minimize harms to

the public (Wilson, 2020). However, food safety is an ever-changing landscape full of conventional and emerging food safety hazards. It demands equivalent learning and improvements from food operators and food safety agencies' end. However, many food safety authorities and regimes could not effectively cope with such challenges for many reasons, including outdated legislation and standards, defective food regulatory systems, and backward testing capabilities (WHO, 2020, April 30). Research has found many governments have not put food safety high enough in the policy agenda despite increasing FBD incidents (Käferstein & Abdussalam, 1999). So, what triggers learning in a cumbersome and bureaucratic environment like food safety authorities? Can the public organisations learn from the food safety crises and consequently make changes based on newly obtained knowledge from the crises? In such circumstances, it is crucial to find out how organisational learning happens in food safety authorities, such as what socio-political factors facilitate learning and what factors inhibit learning in a public organisation. To develop an organisation well-prepared for crises, decision-makers in the organisation need to remove learning barriers (Elliott et al., 2000).

Through the lens of crisis-induced organisational learning theory, this study examines the 2008 Sanlu melamine infant formula scandal¹ in China and the 2013 Fonterra botulism scare² in New Zealand (NZ). Qualitative content analysis will be employed to examine and interpret the data corpus consisting of news articles and government documents on the crises in question. It aims to examine food safety problems in the two socio-political and economic contexts, food safety responses by the two authorities, and crisis-induced organisational learning in the two authorities. This study first

¹ Be referred to as Sanlu case in the thesis.

² Be referred to as Fonterra case in the thesis.

identifies loopholes of the two national food safety authorities and regimes in the biggest-ever food safety crises in each of the countries. Then it will investigate if the two government agencies have learned from the crises and implemented the lessons by making related changes in the regulatory agencies and regimes. To do so, this research needs to answer the following questions: how does a government agency learn from food safety crises? What can be identified as evidence of organisational learning in the food safety agency? The following is a brief introduction of the two food safety authorities and regimes in this study and the challenges they were facing prior to the crises in question.

1.1.1 CFSA and its questioned legitimacy

People's perceptions of food safety have profound political implications (Wu et al., 2017). Chinese people believe in “民以食为天”, meaning food is the paramount necessity for people, as reflected in an aphorism from the classic book of Chinese history *Shiji*, or The Records of the Grand Historian³. It suggests lives of people depend on food. It is a reflection on lessons in China where famines and resulting riots often led to violent replacement of dynasties. This quote goes after “王者以民为天”, meaning a ruler's life depends on people. The line warns ruling emperors that food security is a primary component of legitimacy to rule or govern people. Chinese people often use the quote nowadays to express their discontent in times of food safety crises.

On the eve of the Sanlu case, repeated food safety incidents sparked public outcries, questioning the capabilities of Chinese food safety governance (Zhu et al., 2017). Prior to the 2008 melamine

³ The monumental book was believed to be finished in 94 BC by historian Sima Qian.

scandal, the Chinese food safety authorities⁴ (CFSA) were segmented organisations consisting of government agencies from four ministries, namely the Ministry of Health (MOH)⁵, the Ministry of Agriculture (MOA)⁶, the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), and the State Administration for Industry and Commerce (SAIC). The China Food and Drug Administration (CFDA)⁷ was an agency newly merged into MOH. It was rebranded from the State Food and Drug Administration (SFDA) in the aftermath of a series of food and drug product scandals, leading to the execution of its head, Zheng Xiaoyu, for taking bribes in 2007. The food safety authority was later degraded from a vice-ministerial level government agency to a subordinate of MOH. The AQSIQ was a key food safety regulator responsible for product verification and food safety and quality control. The dairy food safety framework was empowered by laws including the 1993 Product Quality Law (PQL) of the People's Republic of China (PRC), the 1995 Food Hygiene Law (FHL) of the PRC, and the 2006 Agricultural Product Quality Safety Law (APQSL) of the PRC.

The Chinese government tried in many ways to improve food safety governance, including reorganising or rebranding the Chinese food safety authority. However, the repeated reorganisation of the food safety agencies did not make much difference in the food safety situation (Yuan, 2014). Repeated fatal food safety scandals (see Table 1) panicked and traumatized Chinese publics. They were increasingly concerned about food safety hazards from various contaminants, such as gutter oil,

4 Chinese food safety authorities (CFSA) is used in this study to represent the overall food safety authorities consisting of CFDA of MOH and other food safety agencies from AQSIQ, MOA, and SAIC.

5 MOH and former National Population and Family Planning Commission merged into one ministerial agency named as National Health and Family Planning Commission (NHFPC) in March 2013.

6 MOA was rebranded as Ministry of Agriculture and Rural Affairs (MARA) in 2018.

7 In 2018, CFDA was merged into the State Administration of Marketing Regulation (SAMR), the new Chinese competent regulator integrated food safety sectors from five former ministries including CFDA, the Ministry of Agriculture, the General Administration of Quality Supervision, Inspection and Quarantine, the State Administration for Industry and Commerce, and the Ministry of Health.

Table 1 Food safety incidents in China between 2001 and 2011

Year	Major food safety scandals	location
2001	Poisonous soymilk with heavy metals and germs	Jilin province
2002	Fake sugar using magnesium sulphate and other unidentified chemicals	Jinhua, Zejiang province
	Fake duck blood tofu tainted with chemicals	Changchun province
2003	Poisonous kelp products tainted with industrial colouring	Hangzhou, Zejiang province
	Poisonous Jinhua Ham tainted with dichlorvos	Jinhua, Zejiang province
2004	Fake spirit with industrial alcohol methanol	Guangzhou city
	Inferior infant formula	Fuyang, An’hui province
	Leather milk powder using leather-hydrolysed protein	Shandong province
2005	Beer products with formaldehyde as additive	Beijing city and Shandong province
	Preserved fruit with Sulphur dioxide residue	Chao’an, Guangdong province
	Turbot fish with drug residues	Shanghai city
2006	Salted duck eggs tainted with poisonous Sudan Red	Hebei province
	Pork products tainted with clenbuterol	Shanghai city
	Fake honey	Hubei province
2007	Contaminated wonton and dumpling	Guangxi province
2008	Sanlu melamine infant formula	Hebei province
	Fake dates	Xinjiang region
2009	Melamine tainted egg from problematic chicken feed	Liaoning province
	Hotpot ingredients tainted with chemicals	Across the country
	Shengyuan infant formula with tainted with hormone	Hubei province
2010	Gutter oil	Across the country
	Cowpea with pesticide residue	Hainan province
	Recurrent melamine infant formula	Qinghai, Gansu provinces

Source: Adapted from Phoenix New Media (2010) and other Chinese news reports

Sudan Red-tainted spicy sauce, sulphur-smoked ginger, tainted steam buns, clenbuterol-tainted pork, plasticizer-tainted beverages, inferior milk powder, and melamine-contaminated infant formula, high pesticide residues in vegetables, and others (Chen et al., 2015; Li, 2012, October 15; Ross, 2012; Xiao, 2011; Zhang et al., 2013; Zhou, 2017; Zhu et al., 2019). The food safety incidents cost people's health or even lives and destroyed consumer confidence in domestic food products. The 2004 Fuyang infant formula incident and the Sanlu case were the two most shocking food safety scandals in recent history. According to the State Council of China (2005, August 9), inferior infant formula products manufactured by 45 Chinese dairy companies in the 2004 Fuyang infant formula scandal led to the hospitalization of more than 16,000 babies. More than 200 of the victims suffered from serious malnutrition, and 12 of them died. The nation was shocked by the photos and news articles reporting those events. The Fuyang infant formula scandal was widely known in China as "big-head baby incident" because the victims' heads were disproportionately big due to skull deformity caused by malnutrition. Sanlu was one of the 45 infant formula brand names blacklisted by the Fuyang local food safety authority. The incident repeated itself in 2020 when young babies in Hunan province reportedly suffered the same illness from similar inferior infant formula products (Zheng & Feng, 2020, May 14). The Sanlu case sickened nearly 300,000 babies and killed six of them. According to MOH's annual reports on food poisoning incidents between 2005 and 2017 (See Table 2), thousands of people in China suffered from food contamination every year, and hundreds of them died from those incidents. Some researchers believed the official statistical numbers were discounted to downplay the real situation (Zhang, 2005).

Food safety has become one of the top concerns of the Chinese public for years (Jia & Jukes, 2013). The repeated occurrence of the devastating food safety incidents and scandals revealed a total failure of the dairy food safety regulatory system under CFSA' watch (Li, 2013). According to a national

survey in 2010 on adult consumers' confidence in safety of food products in China, two thirds of the respondents expressed concerns on food safety (Wu et al., 2017). The Chinese public had every reason to worry about safety of food products on their dinner table. A popular online posting jokes all Chinese people are walking periodic tables due to the chemicals they consumed in their foods. The dark humour was an expression of deep discontent towards the food safety situation and incompetence of the food safety agencies (Wu et al., 2017).

Table 2 Food poisoning incidents in China during 2005-2017

Year	No. of reported incidents	No. of poisoned people	No. of deaths
2005	256	9021	235
2006	596	18063	196
2007	506	13280	258
2008	433	13013	161
2009	271	11007	181
2010	220	7383	184
2011	189	8324	137
2012	174	6685	146
2013	152	5559	109
2014	160	5657	110
2015	169	5926	121
2016	323	8955	157
2017	348	7389	140

Source: Yearly reports on food poisoning issues by MOH during 2005-2017

In the era of economic globalisation, a food safety crisis within a country can have an impact on people across its national border (Diers-Lawson & Croucher, 2017). China has become the fourth

leading food exporter in the world since 2009 (WorldAtlas, 2017, April 25; Zhou, 2017). The 2008 melamine scandal triggered a food product crisis impacting 11 countries and regions⁸. Chinese dairy products, together with other food products, were banned by foreign markets. The unprecedented food safety incident revealed the Chinese dairy food safety regulatory system was characterised as backward in dairy food safety standard and testing capacities and chaotic in food safety regulation and enforcement. The Chinese food safety authority was blamed for its lax regulation. The Chinese government was under pressure to hold the dairy companies accountable and overhaul the broken food safety system. The then Chinese Premier, Wen Jiabao, apologised to the victims and the Chinese public. He also vowed to learn lessons and make changes from the Sanlu incident.

According to Jie and Hasan (2017), learning from a crisis for an organisation is not limited to recovery efforts; it is more about making improvements to prevent such crises from happening or be better prepared for future crises. Research findings of Elliott et al. (2000) and Jaques (2007) suggest organisational learning can happen at any stages of crisis management, but the post-crisis stage is a critical period for occurrence of organisational learning and system modification. A critical or monumental crisis, like the Sanlu case, can lead to a prolonged political and societal process lasting for years or even decades (Stern & Sundelius, 2002). More than 10 years have passed since the outbreak of the melamine infant formula scandal. Numerous academic studies have explored the case from various perspectives, focusing mainly on the crisis response of Sanlu. Few studies examined its impact on CFSA, especially from the angle of crisis-induced organisational learning changes in the Chinese food safety authority, such as the structural design for the government agencies, dairy food

⁸ The scandal impacted Hong Kong, Macao, Taiwan, Japan, South Korea, Singapore, India, Indonesia, Philippines, the USA, the EU, and Brazil.

safety legislation and regulations, risk management programs, the dairy food safety testing regime, and the product tracing and recall system.

A public crisis caused by organisational failure for its action or inaction can put the legitimacy of the organisation in question (Elliott, 2009). Response to such a crisis can test a political party's governance capacity (Christensen & Læg Reid, 2016). In response to the public's complaints and frustration about the food safety situation in China, President Xi Jinping reminded food safety officials at a meeting that the competence of the Party's governance would be questioned if CFSA could not put the prolonged food safety issue under control (Lian, 2015, September 22).

1.1.2 The damaged image of NZFSA

NZ is a leading country in dairy food products production and export. The OECD country of 4.9 million people produces enough food to feed 40 million people and most products from the dairy, meat, seafood and beverage industries have been exported to 200 markets across the globe (Hancock, 2021, July 21; MPI, 2020, September 22). In 2019 for example, NZ food and beverage exports valued 29.4 billion NZ dollars, accounting for 46% of all goods and service export value (MBIE, 2020, January 18). NZ was the 8th largest dairy producer and the largest dairy product exporter in the world, supplying 95% of its milk to more than 100 markets (Dairy Companies Association of New Zealand, 2022, January 19).

Prior to the Fonterra case, food products produced and processed in NZ had earned the country a high reputation as a global leader in food safety and quality control (MPI, 2020, September 22). The New Zealand Food Safety Authority (NZFSA) consisted of three regulatory parties, including the Ministry for Primary Industries (MPI), verifiers, and food operators. MPI was, and still is, the NZ

government agency that ensures food safety “from farm to fork” for consumers at home and abroad (NZFSA, 2020). NZ dairy food safety legislation included the 1999 Animal Products Act (APA), the 1981 Food Act (FA), and the Australia-New Zealand Joint Food Standards⁹ (Dean et al., 2013, December 3, 2014, November 24). Under the 1999 APA, all NZ animal product processors must register to MPI with a Risk Management Program (RMP), a combination of internationally recognised Hazard Analysis Critical Control Points (HACCP) and Good Manufacturing Practice (GMP) (MPI, 2020, December 10). Food operators could not start operation until their RMPs were evaluated and approved. The food operators, as part of NZFSA, were responsible for self-regulation against its RMP to manage the safety and suitability of their food products (MPI, 2013, August 25, p. 7). MPI recognised verifiers, playing a key role in NZFSA, were the food products auditors who examined and decided whether a dairy product complied with standards and specifications under related food acts. Verifiers were positioned as third-party and independent auditors (Dean et al., 2013, December 3). When MPI was notified or aware of any non-conformance, it would use its statutory power to hold those responsible accountable. If necessary, it would trace affected products, notify competent foreign authorities, and compel product recall in domestic and overseas markets.

However, the Fonterra case scratched NZ’s image as a premium food products producer and exporter. The dairy product regulatory system under MPI’s watch was questioned for its capabilities and competence in product quality verification, testing capacity, product tracing and recall, and crisis response. Fonterra was the largest company in NZ and its export value accounted for 90% of the

⁹ It was a result of agreement between Australia and NZ governments signed on December 5, 1995.

whole dairy industry in the country (Gray & Heron, 2010). As the biggest dairy exporter in the world, it was the business card of NZ (Statista, 2021, July 22).

On August 3, 2013, MPI released food safety concerns about three batches of whey protein concentrate (WPC) 80¹⁰ products manufactured by Fonterra, announcing three batches of them were potentially contaminated by clostridium botulinum¹¹, a toxin that can produce lethal botulism. The Director General¹² initiated precautionary recall of the impacted products from domestic and overseas markets. Eight importing countries including China and Australia were impacted by the incident and suspended or banned dairy products from NZ. Some other countries including Russia and Belarus, which had not imported the impacted products, also banned dairy products from NZ. The product recall proved to be a massive challenge for all involved parties. Given eight months had passed before the outbreak of the incident, a big portion of the impacted products had been consumed already. In addition, WPC80 products were widely used as ingredients in a range of products such as infant formula products, nutritious beverage, and other food products. It took several weeks and enormous efforts for NZ government agencies, Fonterra, and related foreign food safety authorities to identify impacted products and track them down. The incident caused significant losses for Nutricia, the subsidiary of French food giant Danone.

The whole event flipped when MPI announced dramatically on August 23, 2013 WPC80 incident was a false alarm and further testing found no clostridium botulinum in the impacted products.

¹⁰ Whey protein concentrate with 80% content is an ingredient for infant formula, sports drinks, and a range of other dairy and beverage products. The botulism was therefore called as the WPC80 incidents as well in media reports and aftermath inquiries. In this study, the WPC80 incident is also used in certain circumstances interchangeably to the Fonterra botulism scare.

¹¹ A bacterium that produces dangerous toxins (botulinum toxins) under low-oxygen condition. They are one of the most lethal substances that can block nerve functions and lead to respiratory and muscular paralysis.

¹² The CEO of MPI.

However, NZ's pure and green image was damaged (Kirk & Kloeten, 2014, December 9) and the reputation as a world leader in food safety was at stake. The NZ government initiated a two-stage inquiry to review the dairy product food safety regime under NZFSA's watch and investigate the cause of the crisis. The 2013 botulism scare was not the first time for Fonterra to be involved in a food safety crisis. When the crisis was unfolding, Fonterra was criticised by the media as a repeated food safety offender. New reports related Fonterra to its involvement in the Sanlu case as a 43% shareholder of Sanlu. However, the Chinese public did not attribute much blame to Fonterra mainly because the NZ Government blew the whistle to the Chinese central government. In 2013, Sri Lanka governmental regulators found imported dairy products manufactured by Fonterra were contaminated by dicyandiamide¹³. Fonterra and MPI were both criticised for delaying notification to the public and foreign food safety authorities despite having known months earlier about the presence of dicyandiamide in milk (Radio New Zealand, 2014). It led to strengthened scrutiny of NZ dairy products by China and Malaysia.

The government inquiry into the 2013 botulism scare consisted of legal and dairy experts from NZ, Australia, and Ireland. The focus of the first stage of the inquiry was to review NZ's regulatory, best-practice requirements, testing regime, and product tracing and recall systems for the dairy industry (Dean et al., 2013, December 3). The inquiry confirmed the NZ dairy food safety system was generally robust and still among the best in the world. However, there were voices in Parliament denouncing the incident as a "complete systems failure" (Ingleby, 2016, p. 153) for shortfalls in testing standards, monitoring and auditing systems, and the traceability of the impacted products. The second part of the inquiry was to investigate causes of the crisis and Fonterra and MPI's responses

¹³ An agricultural chemical applied to pasture by farmers to prevent nitrate seeping into rivers or lakes.

in handling the crisis (Dean et al., 2014, November 24). The report credited MPI for putting consumer interests first. The inquiry also identified 29 shortfalls and recommended MPI learn from the lesson and make changes in decision-making processes, risk assessment, crisis communication to the public, crisis planning, product traceability, and coordination among government agencies and with the industry. MPI accepted all the recommendations and committed to make relevant changes.

1.1.3 Similar circumstances faced by CFSA and NZFSA

CFSA and NZFSA were working under two significantly different socio-political and economic contexts. They were faced with equally different food safety landscapes and crises. The two dairy product crises were triggered by completely different causes. The Sanlu case in China was caused by melamine adulteration driven by unethical profit extortion. Product contamination of the 2013 WPC80 incident in NZ was caused by an accident in a Fonterra's dairy plant. The former was found to be an industry-wide adulteration practice with involvement of almost all major Chinese dairy firms. It was the most devastating food safety scandal out of a series of such incidents. The latter was an isolated incident without involvement of any other dairy firms and the precautionary product recall was triggered by problematic testing reports.

- At the same time, the two food safety authorities were confronted with many challenges in common in handling the two crises in question
- The problematic products in the two cases were mainly about socially sensitive infant formula products
- Each of them was dealing with a dairy giant with power from excessive industrial influence and economic significance

- The incidents in question were biggest-ever in scope and magnitude leading to international reactions
- The crises were avoidable from a governance perspective
- Both crises caused significant damage on food safety reputation of the two countries
- They inspired public debates and official review of the dairy food safety regulatory systems
- They triggered comprehensive changes in food safety legislation, regulations, and enforcement.

According to Diers-Lawson and Croucher (2017), national culture and political institution are key factors influencing governments' approaches to handling public crises. This study puts CFSA and NZFSA and their crisis responses to the two food safety incidents under the same theoretical lens to examine how they responded to the crises in question and what and how they learned from them. An in-depth analysis of the two crises and government responses can reveal socio-political roots leading to food safety problems in the two countries. It can also disclose loopholes and underlying problems in the food safety authorities and their crisis responses, which in return can be used as indicators to identify organisational learning in CFSA and NZFSA. A comparison between the two cases can shed light on factors contributing to the causes of the crises and consequent organisational learning in the two food safety agencies and the regulatory systems. The study can also explore which factors in the two socio-political and economic contexts facilitate or inhibit organisational learning in the food safety authorities.

1.2 Significance of the study

The two dairy products crises in this study caused massive economic and reputational losses to China and NZ. The two governments were criticised for their lax regulation leading to the dairy products crises and poor performance in crisis responses. Both government agencies were urged to learn from the costly lessons. Through qualitative analysis of the data corpus, the study can generate fresh insight into what and how a government organisation can learn from a food safety crisis and what socio-political and economic factors facilitate or inhibit learning in the two contexts. In doing so, this study will contribute theoretically and practically in the following areas.

A large body of past research in crisis management focused on business organisations and is limited to crisis prevention and response perspectives (Smith & Elliott, 2007), leaving learning from crises in public organisations an under-researched area (Antonacopoulou & Sheaffer, 2014). This study can fill the research gap and cast light on crisis-induced learning in government agencies. In addition, theoretical development in relation to crises and organisational learning has been scarce (Broekema et al., 2017). Studies for testing theoretical frameworks accounts for less than one third of published articles in the area of communication study (Coombs & Holladay, 2010). Through examining the two food safety incidents from the crisis-induced organisational learning perspective, this qualitative research will review current crisis-induced learning theories, such as what constitutes organisational learning, what processes are involved, and particularly what socio-political factors influence organisational learning and its implementation under the Chinese and the NZ contexts. It will also shed light on building a theoretical framework to compare crisis management and resulting organisational changes in the government sector under different socio-cultural contexts.

In the era of globalisation, a food crisis can cross the border and potentially affect everyone in the world, as happened in the two crises in question. This study will illuminate how a government agency or agencies can learn from a food safety crisis. By examining factors influencing crisis-induced organisation learning in the Chinese and NZ government agencies, this study will contribute to the understanding of the dairy food safety regulatory systems and crisis response mechanisms in China and NZ and also build a knowledge base for further enhancement of the systems. In a broader sense, it can enable governments and crisis response practitioners to get better prepared and coordinated when handling a public crisis. This capacity is especially significant at the moment when all governments are struggling to handle an unprecedented global pandemic.

1.3 Structure of the thesis

The thesis is composed of seven chapters. Chapter One contextualises the research by providing a global food safety situation, a brief introduction to CFSA and NZFSA and the dairy food safety regulatory systems under their watch, the food safety crisis circumstances faced by the two food safety government agencies, and a rationale for comparing the two cases. The aim of the study is to identify evidence of crisis-induced organisational learning in the two food safety agencies and regimes and the focus is to explore the underlying causes of the food safety problems and influencing factors facilitating or inhibiting learning in the two food safety authorities. It concludes with explanations of the theoretical and practical significance of the study.

Chapter Two gives detailed accounts of the two dairy companies, Sanlu in China and Fonterra in NZ, the outbreak of the two dairy product incidents, the approaches being employed by the two food safety authorities' in handling the crises, and findings of the two food safety crises. The review of the two crises and their socio-economic and political settings constructs an analytical context for

identification of loopholes in the food safety organisations and regimes which provides a basis to identify changes in the two government agencies as learning evidence induced by the crises.

Chapter Three reviews previous research on crisis management and organisational learning highlighting the theoretical frameworks and models developed by scholars to explore crisis-induced organisational learning. Key concepts and definitions are provided in this chapter. The complexity of crisis-induced learning processes and the possibility of crisis-induced learning occurring in a public organisation are discussed in the literature. Both issues are found to be under-researched areas. This chapter finally raises the two research questions in an effort to address the identified research gap through examining two cases within the research scope.

The research methodology is described in Chapter Four. It explains the use of a multiple case study design for this study. It follows with a detailed description of sources of the data corpus, data collection methods, qualitative content analysis, use of NVivo for data coding, processes of data exploration and interpretation.

Chapter Five reports findings in the Sanlu case in China. Using the three-stage crisis management theoretical framework, a qualitative analysis of the data corpus examines the Sanlu case to find out what caused the melamine contamination, how the products were qualified and distributed to the market, what Sanlu and CFSA did in response to the complaints about the melamine-contaminated products, and how the Chinese government and food safety agencies managed the crisis. Upon identifying loopholes in CFSA and dairy food safety regime, the research proceeds to establish evidence of crisis-induced organisational learning in CFSA and the Chinese dairy food safety regulatory system. The evidence includes consequent changes of CFSA in its organisational design, food safety legislation and enforcement, dairy product testing standards, product tracing and recall

system, and other related improvements to tackle the underlying roots of food safety problems in China.

Chapter Six represents the processes of data examination and research findings of the Fonterra case. Following the same theoretical framework and research methods as employed in the Sanlu case, this chapter investigates the causes of WPC80 incident and the responses of MPI and verifiers at different stages of the crisis management. It utilises data corpus to assess performance of NZFSA against the NZ dairy food safety regulatory framework and crisis response protocols to identify loopholes in the dairy food safety system and NZFSA. It is followed by examination of changes having occurred in NZFSA and the dairy food safety regime induced by the crisis.

The main themes covered in Chapter Seven include a discussion and comparison of findings of the two crises, limitations of the study, and problems for future research. By discussing and comparing the two cases, the study seeks to analyse socio-political and economic factors contributing to or impeding organisational learning in the two food safety authorities within the Chinese and NZ contexts. The chapter ends with a statement in the limitations of the study prospective for future research inspired by this research.

CHAPTER 2 THE RESEARCH CONTEXT

Stern and Sundelius (2002) claimed all case studies in crisis management were embedded in their historical, institutional, and political contexts. Other researchers in this area of study, such as Deverell (2010) and Stern and Sundelius (2002), also suggest it is a necessary step to provide a context of the crisis in question to facilitate contextual interpretation of crisis management behaviours of an organisation. Deverell (2010) stated such a context, or a holistic description of the crisis events can be constructed using narrative sources, including newspaper articles, government documents, and meeting minutes of the organisation in question.

This chapter gives detailed accounts of the Sanlu case and the Fonterra case to contextualise socio-political and economic settings of the two food safety incidents in China and NZ. The unfolding of the crises and responses from the food safety agencies can reveal problems or loopholes existing in the food safety regulatory agencies and regimes, which can be used to identify organisational learning in the two food safety authorities triggered by the crises.

2.1 The Sanlu infant formula crisis in China

2.1.1 A brief introduction to the Sanlu Group

Sanlu, or the Sanlu Group, was a major dairy company in China headquartered in Shijiazhuang city, the capital of Hebei Province. The company was founded in 1956 as Xingfu Dairy Cooperative. It was rebranded as the Sanlu Group in 1996 after several rounds of acquisition. Tian Wenhua, a veterinary study graduate, was elected as chairperson and Chief Executive Officer (CEO) of the company. The small dairy company grew rapidly and became a top dairy manufacturer. It was fifth largest dairy company and the largest milk powder manufacturer in China. The Sanlu Group's CEO

Tian was therefore elected as a deputy chairperson of the China Dairy Industry Association¹⁴ (CDIA) for her success and influence in the industry. As a state-owned enterprise (SOE), Sanlu was the most important taxpayer for the local government. It had been the largest milk powder manufacturer in the Chinese market for 15 consecutive years since 1993 (Cui, 2008, December 31). In 2007, the dairy giant's annual sales were worth 1.5 billion US dollars (Veil & Yang, 2012), accounting for 18.26% of the domestic market share (Gao et al., 2012). Sanlu's distribution channels covered 600 cities in 31 provinces (Yu, 2009). Its brand value was approximately 15 billion *yuan*, or 3 billion US dollars. In 2005, Sanlu entered an international joint venture with the Fonterra Cooperative Group from NZ, the world's largest dairy exporter. Fonterra purchased 43% of Sanlu's shares for 107 million US dollars (Pavlovich et al., 2016). As a result, the NZ dairy giant replaced three of the seven Sanlu Board of directors with its own representatives.

2.1.2 The outbreak of the Sanlu crisis

The year 2008 was an eventful year for Chinese people. On May 13, an 8.0 magnitude earthquake struck Wenchuan, a county of Sichuan province in Southwest China. It claimed more than 60,000 lives, leaving another 26,000 missing and 35,000 injured. It triggered a national level crisis response and rescue efforts. On the 8th of August, the whole country was in a festive atmosphere to celebrate the opening of the 29th Olympic Games in Beijing. It was the first time China had hosted the events, a prime time to showcase to the world the nation's successful rise through efforts of several generations in the past century. It was obviously the worst time for a scandal to break out that

¹⁴ It was founded as an industrial association in 1995 and has become a member of International Dairy Federation (IDF) since then. The association is made up of more than 580 large and medium-sized Chinese dairy firms.

victimized hundreds of thousands of innocent babies. Then came the Sanlu infant formula scandal, bringing Chinese politicians and the public to a roller coaster ride of a year.

The scandal was triggered by a news article. On September 11, 2008, the *Oriental Morning Post*, a Shanghai-based newspaper, published *14 Babies in Gansu Sickened with Kidney Stone after Drinking Sanlu Infant Formula*. It was reported by investigative reporter Jian Guangzhou. Prior to the report, thousands of babies in Gansu and other provinces were hospitalised with kidney stones inflicted by unknown causes. Kidney stone is a rare disease among infants given their young age and exposure to related pathogenic sources. Several months before Sanlu was brought under the spotlight, some doctors and parents were suspicious of contamination in the dairy giant's infant formula products because the hospitalised babies had all consumed its products. Jian was the first reporter to name Sanlu responsible (Lyu, 2012). According to follow-up media reports and government investigations, Sanlu's infant formula products were contaminated by melamine, a toxic chemical mainly used in making plastic products. This unethical business behaviour, as found by government investigations, started as early as 2004 (China Daily, 2010, July 10). Investigations found Sanlu manufactured 904 tonnes of melamine-contaminated infant formula products and sold 813 tonnes of them between August 2 and September 12 (China Daily, 2009, January 22).

The scandal could be tracked back to February 2008 when a father first complained on a blog online that his daughter had trouble urinating after consuming Sanlu infant formula products. However, he later removed his posting after allegedly receiving four packages of milk powder from Sanlu (Lerbinger, 2012). In March 2008, Sanlu received numerous complaints from parents, claiming its products led to dark-colored urine or urinating difficulty in baby consumers. Sanlu consequently conducted internal tests and results were presented to the CEO Tian (Veil & Yang, 2012). The Sanlu

Group held a board meeting informing all board directors of the melamine contamination in their infant formula products and finally came to a decision to initiate a full recall of the products. However, the decision was allegedly overruled by the Shijiazhuang municipal government (Custance et al., 2012; Fu & Nicoll, 2011; Ghazi-Tehrani & Pontell, 2015; Hubbard, 2010, August 8). According to S. Chen (2009) and Hubbard (2010, August 8), a Fonterra representative on the Sanlu board of directors disclosed the melamine contamination to a NZ diplomat at a cocktail party at the NZ embassy in Beijing on August 14, 2008. A formal report on the issue was sent to Wellington on August 31. A week later, the then NZ Prime Minister Helen Clark informed the Chinese central government about the melamine infant formula contamination (S. Chen, 2009; Feng et al., 2012; Wishnick, 2009).

With the unfolding of the scandal, it was found that melamine had been adulterated into raw milk by milk collecting stations under the name of “protein essence” or “protein powder” (J. Chen, 2009, p. 109). It could fool raw milk testing instruments into a falsely high reading of protein content in watered-down milk. By the time of the scandal, the count of nitrogen was used as the only indicator of nutrition in raw milk. Melamine is a nitrogen-rich organic compound. Adding melamine into watered-down milk had been done for years and had become an open secret in the Chinese dairy industry (China Daily, 2009, January 6; Fairclough, 2008, November 3; Gale & Hu, 2009). Below a certain point, melamine in contaminated foods can be excreted through the human urinary system; but beyond certain levels it can cause kidney stones and even death (Ghazi-Tehrani & Pontell, 2015). Media reports related the scandal to pet food melamine contamination in 2006 in which Chinese exporters had to recall products from the USA, the EU, and South Africa after pets died from renal problems (Cai et al., 2009). CFSA initiated a full-scale and industry-wide dairy product safety and quality inspection.

Though most of the melamine-tainted dairy products were distributed in mainland China, some food products exported to Taiwan, Hong Kong, and other overseas markets were also found to have been contaminated by the chemical. Foreign food safety authorities including NZ, Australia, India, Japan, and Switzerland found melamine contamination in imported candies, chocolate, eggs, biscuits, and pastries from China (China Daily, 2008, September 20, 2018, February 22). During the Sanlu incident, Hong Kong and Singapore food safety authorities forced a Chinese company to recall all its melamine-tainted biscuits from their markets (China Daily, 2009, January 4). These countries suspected imports of specific food products made in China. After high levels of melamine were detected in baby soy food and baking powder imported from China, the EU followed suit and banned those products made in China and scrutinised other food products (Custance et al., 2012). China's food exports nosedived to their lowest level in the wake of the Sanlu case (China Daily, 2008, September 20). The reputation of the Chinese products was at stake (NPC, 2008, November 10).

2.1.3 Responses of Sanlu and CFSA

CFSA, under the central government's directives, responded swiftly (See Table 3). MOH confirmed the melamine-contaminated infant formula products were the cause of kidney stones in the hospitalised babies. On September 12, 2008, Sanlu was forced to recall about 700 tons of the infant formula products that were made prior to the date of August 6, 2008. On September 13, the Chinese central government triggered its Level I food safety emergency response plan¹⁵. CFSA sent a joint investigation team to the headquarters of the Sanlu Group in Shijiazhuang city to investigate

¹⁵ Food safety is categorised as public health crisis in China. There are four levels of government emergency response plans descending from Level I the highest, to the Level IV the lowest.

Table 3 Timeline of CFSA handling the 2008 Sanlu crisis

Date	Actions taken by the government agencies
August 2	The Shijiazhuang Municipal Council was informed by Sanlu of the melamine issue, no action was taken.
September 2	The Shijiazhuang Municipal Council reported the melamine issue to the provincial level.
September 8	The central government was notified by the NZ government about the Sanlu infant formula contamination issue.
September 11	MOH announced that Sanlu's melamine contaminated products sickened infants. AQSIQ ordered to recall 700 tons of its products from the market.
September 12	Sanlu admitted the contamination. MOH notified WHO of the food safety.
September 13	The central government sent a working group to Hebei Province, level I food safety emergency plan was triggered. Sanlu was ordered to halt production. Nineteen suspects were arrested.
September 14	Nineteen suspects were arrested.
September 16	AQSIQ released a list of 22 companies with melamine contamination, and abolished Sanlu inspection-exemption products title and removed it from the China famous brands list.
September 17	The Mayor and Deputy Mayor of Shijiazhuang city together with other 3 local food safety senior officials were sacked.
September 18	AQSIQ announced liquid milk products were also contaminated with melamine, and declared to abolished inspection-exemption system in the food industry
September 22	Premier Wen Jiabao visited victims in a hospital and apologised. AQSIQ head resigned, and the Shijiazhuang party chief was sacked
October 14	The government ordered recall of all liquid milk and milk powder products produced before September 14, 2008.
December 24	The Shijiazhuang intermediate court declared Sanlu bankrupt.
December 27	Twenty-two involved dairy firms set up a 1.1 billion <i>yuan</i> (\$162m) fund to compensate six dead babies, and nearly 300,000 affected others.
January 22, 2009	CEO Tian Wenhua was sentenced to life in prison; two others were sentenced to death.

Source: Adapted from *China Daily* reports and Xinhua news.

the cause of the scandal. More working groups were formed and sent to all dairy companies to undertake a full-scale and in-depth investigation into the contamination incident. It proved an easy task to find out the industry's open secret.

When approached by news media on September 11, Sanlu first denied any problems in its infant formula products. It was refuted by MOH's public announcement. A spokesperson of the company

admitted the next day its products were contaminated by melamine. On September 15, 2008, Sanlu issued an apology to the public and recalled all its products manufactured before August 6, 2008. Sanlu had in fact secretly recalled 43 million US dollars' worth of products from consumers and sales agents since August 18 (Veil & Yang, 2012). Test reports showed the level of melamine in some batches of Sanlu's products was as high as 2,560 mg per kilogram, thousands of times higher than the tolerable level of 0.63 mg/kg of body weight set by the WHO (WHO, 2010, July 6). Sanlu's website was attacked by angry hackers, and its brand name was changed to “三聚氰胺集团”, meaning the Melamine Group.

This was not the first time the dairy giant had been involved in an infant formula scandal. In 2004, 13 babies in rural areas of Anhui and Shandong provinces died from consuming inferior infant formula products and more than 200 other babies got malnutrition (Taylor, 2019). Tests of protein content showed nearly zero nutrition in the infant formula products (China Daily, 2004, April 26, 2004, May 10). Sanlu was on the blacklist. It was finally removed from it allegedly with help of the Shijiazhuang municipal government (Ye & Pang, 2011). Following the tragic incident in Fuyang, the Chinese government decided to replace the 1995 FHL with a food safety law and restructure CFSA accordingly (Zhou, 2017).

On September 16, 2008, AQSIQ released a list of 22 dairy manufacturers including dairy giants Yili, Mengniu, and Bright Dairy whose infant formula products were found tainted with melamine (Ghazi-Tehrani & Pontell, 2015; Gong & Jackson, 2012; Wishnick, 2009). (See Appendix 1). The crisis was therefore also called the Chinese melamine milk powder scandal. AQSIQ removed Sanlu from China's Famous Brand list and revoked its inspection-exemption policy from the company (State Council of China, 2008, September 17). The Chinese food safety regulator later extended the

revocation of its inspection-exemption policy to the whole food industry. MOH informed the WHO of the melamine issue. Medical teams were sent out to local hospitals to screen for melamine-sickened infants. MOH urged parents to take their babies to hospitals for examination if they had consumed the impacted products. Panicked parents rushed their infants to hospitals (Mooney, 2008, October 9). Medical teams were sent out to assist local hospitals in treatment of impacted infants throughout the country. The Chinese government gave sickened babies free hospitalization. By the end of the scandal in December 2008, nearly 300,000 infants as having been confirmed being sickened by Sanlu's contaminated products (Veil & Yang, 2012). Six babies died and 5,300 developed kidney stones and needed hospitalization (Pei et al., 2011). The 22 involved dairy companies issued an collective apology to the Chinese public and set up a fund of 1.1 billion *yuan* (USD 162 million) to cover the medical fees and compensation to the impacted families (Zhu & Cui, 2008, December 30).

On September 26, Tian Wenhua, the CEO, and three other top managers of Sanlu were arrested (Ye & Pang, 2011). During court trials, Tian claimed she reported in written form twice to the local government in August, 2008 about the melamine contamination, but the prosecutors denied her statement and accused her of making the cover-up decision to avoid reputational damage to Sanlu (China Daily, 2009, January 1a). Ye and Pang (2011) also suggested the top officials of the Shijiazhuang Municipal Council colluded with Tian to cover up the contamination incident. On September 8, the then Prime Minister of NZ Helen Clark ordered officials to leapfrog the local government and notify the Chinese central government directly of the melamine contamination issue. On December 24, Sanlu went bankrupt with a debt of 1.1 billion *yuan* (nearly USD 162 million), less than three months after the scandal was disclosed to the public (China Daily, 2009, February 12). By January 2009, 60 people were arrested (Gao et al., 2012) and 21 of them were convicted of related

crimes (Ghazi-Tehrani & Pontell, 2015). The CEO of Sanlu, Tian Wenhua, was sentenced to life in prison¹⁶, three other top managers were sentenced to jail. Two milk dealers who added melamine into milk were executed, and another one got a suspended death penalty¹⁷ (China Daily, 2009, November 25).

2.1.4 Public accountability and aftermath of the scandal

The Sanlu case brought casualties and prolonged illness to the most vulnerable and innocent consumers in China. It destroyed the reputation of Chinese dairy products and other made-in-China food products (National People's Congress, 2008, November 10). The incident left Chinese food exporters in deep trouble for many years. Consumer confidence in Chinese domestic dairy products collapsed. Chinese parents resorted to various means to buy foreign dairy infant formula products. According to news reports, foreign markets for a while had trouble meeting the immeasurable demand from Chinese mothers. Some infant formula-exporting countries even imposed restrictions on buying to secure their domestic needs (China Daily, 2012, April 16, 2012, June 22, 2013, April 15, 2013, May 16). Even Hong Kong authorities issued such a regulation, restricting mainland consumers a maximum of 1.8 kg of infant formula products (China Daily, 2013, March 4).

The Chinese public was enraged by the revelations of long-time and industry-wide unethical business practice. CFSA was also found defective in dairy food safety governance and crisis response. There were online outcries questioning the trustworthiness of the domestic dairy manufacturers and

¹⁶ After 3 times of controversial commutation, Tian Wenhua's life in prison has been shortened to 16 years in jail by 2016.

¹⁷ Suspected death sentence is a unique criminal penalty in China, only next to the capital penalty in severity. It usually suspects two years as stated in the sentence, which means the convict is to be executed by the end of the suspected "one year, or two years" due to their performance of repentance during the suspected period. In practice, most convicts will be resented to life in prison or even lighter imprisonment.

the food safety government agencies. The public urged the government to hold accountable the top management of Sanlu, food adulteration offenders, and responsible food safety officials. CFSA was faced with domestic and international challenges for its inability to ensure food safety. The public resentment of CFSA triggered by the scandal was a result of an accumulation of repeated food safety scandals. Chinese newspapers, televisions, and online news media exposed various inferior, contaminated, or adulterated food products in the market, such as “the ink-tainted noodles, fake wine, fake tofu, poisoned mushrooms, recycled steam buns, illegal food colouring, steroids pig feed, faked beef, tainted bean sprouts, fake sweet potato flour, mercury-injected fish, sodium injected shrimp, and gutter cooking oil” (Ross, 2012, p. 49). Over the years, more unsafe food products were added in, such as tainted milk powder, clenbuterol meat¹⁸, and tainted steamed buns (Jiang & Zhu, 2013; Zhu et al., 2017).

In response, the then Premier Wen Jiabao visited a hospital and apologised to the impacted families and the Chinese public (Littlefield & Sellnow, 2015). He pledged to hold the responsible accountable, strengthen food quality control, and ensure food safety. According to investigations, when Sanlu management acknowledged the melamine contamination in June 2008, it sat on the crisis for weeks before reporting to the Shijiazhuang Municipal Council. The local CFSA and senior Shijiazhuang government officials did not recall the tainted products or inform the public of the contamination. They reportedly did not report to its superior provincial authority, as required in its public crisis response plan, until September 9 (State Council of China, 2008, September 22). The scandal was concealed from the public for at least five months while the melamine-tainted dairy

¹⁸ meat of livestock, including cattle, lamb, poultry and swine contaminated with clenbuterol when farmers use it for leaner meat with a higher muscle-to-fat ratio though the drug is banned due to serious health concerns

products were being sold to feed babies. The infant formula contamination did not come under the spotlight until Jian Guangzhou's explosive news article. According to Feng et al. (2012), Fonterra waited weeks for approval to recall the impacted products before that. The upset NZ Labour government finally notified the issue to the Chinese central government.

The public accountability procedure was also triggered during the investigation. Good crisis performance can make careers while poor performance breaks them (Stern & Sundelius, 2002). That's what public accountability brings about. Li Changjiang, the head of AQSIQ was forced to resign. The party chief of the Shijiazhuang Municipal Council was sacked from his position (China Daily, 2008, September 23a; State Council of China, 2008, September 22). Hebei Provincial government later sacked all senior officials of Shijiazhuang Municipal Council. More than 200 public officials in all food safety related agencies were punished for corruption or other malpractice (China Daily, 2009, January 11, 2011, January 14c).

Government investigations identified major loopholes leading to the systemic failure in the dairy food safety regime and crisis response system (NPC, 2008, November 10; State Council of China, 2005, August 9). During the scandal, parents were confused by contradictory information released by different food safety agencies and other crisis response government departments (Xinhua News Agency, 2009, March 1a). The dairy food safety standard was found too outdated to cope with the ever-changing food safety situation. Testing personnel and resources between urban and rural areas were unevenly deployed. In addition, the segmented structural design of the food safety authority was highlighted as a major shortfall in the regulatory system, leading to overlaps and gaps in the dairy food safety regulatory system. (China Daily, 2014, March 15). There was a consensus in Chinese public and food safety researchers, including even some government officials, food safety

situation in China could hardly improve without change in the segmented design of CFSA (Wu & Tian, 2009).

CFSA was aware it could not afford another big below (China Daily, 2009, February 28). A systemic change to the food safety regulation and crisis response system had to happen. The Chinese government and law makers decided to speed up food safety legislation (China Daily, 2009, March 2, 2009, March 9b, 2015, April 25). Chinese public and law makers agreed to overhaul the food safety regime and reinforce regulations/laws enforcement (NPC, 2008, November 10; Xinhua News Agency, 2009, March 1a). The Chinese top leadership pledged to learn the lesson and ensure dairy product safety. The Chinese government decided to speed up replacement of the 1995 FHL with a food safety law that was put on the legislation agenda in the wake of the 2004 Fuyang inferior infant formula scandal (NPC, 2008, November 10; State Council of China, 2005, August 9). Food safety researchers and related law makers weighed in and called on CFSA to learn the lesson and make improvements.

2.2 The 2013 Fonterra botulism scare

2.2.1 A brief introduction to the Fonterra Cooperative Group

Headquartered in Auckland, Fonterra, or the Fonterra Cooperative Group Limited, is the largest dairy product exporter in the world (Bathurst & Galloway, 2018; Jay & Morad, 2007) and the largest company in NZ (Stringer & Ge, 2010). In 2020, the cooperative was made up of 10,000 dairy farmers, who derived 90% of their income from Fonterra (Fonterra Cooperative Group, 2020). The dairy cooperative employs 22,000 employees globally and operates in forms of subsidiaries, joint ventures, and partnerships in 140 countries. The dairy giant employs 12,000 NZers (MPI, 2018, June 29). It

supplies a variety of dairy products including milk powders, milk proteins, cheese, and medical ingredients to over 100 markets in the world (MPI, 2018, June 29). In the financial year of 2012, the dairy company's exports contributed \$11.6 billion dollars to the NZ economy, accounting for 20% of the country's total exports and 3.1% of its GDP (Foote et al., 2015).

Fonterra was the business card of NZ and the representative of the “clean green” (Blackett & Heron, 2008, p. 75) reputation of the country by supplying premium dairy products to the world. In a NZ crisis management specialist's word, “when Fonterra sneezes, NZ doesn't just catch a cold, we get the flu” (Noble, 2014, November 27). It was not an overstatement. It was proved to be true by the dairy food safety crisis in this study.

2.2.2 The 2013 WPC80 product recall

On August 2, 2013, MPI, the NZ's food safety watchdog, initiated a precautionary recall of three batches of Fonterra's WPC80 products, announcing they potentially being contaminated by clostridium botulinum (Bennett, 2013, August 28). Clostridium botulinum is known as a fatal toxin that, sometimes, can be developed in certain contaminated foods (Fearn-Banks, 2016; Moy et al., 2003). The impacted products were normally used as ingredients in a range of products, such as infant formula, sports drinks, yoghurts, and animal feeds (Bathurst & Galloway, 2018; Beckford, 2013). On August 4, Fonterra started a voluntary recall of its products. MPI, together with other food crisis response agencies, took a series of actions to identify impacted products, track down the products, notify related foreign competent regulators, and release updates to the public about the food safety concern (See Table 4). The global product recall involved a total of 42 tonnes of WPC80 products, and 37.8 tonnes of them were exported to eight countries including China, Australia, Saudi Arabia, and Thailand (Dean et al., 2014, November 24). The impacted countries imposed restrictive

measures on NZ dairy products or banned their imports. Other countries such as Russia, Belarus, and Kazakhstan also reportedly took restrictive measures or banned products from Fonterra (Beckford, 2013). By the end of the crisis, more than 1000 tonnes of products were tracked down and recalled from those countries (Craymer, 2013, January 26).

MPI set up a response management team led by a senior ministry official, a technical team to answer scientific questions, and an operation team responsible for product tracing and recall. MPI sent auditors to Fonterra's head office and its Australian subsidiary Darnum to help with tracing and to recall the impacted products. MPI issued several statements from its Director-General announcing the batches of impacted infant formula products. The conflicting information on the impacted products between different statements from MPI and news releases of other government crisis responders were criticised by NZ news media and the public for lack of accuracy and coordination.

To validate the botulism positive test results from AgResearch, MPI commissioned 195 tests from laboratories in NZ and the USA using various technologies to verify the results from AgResearch. Test reports from the Centre for Disease Control and Prevention (CDC) and the National Veterinary Services Laboratory (NVSL) of the USA suggested the bacteria was not clostridium botulism. The cause of high reading of SRC was finally identified as clostridium sporogenes, a bacterium incapable of producing toxin. The contamination was identified as food spoilage with no significant health risks (Bennett, 2013, August 28). MPI declared the 2013 Fonterra precautionary products recall was a false alarm and revoked its previous Director-General statements. MPI updated the results to competent regulators of related foreign countries on August 28, 2013.

Table 4 The timeline of MPI's responses to the Fonterra case

Time	Actions
February 1, 2012	At Fonterra's Hautapu plant, torch lens was broken and sucked into a dryer, 42 tonnes of WPC80 became affected (Dean et al., 2014, November 24).
April 11, 2012	AsureQuality, the food safety verifier, approved reprocessing of the product and also approved it for stock feed.
May 2012	Rework of this product took place, improperly cleaned hoses and pipe used in the process.
July 2012– February 2013	37.8t of reprocessed product was sold to customers in eight countries for use in nutritional powders and Ultra-high temperature beverages.
March 18, 2013	High levels of SRC found in end products for Danone in a Fonterra's subsidiary in Australia. (Fonterra Independent Inquiry Team, 2013, October 23, p. 40).
April 3, 2013	High SRC level was traced down to WPC80 produced at Hautapu.
July 24, 2013	Fonterra formed a critical event team, without informing AsureQuality, MPI, or customers of a potential food safety problem.
July 26, 2013	Fonterra engaged AgResearch to undertake a mouse bioassay test for botulinum and put product on hold but not to tell customers until 5 August when final test result confirmation (MPI, 2013, August 29).
July 31, 2013	AgResearch reported to Fonterra presumptively confirmed positive for clostridium botulism test.
August 2, 2013	Fonterra briefed MPI, AsureQuality, and DairySafe Victoria of the positive result for clostridium botulinum in three batches of WPC80.
August 2, 2013	MPI responded by urgently requesting Fonterra for its Product Risk Assessment, timeline and details for testing, and bacterial strain and toxin type details.
August 2, 2013	MPI set up a Response Management Team, a Technical Team, and an Operations Team to identify, trace, and manage potentially affected product, notified foreign regulators, and decided to validate AgResearch results using internationally recognised labs.
August 3, 2013	MPI media released food safety related to Fonterra's WPC80 in accordance with the APA 1999 and the FA 1981.
August 4, 2013	Nutricia voluntarily recalls specific batches of milk powder products.
August 5-9, 2013	MPI sent auditors to Fonterra to help with tracing and recall, notified competent authorities in China, Philippines, Vietnam, Saudi Arabia of updated information.
August 8/9, 2013	Sample cultures were shipped to the CDC and NVSL labs in USA for verification of the contaminants.
August 25, 2013	MPI reports that all affected product has been adequately traced and managed.
August 27/28, 2013	The US NVSL and CDC labs reported no evidence of presence of clostridium botulinum.
August 28, 2013	MPI general director revoked the statement on 12 August and other previous statements regarding contamination issues and products recall.
August 28 onwards	An independent inquiry committee was established to investigate the issue and an industry-wide working group called "Dairy Traceability Working Group" was formed to develop industry-wide best practice.
12/March/2014	MPI filed charge against Fonterra in Wellington District Court (MPI, 2014, March 13).

Source: Adapted from Galloway et al. (2019) and Dean et al. (2014, November 24):

The precautionary recall triggered by a false alarm cost Fonterra dearly. The initial cost of the recall was estimated to be about 15 million NZ dollars (Bennett, 2013, August 28). NZ's dairy exports suffered a loss between 105 million and 347 million dollars since the scare started in November 2014, amounting to 0.6 to 1.9% of its total dairy exports (Stojkov et al., 2016). Other food products exporters in NZ were also affected by the reputational damage caused by the dairy giant. Fonterra's head of milk products division Gary Romano declared his resignation within two weeks of the recall announcement (Craymer, 2013, January 26). The French food company Danone ended its contract with Fonterra and later sued the NZ dairy company for failing to compensate it for financial loss generated by the products recall. The Singapore arbitration tribunal decided that Fonterra should pay Danone 183 million NZ dollars (Mackenzie, 2017).

The ripple effect caused by a production accident led to a devastating tsunami in NZ's food industry due to Fonterra's series of mismanagement decisions. The largest NZ company was labelled as "Fortress Fonterra" for its belated disclosure of related information to the ministry and lack of collaboration in response to the crisis (Fonterra Independent Inquiry Team, 2013, October 23, p. 6).

The biggest food safety crisis in NZ history stained the pure and green reputation of the country. NZ's dairy product exports were at stake. The then government initiated two rounds of government inquiries to review the rigor of the dairy food safety regulatory system and the cause of the crisis. Fonterra also commissioned a third-party inquiry team to find out the causes of the crisis.

2.2.3 Inquiries into the crisis

On September 12, 2013, the NZ Government established a government inquiry team to investigate WPC80 incidents. The government inquiry team was comprised of legal advisors, staff

from the Department of Internal Affairs, an independent peer reviewer professor Alan Reilly, and the chief executive of Food Safety Authority of Ireland. Chaired by the Queen's Counsel Miriam Dean, the government inquiry team conducted a two-stage investigation.

The first stage was to review the NZ's dairy food safety regulatory system by examining its regulatory and best practice requirements to find out its adequacy and recommend necessary changes. The first stage concluded with a report including 29 recommendations published in December 2013. In this stage, the inquiry teams identified loopholes in the regulatory system and suggested changes in regulatory design, food safety standards, the role of MPI, verifiers, testing quality and integrity, product traceability, and contingency planning. The first stage inquiry indicated:

NZ's dairy food safety system is fundamentally robust and consistent with international risk management principles. There is no evidence of any regulatory crisis ... No urgent or significant change to NZ's dairy food safety system is indicated at this time. NZ's dairy food is as safe as any in the world. But, as with any system, improvements are always possible. (Dean et al., 2013, December 3, p. 14)

The first stage found the regulatory framework was sound in general. The inquiry also indicated it was necessary to learn from the crisis to make related changes in the dairy food safety regulatory system.

The second stage of the government inquiry took six months and published its report in November 2014. Core participants included Fonterra, MPI, AssureQuality, AgResearch, and the French food company Danone. Besides interviewing key stakeholders like dairy companies, regulators, verifiers, customers, relevant ministries, labs, and experts in NZ, the inquiry team

consulted regulatory bodies in the world as well. The team was excluded from inquiring into MPI's compliance investigation, not even reporting on or influencing its judgement. The aim of the second stage of the inquiry was to examine the causes of WPC80 incident and the responses from Fonterra, MPI, and other involvers. In the second stage, the inquiry focused on examining how an accident in production escalated into a storm that stained the pure and green reputation of NZ's food products.

According to Dean et al. (2014, November 24), WPC80 product contamination was caused by a production accident in a Fonterra plant in Waikato. It was escalated into a food safety tsunami by Fonterra's mismanagement. In MPI Minister Nathan Guy's words, Fonterra made "a chapter of errors" (Kirk & Kloeten, 2014, December 9) in handling the contamination. The government inquiry found a torch was dropped and broken into an operating dryer on February 1, 2012 when a staff at the Hautapu plant was inspecting the machinery. The incident was reported to AsureQuality, Fonterra's dairy food safety verifier. The Fonterra plant requested to rework the impacted WPC80 products. AsureQuality first rejected the application, but another team of the verifier approved the rework on April 11 (Dean et al., 2014, November 24; Fonterra Independent Inquiry Team, 2013, October 23). Fonterra personnel finally reprocessed the impacted WPC80 in May (Dean et al., 2014, November 24). AsureQuality did not report the food safety issue to MPI, nor did the verifier sent personnel to supervise the reworking. As a result, the plant reworked the impacted products using facilities out of the dairy company without notifying the verifier. Inadequately cleaned hoses and pipe were used in the process, departing from its RMP.

In March 2013, Fonterra Australia subsidiary Darnum plant tested five batches of finished nutritional products manufactured for Danone, who set requirements to screen for SRC. The test results showed a high reading of SRC and the products were downgraded as stockfeed (MPI, 2013,

August 25). Darnum finally tracked down and identified the three batches of reprocessed WPC80 products from Hautapu plants as the source of the contamination. Darnum complained in Fonterra's internal system about the issue and sought financial compensation. Fonterra decided to conduct testing to rule out clostridium botulism in the impacted products as recommended by a Danone microbiologist. According to Dean et al. (2014, November 24), a senior manager did not escalate the ongoing food safety concern to the top management of Fonterra, and she mistakenly approved the test for toxic botulinum. Fonterra engaged AgResearch, a lab owned by Fonterra and MPI, to conduct a mouse bioassay test without seeking advice from its senior scientists or its chief executives. AgResearch was found to be not an accredited lab to conduct the botulinum test. AgResearch's test report to Fonterra indicated "potentially detected clostridium botulinum" because "three out of three mice died" on July 31 (Dean et al., 2014, November 24, p. 56). However, the lab could not rule out other close relatives of toxic botulinum strain and recommended further testing. Fonterra set up a crisis management team right away, without informing MPI. It was on August 2 that Fonterra briefed MPI and AsureQuality of "confirmed clostridium botulinum" (Dean et al., 2014, November 24, p. 56) contamination in three batches of its WPC80 products. Fonterra allegedly did not provide sufficient information but suggested to MPI it had communicated the test results to its customers. MPI was reportedly put in an embarrassing situation to release the food safety issue immediately without being fully prepared before Fonterra did it first.

News articles related Fonterra's botulism scare to its involvement in other high-profile dairy products crises, including the 2008 melamine infant formula scandal and the 2013 dicyandiamide contamination (Fox, 2013, September 7; National Business Review, 2013, August 9; NZ Herald, 2013, August 6a; The Dominion Post, 2015, March 11). Fonterra was rebuked for its segmented corporate culture and making profits at the expense of food safety practice, putting the whole

country's food safety reputation at stake (Kirk & Kloeten, 2014, December 9). Fonterra was strongly recommended to foster a food safety culture in its company. Stakeholders also believed Fonterra should restructure its board of directors in the wake of the botulism scare and have a member with a food safety science background and crisis management experience in the leadership (Ingle, 2016). The dairy giant remained a target of public criticism for too many unanswered questions, such as the four months' delay in notifying regulators and consumers, lack of collaboration between departments in handling food safety issue, absence of food safety culture in the cooperative, lack of trust and coordination with the ministry, and ill-prepared crisis response plans (The Dominion Post, 2013, August 30).

Post-crisis inquiries indicated NZFSA had to address numerous problems in its dairy food safety regulatory system. First, the food operator did not uphold its RMP to ensure dairy food safety. Fonterra was trapped in a culture discouraging departmental collaboration in its workplace (Bathurst & Galloway, 2018, p. 343), leaving itself, and sometimes the whole country, vulnerable in times of reputational crisis. The 2013 botulism bombshell almost shattered the faith of safe dairy products manufactured in this country. NZ's pure and green image was unavoidably damaged by WPC80 incident (Stojkov et al., 2016). In March 2014, MPI filed four charges against Fonterra for breaching the national food safety code (MPI, 2014, March 13). Fonterra accepted all the charges and was fined 300,000 NZ dollars. The verifierASUREQuality was also found defective in enforcement of NZ dairy food safety regulations. It did not seek details of the reworking process before approval. No auditors were present to supervise the reworking. The auditor did not report to MPI upon the food safety issue raised by Darnum in Fonterra's internal system. MPI was also found problematic in response to the crisis (Dean et al., 2014, November 24).

2.3 A big lesson for CFSA and NZFSA to learn

Food safety remains one of the biggest challenges for both the Chinese and NZ governments. The two largest dairy products incidents in history sparked heated debates on food safety issues in the two countries. Learning from the crises and improving the food safety regulatory system were regarded as urgent tasks for the governments in both countries when public crises pose threats to public health and safety, government agencies are expected to take measures to protect the public and make changes to prevent such happenings from reoccurring (Christensen & Læg Reid, 2016). In the post-crisis stage, public accountability is a core process aiming to hold the responsible accountable, identify loopholes in the crisis management system, and make relevant changes for preparation of future crises (Broekema, 2016). Lodge (2011) found in comparing regulatory responses to food scandals between Denmark, Germany, and the USA, regulatory responses to food safety crises were related to different institutional settings and national culture.

The 2013 botulism scare stained the reputation of the world-leading food safety regime ruled by MPI. Many shortfalls and loopholes in the system were identified in the post crisis government inquiries. The inquiry team recommended MPI further strengthen the dairy food safety regulatory system. Meanwhile the picture is quite different in China regarding food safety governance. In the past three decades, there have been countless headlines of shocking food safety scandals on all kind of news media platforms. Unlike safety crises in NZ, most food safety incidents in China were caused by unethical business practices by organisations or individuals in the food industry. Some food safety concerns lasted for many years without any evidence of being put under control by CFSA. For example, gutter oil, inferior or poisonous infant formula, and pesticide residue in vegetables have

remained major food safety concerns in China for decades. A 2018 survey released by Tsinghua University indicated food safety was a top concern for the Chinese public (Zhang et al., 2018).

The Chinese food safety regulation system and CFSA have been the target of constant criticism from the public and media for their deficiencies and incapability. The food safety regime needs to learn and make changes to address problems revealed by the Sanlu case, in addition to a series of other food safety incidents. Systematic problems in the Chinese food safety regime were identified as:

- Overlaps or gaps in supervision caused by segmented supervision by multiple government agencies (Li, 2008)
- double standards and enforcement on food product safety for the Chinese public and the privileged domestic elites and foreign markets
- dispositioned monitoring processes and efforts focusing on end products rather than the whole stream of the production (Zhang et al., 2018), and
- loose accountability systems failing to hold responsible officials accountable.

Many punished officials reportedly resumed their positions a couple of years after being sacked or just shifted from one government agency to another. For example, Sun Xianze, a senior official in CFDA, was demoted for his dereliction of duty in the Sanlu melamine incident, but he was later found promoted as deputy director in charge of national drug safety. The 2018 Changchun vaccine scandal brought Sun into the spotlight again. But he managed to retire from his position without being held accountable. The Chinese news media and public were enraged by the public accountability games. There were reports about Chinese parents unsatisfied with the compensation

plan who were still seeking justice for their children. The melamine-tainted infant formula resurfaced in Chinese rural areas in 2020 (China Daily, 2020, May 14).

It does not mean the Chinese government leaves the food safety issue behind and would not do anything to improve the regulatory system. Food safety has been high on the policy agenda of the Chinese government in the last two decades. As the biggest transitional economy in the world, China has been in the process of catching up developed countries in many aspects, including the food safety regulatory system. Chinese governments have been striving to increase food safety regulatory efficiency and there were projects in CFSA aiming to learn from the EU, the USA, Australia, and Canada for the concept of co-regulation between government and the food industry, particularly from the EU for the similarly varied regional and provincial feature in their food safety regulation (Chen et al., 2015). There have been several rounds of reform and restructure of the government agencies in charge of food safety. To address the fragmented supervisory system administered by several ministerial departments, the State Administration of Marketing Regulation (SAMR), established during the overall structural government reform in 2018, integrated all the relevant departments in CFSA and the China Entry-exit Inspection and Quarantine Authorities (CIQA) of the General Administration of Customs (GAC). The Food Safety Law was proposed and listed in the legislative agenda in the wake of the Fuyang inferior infant formula incidents (Xinhua News Agency, 2014, June 23). The legislation was accelerated by the Sanlu case. The first Food Safety law was passed on February 29, 2009, five months after the outbreak of the melamine infant formula scandal, and became effective in the same year on June 1, Children's Day.

As the ultimate competent food safety regulator in NZ, MPI did not escape the 2013 WPC80 incident unscathed. The Fonterra case shocked not only consumers at home but other importing

countries including China, the biggest market for NZ food products. The Sanlu case shattered Chinese consumers' faith in food safety of domestic dairy and other food products. Parents of young babies have been trying to buy safe infant formula products made by reliable brand names outside of China. Chinese national media covered the botulism scare and the dicyandiamide contamination incident widely. Chinese parents reportedly began to feel concerned about the safety of infant formula made in NZ (Harris, 2013, December 9) and began to perceive infant formula manufactured by foreign suppliers in a critical way. China immediately suspended imported products from Fonterra. Some other countries also banned Fonterra's products. MPI was questioned why the regulatory procedures failed to trigger information sharing from Fonterra and whether it had learned the lessons from the dicyandiamide contamination crisis. NZ was questioned at home and abroad about its world-leading food safety regime, and MPI was criticised for burying its head in the sand over the issue for too long (Kirk & Kloeten, 2014, December 9). MPI Director-General Martyn Dunne rejected the denouncement by citing the first stage of the inquiry report which stated the product recall incident was not caused by any failure of the regulatory system. However, he admitted the government agency had made significant changes since the Fonterra case, as per the 29 recommendations from the final report, including regulatory design for dairy food safety, the role of regulators, the role of third parties' verification systems, testing quality and integrity, implementation of food safety standards, traceability of products, and recall and contingency plans (Ball, 2013). Another unexpected change prompted by the botulism scare was that Chinese authorities would take over regulation of the infant formula trade between the two countries from mid-2014, and manufacturers who would export infant formula to China, the largest dairy products importer, would also be audited by Chinese authorities thereafter (Ball, 2013).

Food safety is essential for public health. A good reputation in this regard is important for food producers and exporters. During the Fonterra WPC80 incident, news media, the public, and the government in NZ were concerned about the reputational damage caused by the precautionary products recall. The NZ Government and stakeholders holds its “green and clean” image dear and would make extra efforts to restore its image as a world-leading food products provider to customers at home and abroad. The government is working at a target to reduce foodborne campylobacteriosis incidents by 20% by 2025 (MPI, 2020, March 9). For this purpose, the NZ Government has reorganised the food safety government agencies a couple of times. In April 2011, the Ministry of Agriculture and Forestry merged with the Ministry of Fisheries and was renamed as MPI the next year to consolidate its regulatory system on food safety (Chen et al., 2015). In 2018, MPI was reorganised again and formed four entities including NZ Food Safety, Fisheries NZ, Te Uru Rākau (Forestry NZ), and Biosecurity NZ. In 2019, the fifth entity, Agriculture and Investment Services, was formed within MPI (MPI, 2020, September 22). In food safety legislation, the NZ Government regulated dairy products empowered by the Animal Products Act (APA) 1999 and the Food Act (FA) 1981, which was found in the independent inquiry that MPI had inadequate statutory power to get sufficient information from businesses. In 2014 the new FA was passed, in the wake of the Fonterra WPC80 incident, and came into force in March 2016. Then in 2018, the Food Safety Law Reform Bill was passed to strengthen the regulatory framework regarding statutory power to MPI and food products traceability recommended by the government inquiry team into the Fonterra WPC80 incident (NZ Government, 2018).

In the context of the COVID-19 pandemic, the NZ Government’s framework of good practices in handling a public health crisis can offer transferable lessons to struggling countries in response to the pandemic (Wilson, 2020). The crisis-induced organisational learning process in government

agencies in handling COVID-19 of course can also apply to another public health scenario, the food safety issue.

This study aims to find evidence of organisational learning in Chinese and NZ food safety authorities, CFSA and NZFSA, after handling the Sanlu case and the Fonterra case. In the wake of the two dairy products incidents, both CFSA and NZFSA were criticised for deficiencies due to their ineffective regulation and surveillance on dairy products safety and inefficient response to the two largest ever food safety incidents happened in the two countries. They both were urged by the public and media to learn from the food safety crises and make changes in the organisations and the food safety regulatory frameworks under their watch. Since the two dairy products crises impacted on bilateral investment and food products trade between China and NZ, CFSA and NZFSA were involved in both crises.

In short, the two dairy product crises in this study provide a valid setting to analyse:

- why did the government agencies choose their approaches to handle the food safety crises?
- what evidence of organisational learning occurred in the two public organisations in the wake of the crises?
- what factors contributed or impeded the organisational learning?
- what factors contributed or impeded organisational learning in CFSA and NZFSA under the political and societal contexts?

CHAPTER 3 LITERATURE REVIEW

This chapter utilises crisis-induced organisational learning theory to analyse to what extent CFSA and NZFSA learned and evolved from the two crises in question. It starts with reviewing the literature to conceptualise organisational crisis and crisis management in this study. It follows with a discussion of how interdisciplinary scholars develop and employ models of crisis-induced organisational learning and of which one will be used in this study. Finally, the chapter reviews how government agencies, specifically in China and NZ, learn from food safety lessons and how socio-political factors facilitate or inhibit learning in public organisations from past food safety crises.

3.1 Conceptualisation of organisational crisis

3.1.1 Definition of crisis in literature

The word crisis originates from “krisis” in Greek, meaning “a moment of decision” (Shrivastava, 1993, p. 25). It was first used as a term in medical science, denoting a very dangerous physical condition of an organism which needs external intervention to recover (O'Connor, 1981). The term was later borrowed by social scientists to describe devastating situations in the fields of economics, politics, and sociology (Shrivastava, 1993). The impacted parties of a crisis can range from an individual or a group to an organisation or even a society (Stern, 1999). Divergent and multi-faceted use of the term *crisis* makes the concept ambiguous (Samman, 2015). However, all those definitions highlight generalised concepts of “decision moment” and “turning point” (O'Connor, 1981, p. 301). Though a crisis always accompanies with a destructive moment that deserves a quick decision, abundant examples suggest significant impacts of a crisis can lead to an opportunity to review and

restructure a system for improvements (Broekema et al., 2017; Coombs, 2014; Ford, 1981; Ray, 1999; Ulmer et al., 2017).

In the field of crisis management, prominent scholars defined crisis from different perspectives. Ford (1981) defined crisis as a situation exhibiting two characteristics, “threat and time pressure” (p. 301), emphasising the destructive and emergent features of a crisis. Heath and Millar (2003) emphasised manageability of a crisis event and its threat to reputation and interest of an organisation and its stakeholders, defining it as “an untimely but predictable event that has actual or potential consequences for stakeholders’ interests as well as the reputation of the organisation suffering the crisis” (p. 2). To Fearn-Banks (2016), a crisis is “a major occurrence with a potentially negative outcome affecting an organisation, a company, or an industry, as well as its publics, products, services, or good name” (p. 1). Therefore, if not handled properly, a crisis can potentially exert substantial damage to the well-being of an organisation. Hence, a crisis deserves attention to prevent it from happening or spreading. However, drawing from philosophy in China, many scholars started to perceive crises in a more sophisticated way (Cross & Jofus, 1997; Friedman, 2002; Gunderman & Applegate, 2005; Keown-McMullan, 1997; Wrigley et al., 2003). There are two characters (危机) standing for the term *crisis* in Chinese, which means threat and opportunity individually. It signifies seeds of opportunity can be embedded in a threat, implying a well-handled crisis can turn into an opportunity. A considerable body of Chinese classic literature teaches people how to view crises from a critical point of view. Ford (1981) reminded his managers about the Chinese philosophy and suggest them to manage crises with a “look ahead for opportunities” (p. 16) mindset. Carley and Harrald (1997) believe crisis situations provide “a window of opportunity” (p. 312) for organisations to review their crisis response procedures and behaviour patterns in order to make relevant improvements. Bird (2016) encourages organisations to review serious ethical crises and learn from

historical events. Coombs and Holladay (2010) stated crises “inherently are threats” (p. 19) but the outcomes of such crises can be opportunities if handled properly. Nathan and Kovoov-Misra (2002) even viewed crises as valuable resources for an organisation to learn and build its response competence at the expense of other organisations’ crisis experiences.

3.1.2 Definition of organisational crisis

Most researchers have defined organisational crises with a focus on the negative aspects and the destructive consequences they can bring to stakeholders. For example, Shrivastava et al. (1988) defines crisis as “organisationally-based disasters which cause extensive damage and social disruption, involve multiple stakeholders, and unfold through complex technological, organisational and social processes” (p. 285). Viewing more from an organisation’s internal attributions of a crisis, Weick (1988) emphasises that the “high consequence” (p. 305) of a crisis in an organisation which, though, low in probability, is a threat to the most fundamental goals of the organisation. Seeger et al. (1998)’s definition of organisation crisis shares the view in its potential damage to an organisation’s “high priority goals” and perceives it as “a non-routine event” or “a series of events” (p. 6). Pauchant and Mitroff (1992) stress an interrelationship between personnel and the system of an organisation. The author posits crises are caused by loopholes in an organisation’s system and faults in personnel’s decisions, indicating improvement in the two factors and in their interactions can diminish the chance of a crisis. Furthermore, managing a crisis demands responders exhibit precaution, immediate action, and control of threats (Pearson & Mitroff, 1993).

Heath and Millar (2003) employ a rhetorical approach to examine each crisis on its “actual dimension” and “perceived dimension” (p. 6) which entail managerial and communicative choices respectively in crisis management. Coombs and Holladay (2010) notes that the most comprehensive

definition of organisational crisis was provided by Hermann (1972) who defined it as a surprise event that threatened the central goals of an organisation and thus deserved a quick decision. Coombs (2010b) defines organisational crises as abnormal occurrences, in expectable but unpredictable ways, that could exert negative physical, financial, and psychological consequences to its stakeholders. The author emphasises the existence of a crisis depends on stakeholders' perception. Lerbinger (2012) recognises a crisis, characterised as being sudden, unpredictable, and time compressing, can bring reputational and financial damage, and sometimes even threaten its very existence. According to Pearson and Mitroff (1993), an organisational crisis is composed of five dimensions:

- Incomplete control of the organisation
- A need for response
- A surprise occurrence
- Demand of immediate attention, and
- High magnitude.

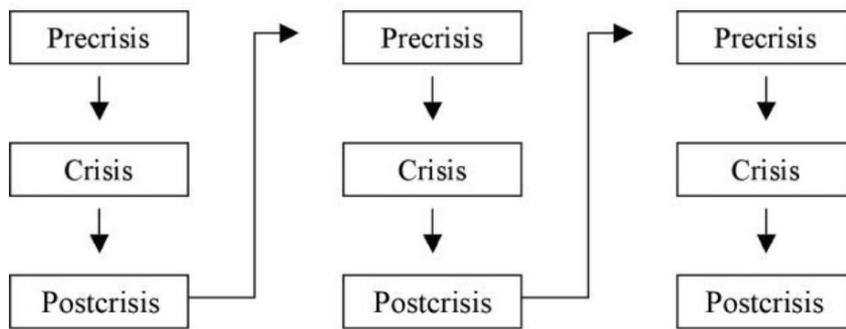
According to Antonacopoulou and Sheaffer (2014), organisational crisis is a challenging situation that upsets basic assumptions of an organisation, threatens its existence and legitimacy, and undermines its performance due to lack of immediate and effective coping mechanisms.

Crisis management researchers classified organisational crises into various categories from different perspectives. Littlejohn (1983) sorted out comprehensive categories of organisational crises based on the causes, such as economic downturns, energy shortage, corporate theft, fire, or natural disasters. Mitroff (1988) later added in new categories such as product defects, facility failures, external economic or information attacks, environmental accidents, and immoral acts against an organisation and its stakeholders. In light of threat levels to impacted organisations, Müller (1985)

grouped crises as “strategic, performance, liquidity, and bankruptcy or dissolution” (p. 40) ones. Borrowing from Attribution Theory, Coombs (2006b) divided organisational crises based on the public’s perception of organisations’ responsibility into three clusters including a victim cluster with low responsibility, an accidental cluster with moderate responsibility, and a preventable cluster with high responsibility.

Crisis management researchers developed models to better understand crisis lifecycle and manage crisis at different stages (Barton, 1993; Coombs & Holladay, 2010; Fink, 1986; Mitroff, 1994; Sturges, 1994). Fink (1986) developed a model dividing a crisis into four phases, including the prodromal stage, the acute stage, the chronic stage, and the resolution stage. The author emphasised organisations should take proactive actions at the prodromal stage to prevent a crisis from happening rather than wait for a crisis to strike and respond reactively. Smith (1990) compacted the four-phase model into a three-phase one, namely phases of “precipitation, operational, and post-crisis” (p. 263). Coombs and Holladay (2010) rebranded Smith’s three phases with catchy terms of pre-crisis, crisis incident, and post-crisis. According to Veil (2011), the post-crisis stage of a crisis is the pre-crisis stage of the next one (see Figure 1). An organisation can be better prepared for future crises through learning and improving from past crises. These researchers noted the main tasks of crisis management at the post-crisis stage were to restore routine business activities, learn from the crisis, and implement the lessons to better prepared for future crises.

Figure 1 Three stage crisis cycle



Source: Veil (2011, p. 120)

3.2 Crisis management theories and crisis-induced organisational learning models

3.2.1 Definition of crisis management

Crisis management is a multidisciplinary study underpinned by theories from multiple disciplines, including psychology, sociology, economics, political science, public health, public relations, and journalism (Deverell, 2010; Diers-Lawson & Meißner, 2022; Smith, 1990). The study emerged in the USA in late 1980s and is still in its development (Robert & Lajtha, 2002). Research on crisis management started from natural disasters and expanded to international relations related to study disputes and warfare (Deverell, 2010). Scholars in the USA contributed considerable insights on the role of leadership in management of a crisis. Leadership of an organisation plays a crucial role in crisis management (Broekema et al., 2019). It involves creating emergent response teams, developing crisis communication strategies, rescuing and relieving victims, and planning conflict resolution (Barton, 1990; Comfort et al., 2012; Shrivastava, 1993). In the wake of a crisis, organisations are also faced with challenges to achieve returning to normality and fostering organisational learning, in which processes leadership also plays a central role (Broekema et al., 2019)

Since a crisis potentially brings about multifaceted damage to an organisation, crisis management in practice is a critical function and responsibility of an organisation (Coombs, 2014; Huzev et al., 2014). Failure of the function can incur serious financial and reputational losses or even termination of an impacted organisation. Scholars in this area of study have tried to develop theories and models to help organisations prevent, contain, recover, and learn from a crisis. A considerable body of crisis management literature contributes to conceptualising and defining the scope of the study from different perspectives (Aboudzadeh et al., 2014; Barton, 1994; Barton & Hardigree, 1995; Birkland, 2009; Coombs, 2006a; Heath et al., 2009; Weick, 1988). NyBlom (2003) stresses on the tasks of minimising loss and facilitating recovery, involving managerial efforts in planning, organising, leading, and controlling resources before, during, and after a crisis. Coombs (2014) emphasises organisations taking proactive processes to prevent a crisis from striking, rather than reacting passively. The author suggests in Situational Crisis Communication Theory that a crisis occurs when stakeholders of an organisation perceive so, and efforts and resources should be employed to protect reputational assets as well as substantial resources of the organisation. This study investigates crisis response approaches employed by the two public organisations, namely CFSA and NZFSA, and organisational learning in the two government agencies induced by the crises in question. Drawing from the authors above, this thesis defines crisis management as a systematic process of planning, responding, and learning from a public crisis by a government agency and other related stakeholders in an effort to improve the food safety regulatory system and the crisis response mechanism.

3.2.2 Theoretical frameworks in crisis management

Crisis management scholars developed numerous models and frameworks in the field of study (Shrivastava, 1993). Normal Accident Theory, Swiss Cheese Model, and High-Reliability

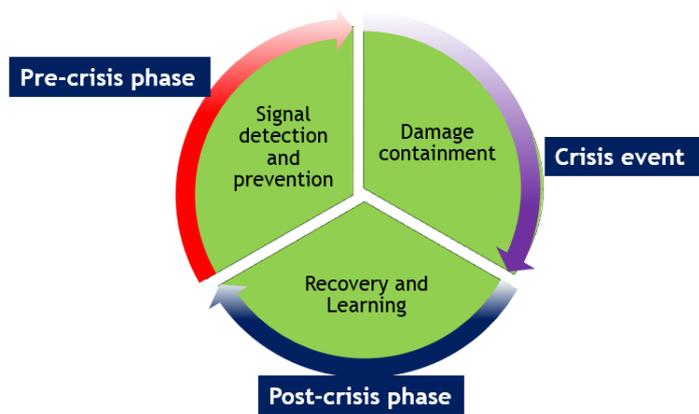
Organisation are three main theoretical lenses of them (Azadegan et al., 2019). In the subfield of crisis communication, for example, Attribution Theory, Situational Crisis Communication theory, Contingency Theory, Framing Theory, and Social Mediated Crisis Communication Theory are among the most frequently applied theories (Wang & Laufer, 2019). The field to explore the impact of organisational culture on crisis management behaviours, Mitroff et al. (1989) developed an “Onion Model” to demonstrate the structure of an organisation’s culture. The four-layer onion-like structure signifies different levels of organisational culture. The two outer layers, or the surface layers, illustrate the structure and behaviour of an organisation. The two inner layers, or the deep layers, demonstrate beliefs and identity of an organisation. According to the authors, the surface layers exert obvious and direct influence on an organisation’s capabilities in handling a crisis, while the deep layers exert inherent and implicit influence on such capabilities. The capacity of cultural adjustments of an organisation has significant impact on the depth of crisis-induced learning in the impacted organisation (Veil, 2011).

To examine factors contributing to an organisation’s crisis management approaches and outcomes, Pearson and Clair (1998) built a model to identify what environmental and internal factors influencing management processes at the crisis preparation and response stages. At the preparation stage, environmental factors, such as industrial practice and government regulations, influence how the management team perceives risks or threats and therefore embodies their perception into crisis planning. Once a crisis strikes, it triggers a planned and coordinated response in the organisation, including coordinated responses of individuals and teams, crisis communication with stakeholders, and engagement with industrial and regulatory entities. As a result, the outcome of the crisis management efforts, good or bad, is greatly impacted by interactions of the two clusters of factors. Other factors including information technology, strategic planning, communication, social media,

knowledge management, governance, and leadership are also crucial in containing crises and diminishing their effects (Hazaa et al., 2021).

Pearson and Mitroff (1993) worked out a five-step crisis management approach for organisations to understand and handle a crisis at different stages of its lifecycle, including the signal detection stage, the prevention stage, the damage containment stage, the recovery stage, and the learning stage. Crisis management should consequently be examined as a cyclical process seeking opportunities to interrupt the lifecycle of the crisis (Mitroff, 1994; Veil, 2011). Through acting upon detected crisis signals, an organisation can prevent its happening. After recovery from a crisis, the impacted organisation should focus on learning from it by reviewing and renovating its crisis management processes (Mitroff, 1994). Jaques (2007) has developed an issue and crisis management model to illuminate detailed crisis management processes and activities in four phases of crisis management processes. He designed three elements in each phase of the management process for organisations to implement and emphasises the elements of crisis management at each stage should be considered as a cluster, not a step, of activities. Seeger et al. (2003) and Coombs (2014) simplified the models into a three-step approach (see Figure 2) to manage a crisis at each of the three-phases of a crisis, including prevention and preparation at the pre-crisis stage, crisis response at the crisis event stage, and recovery and learning at the post-crisis stage. Through reflecting on and analysing the lessons learned from the crisis at the post-crisis stage, an organisation can make necessary adjustments and get better prepared for future crises (Huzey et al., 2014).

Figure 2 Three-phase crisis management model



Source: Adapted from Pearson and Mitroff (1993) and Coombs (2014)

Due to the unpredictable nature of crises, organisations are faced with challenges of making quick decisions in a limited timeframe. Decision-makers are normally faced with taking multi-faceted variables into consideration in the process (Pearson & Mitroff, 1993; Veil, 2011). Müller (1985) warns management of crisis-stricken organisations tends to employ a “blind firefighting” (p. 39) approach to get immediate results, leaving behind a fatal problem in the long term. He therefore suggests crisis management approaches should be handled systematically based on a thorough understanding of complexity of a crisis. With unfolding of an organisational crisis, uncertainty plays out in many ways. There is technical uncertainty for some involved people who lack expertise or skills in crisis response or communication (Lerbinger, 2012; Ray, 1999). Ethical uncertainty can also be a problem when people are holding a role with blurred responsibilities, centring on cause, accountability, or public opinion (Mackintosh & Armstrong, 2020; Mitroff, 2004). Under such circumstances, strategic crisis communication can function as a critical element to remove or diminish uncertainties (Heath & Millar, 2003). Some prominent theoretical frameworks such as Image Repair Theory (Benoit, 1995) and Situational Crisis Communication Theory (Coombs &

Holladay, 2010) have been developed to address such problems faced by crisis communication theorists and practitioners.

According to Nonaka et al. (2000), an organisation's growth, development, and innovation rely on its ability to learn from, create, and manage its knowledge. A learning organisation is the ideal organisational form that can create its future by continuous learning and expanding its capacity for the changing environment (Engström & Käkelä, 2019; Marsick & Watkins, 2003; Whittington & Dewar, 2004). Examination of the learning factors of an organisation can help the management cultivate learning strategies, make informed decisions, and achieve strategic goals (Marsick & Watkins, 2003). Learning from past crises has been highlighted as a basis for improved crisis response of an organisation (Antonacopoulou & Sheaffer, 2014; Smith & Elliott, 2007). It demands an understanding of learning, crisis, and their relationship as a dynamic process (Antonacopoulou & Sheaffer, 2014).

3.3 Crisis-induced organisational learning models

3.3.1 Definition of organisational learning

Organisational learning had not been studied extensively until 1990s (Broekema et al., 2017). Literature in this area was described as “vague and elusive” (p.179) and the key concepts were confusing (Deverell, 2009). Organisational learning is conceptualised as a process based on communication and therefore is regarded as fundamentally a communication phenomenon (Engström & Käkelä, 2019; Klimecki & Lasseben, 1998). Collective thinking and reflection-based insight are key elements in the organisational learning process (Sandine, 1996). Due to differences

in research dimensions and approaches, organisational learning scholars have not developed a commonly accepted definition or theoretical framework (Ghaderi et al., 2014).

Early researchers in the field of organisational learning such as Argyris and Schon (1974) perceived learning in organisations as error detection and correction. Organisations obtain and store knowledge through its individual employees and teams (Argyris, 1995). For Dixon (1992, 2017), organisational learning is a collective and complex process within an organisation through which it can continuously update its knowledge and transform itself. Since knowledge is outcomes of sense making, members of an organisation need to make sense of information in a collective manner to make organisational learning happen (James, 2007; Weick, 1988). To learn from a crisis, a public organisation needs to determine the causes, assess its responses, and undertake remedial actions based on the new knowledge having drawn from the crisis and its responses (Boin et al., 2016). Public inquiry or investigation is such a collective sense-making process (Renå & Christensen, 2020). The ultimate purpose of organisational learning is to increasingly satisfy its stakeholders through eliminating risks and uncertainty and achieve organisational goals (Coombs, 2007b; Hazaa et al., 2021; Nathalie Schiffino et al., 2017). Weick and Ashford (2004) points out three important issues in understanding organisational learning, including the relationship between organisational learning and change, the relationship between individual learning and organisational learning, and unlearning. The authors note organisational learning is to maintain know-how and adopt innovation and other changes as well. Individual learning outcomes are stored in organisational memory in the forms of handbooks, policies, files, and standard operating procedures. The outcome of organisational learning is to address a new situation more effectively rather than to create a new identity for the organisation. For the second issue, an organisation learns through their members whose knowledge is transmitted from one individual or group to another though individual learning is affected by the

organisation, the learning context. According to Starbuck and Hedberg (2001), individual learning does not necessarily result in organisational learning. Unlearning means conscious abandonment of undesirable knowledge or loss of knowledge, experience, and expertise over time. It can be a result of updating obsolete knowledge or employee turnover or retirement. Reorganisation and dismissal of experienced employees can also lead to unlearning (Broekema et al., 2017). Weick and Ashford (2004) highlight an organisation's capacity to acquire and store its knowledge is a core part of its learning. The processes involve individuals of an organisation as well as the aggregate of the individuals. Broekema et al. (2017) note that most scholars have defined organisational learning either from the perspective of acquisition of knowledge or from organisational changes. They combine the two perspectives and define organisational learning as "the acquisition of new knowledge and the translation of the knowledge into more effective organisational action" (p. 327).

Despite the importance of learning for an organisation's sustainable development, organisational changes or reforms may always be perceived as threats by some groups and encounter resistance from within an organisation (Elliott et al., 2000; Smith & Elliott, 2007). It is especially true in public organisations from the political arena (Carpenter & Lewis, 2004; Dekker & Hansén, 2004; Deverell, 2010; May, 1992). However, a crisis event can accelerate the learning and change processes when public attention is drawn to scrutinise actions or inactions of decision makers and societal and political dynamics overcome the resistance to change (Stern, 1997). Crises therefore can be perceived as opportunities for organisations to learn and change. This study focuses on public organisations' learning induced by food safety crises. In this thesis, crisis-induced organisational learning is defined as changes of legislation, policies, and industry regulations through the process of reviewing crisis response performance during or in the wake of a public crisis and implementing lessons learned from the crisis.

3.3.2 Contributing and inhibiting factors of organisational learning

Organisational learning is a very complex process influenced by both internal and external factors of an organisation. It involves different aspects of organisational dynamics and is heavily impacted by learning processes at the individual and group levels (Rogers & Williams, 2006). The unique and unpredictable nature of every crisis situation makes learning from a crisis a more complicated matter (Broekema et al., 2017). As a social process, learning in an organisation is under the influence of contextual factors like its structure, communication and control processes, and information access and dissemination (Antonacopoulou, 2006). Economic, political, emotional, and sociocultural forces are equally significant in shaping the changes of an organisation, especially in the public sector (Antonacopoulou, 2008; Visser & Togh, 2016).

Researchers have found learning from crises is a big challenge for organisations and few of them can learn effectively from their crisis experiences (Deverell, 2010). Both environmental factors and internal factors such as organisational structure, culture, and communication can encourage organisations to learn (Fortune & Peters, 1995; Smith & Elliott, 2006, 2007) or inhibit them from learning (Elliott et al., 2000; Veil, 2011). Through a study of crisis response and organisational learning from four food safety crises in the Dutch food safety government agency, the Food and Consumer Product Safety Authority the NVWA¹⁹, Broekema et al. (2017) identified three clusters of factors (see Table 5), namely external factors, internal factors, and process-related factors, as driving forces of crisis-induced learning in public organisations. Broekema et al. (2017) found external factors played significant roles in driving organisational learning. For example, the political

¹⁹ The acronym is from the term Nederlandse Voedsel- en Waren Autoriteit in Dutch language.

authority could hold the NVWA accountable and steer it in the right learning direction. Drastic budget cuts proved to be the most effective force driving the NVWA to update its crisis protocols and archiving system. Internal factors are also very important organisational learning facilitators. Inter-collegial relations facilitate an information and knowledge sharing culture within a public organisation, and highly motivated staff exerted more efforts for performance improvement and professionalism development. The researchers have found establishment of task-oriented teams allows extensive learning and expertise building. The researchers suggest large team size makes knowledge dissemination difficult and reorganisation should be avoided

Table 5 Key factors driving organisational learning

External	Political-economic context	Social-emotional understanding
	<ul style="list-style-type: none"> • Political pressure • Budget cuts 	<ul style="list-style-type: none"> • Social-emotional events • Media attention
Internal	Organisational culture	Organisational structure
	<ul style="list-style-type: none"> • Inter-collegial relations • Motivation 	<ul style="list-style-type: none"> • Structure of organisation • Structure of processes
Process-related	Stage in crisis management	Organisational forgetting
	<ul style="list-style-type: none"> • Crisis cycle • Sequence of events 	<ul style="list-style-type: none"> • Outflow of expertise • Retaining of knowledge

Source: Broekema et al. (2017)

because it can disrupt an organisation's learning culture. Crisis management phases and organisational forgetting are process-related factors. Public organisations can start learning from the outbreak of a crisis. During the crisis event stage, learning focuses on improvements of response actions. When normalcy is restored, the organisation has time to reflect and make structural changes.

According to Broekema et al. (2017), crisis-induced learning in public organisations can be achieved gradually over different crises, going through a process of adapting, adjusting, and maturing. Loss of crisis expertise and experience through reorganisation, retirement, or sacking is a negative impacting factor because storing and disseminating such knowledge and experience are crucial for an organisation to learn over a long run.

Starbuck and Hedberg (2001) note misperception of organisational environments and organisational attributes, which have a strong influence on what to learn, prevents organisations from learning effectively. Employees of an organisation in many cases have divergent perceptions of properties of their organisations, and their biased perceptions are related to their positions or hierarchical status in the organisation (Martínez-León & Martínez-García, 2011; Payne & Pugh, 1971). Leadership is an important factor to facilitate organisational learning (Starbuck & Hedberg, 2001). However, top-level employers in the management have vested interests and a more favourable views of their organisations. They tend to misperceive negative events to avoid being blamed and resist changes to keep their dominant positions (Starbuck, 1983). As a result, learning in such an organisation can be suppressed by the “self-serving and organisational defensive routines” (Argyris, 1994, July 1, p. 81).

Organisational culture and processes can facilitate or inhibit organisational learning as well. Organisational culture functions as the means of disseminating learning within organisations and at the same time the “symbol and storage of past learning” (Weick & Ashford, 2004, p. 707). Weick and Ashford (2004) have found discouraging a learning culture makes knowledge storage and sharing difficult. The authors indicate an organisation’s long communication chain deriving from its rigid hierarchical structure can lead to distortion of information or loss of voices in the process of

information sharing. A bureaucratic culture makes upward communication difficult and affect an organisation's ability to learn. According to Broekema et al. (2017), crisis protocols can also inhibit organisational learning. The researchers posit protocols can hardly cover all crisis circumstances and crisis responders are less likely to change behaviours even when the situation demands flexibility.

On top of complexity in the processes and dynamics of organisational learning, evaluation of learning in organisations is quite challenging as well (Rogers & Williams, 2006). Difficulty in measuring crisis-induced organisational learning also partly contributes to organisations' difficulty in learning from crises (Deverell, 2010; Stern, 1997). Despite the challenges in evaluating organisational learning, using crisis-triggered changes as measures and evidence of learning has become a dominant opinion among scholars (Antonacopoulou, 2008).

3.3.3 Models of organisational learning

Argyris and Schon (1974) have developed a model of single-loop and double-loop learning to distinguish extent or depth of learning having occurred in an organisation. It is recognised as the most significant categorisation of organisational learning (Deverell, 2009). Single-loop learning occurs when individuals in an organisation are encouraged to learn to improve performance without doubting "the fundamental design, goals and activities" (Argyris & Schon, 1974, p. 367) of the organisation or learning without changing the rules; while in double-loop learning, individuals are able to think out of the box and reflect on fundamentals of an organisation including its structure, values, and goals and seek possible changes of the underpinning rules. Single-loop learning is seen as a problem-solving model because members of an organisation are allowed to detect and correct divergences or errors in the organisation's structure, procedures, plans, and protocols without having to inquire into its basic norms (Smith & Elliott, 2007). The organisation in question can still carry

out present policies and achieve set goals. As a deeper form of learning, double-loop learning aims to detect and correct underlying errors through investigating into norms and assumptions of an organisation (Deverell, 2009). It leads to changes in organisational structure and strategies. The leadership therefore plays a key role in stimulating double-loop learning in an organisation (Argyris & Schon, 1974).

Crisis-induced learning is an underdeveloped area of study (Carley & Harrald, 1997; Deverell, 2010; Smith & Elliott, 2007). Researchers have attempted to create theoretical models to analyse and facilitate crisis-induced organisational learning (Lalonde, 2007). Linsu (1998) has built a model to analyse the learning dynamics of a company at the catching-up stage and examine how the company can learn crisis response lessons from its counterparts. The author concludes all organisations are learning systems and the leadership, the learning orientation and autonomy are key factors facilitating learning in the organisations. According to the Mindful Learning model developed by Veil (2011), learning opportunities exist throughout the whole three stages of crisis lifecycle. The model reveals creation of mindful culture in an organisation can penetrate learning barriers at the pre-crisis stage so that warning signals can be detected, and a crisis can be prevented. Antonacopoulou and Sheaffer (2014) have conceptualised the Learning in Crisis model that integrates emergence and emergency embedded in a crisis which are central to the relationship between learning and crisis. The authors have provided a theoretical basis to capture social complexity and explore meaningful learning from crisis management practice.

For public organisations, learning is supposed to start once implementation of policies does not produce expected results. However, it can be recognised as a problematic situation when the deviation between expectations and actual results is too big and such situations call for a public

inquiry involving policy evaluation and accountability (Visser & Tøgt, 2016). As an important venue for accountability and crisis-induced learning in public organisations, a public inquiry is usually launched in the aftermath of a major crisis to track down and assess problems leading to the crisis and draw lessons from it (Renå & Christensen, 2020). The accountability process involves looking back and making judgement on the past performance. It is a starting point of organisational learning when public organisations look forward and begin to make improvements in aspects like organisational structures or policies (Boin et al., 2008). Organisational learning can theoretically result in development of routines, standardised operating procedures, and accountability processes, and effective communication structure (Carley & Harrald, 1997). Studies on public organisations have found crises often can trigger organisational learning and create opportunities for quick changes and reforms (Birkland, 2004; Deverell, 2009). According to Veil (2011), learning opportunities exist at any phase of crisis management.

However, research findings have indicated public organisations tend to resist learning from crises (Smith & Elliott, 2007). Public organisations have difficulties learning from crises (Broekema et al., 2017). Such restrictive factors include but not limited to complexity of organisational environment and top management's concerns, including an organisational image being tarnished by self-inconsistency or accountability issues (Weick & Ashford, 2004). Furthermore, lack of straightforwardness makes identification of evidence of crisis-induced learning a challenge (Antonacopoulou & Sheaffer, 2014). A systematic alteration of behaviours or policies within an organisation is considered solid evidence of implementation of lessons learnt from a crisis (Deverell, 2009). May (1992) categorised changes sparked by policy failures into instrumental policy learning, social policy learning, and political learning. According to the author, instrumental policy learning is about examination of the viability of policy designs and improvements centring on implementation

tools and skills. Social policy learning goes beyond program management to check over social construction of a policy. It entails inquiry into the goals and scopes of a policy and the nature of government actions which can lead to changes in policy definitions. Political learning is about changing strategies to advocate for or against a policy idea. Many events can entail rapid changes in public organisations or policies. Birkland (2004) notes some of the changes may not be related objectively to policy loopholes revealed by crises. Under accountability pressure, fantasy documents have been found to be produced as a result of superstitious learning, learning without attempts to analyse underlying problems, to prove something has been done after a crisis (Birkland, 2009). The author cited policy changing efforts in the wake of the 1999 Columbine school shootings as an example, in which policy makers in the State of Colorado sought to stricken regulations on irrelevant issues such as video games and pop music as an approach to solve gun violence.

According to Birkland (2009), organisational learning can happen in the wake of a major crisis without any policy changes. This kind of organisational learning takes the form of better understanding of the situation or a more complex cognitive structure (Levy, 1994). As depicted by Birkland (2009) in the policy learning model, accumulated knowledge and experience from previous crises can lead to future policymaking. Levy (1994) perceives organisational learning as a cyclical chain reaction process, starting from individual learning triggered by environmental feedback, then the individual's action to change organisational procedures, then to a change in organisational behaviour, and to further feedback. The author suggests government learning involves both aggregated learning at individual and organisational levels and institutionalisation of the new knowledge. Individual learning and departmental learning aggregate in different ways, depending on the political system they are happening in.

3.4 Food safety governance and governmental learning from crises

Food safety governance has become a hot topic since the mid-1990s following the outbreaks of BSE, genetically modified foods, and other food safety scares (Dreyer & Renn, 2009). In the past two decades, there was a significant increase in scholarly research on food safety issues worldwide. Its public attraction is ascribed to its frequent occurrence in media headlines as well as consequent health threats to the public. Besides consumers, responsible government agencies are among the most important stakeholders in food safety crises. Although government intervention does not necessarily lead to desirable outcomes of food safety crises, in hindsight, there are always lessons to learn. This following literature review presents food safety challenges, food safety crisis management approaches, and crisis-induced organisational learning in food safety authorities.

3.4.1 Challenges in food safety governance

Industry is a key factor influencing organisations' response to crises (Diers-Lawson & Croucher, 2017). The food industry is a domain where risk-based regulation is of central importance. Despite technological advance and regulation enhancement in food safety governance, some major food scares in the last two decades caused tremendous public panics due to their potential threats to people's health, such as the BSE beef recalls in the EU and North America between the 1990s and the 2010s, the Sanlu case in China, the 2011 Fukushima rice ban caused by the nuclear pollution incident in Japan, the 2011 E. coli cucumber scare in the EU, the Fonterra case, the 2013 horsemeat scandal in the UK, the 2017 recall of tainted eggs in Germany, just to name a few. The public has called for more robust food safety regulations and stricter scrutiny of food products because food by its nature is a matter of survival for human being (Lodge, 2011; Vos, 2000). However, in the globalisation era, food safety regimes and authorities across the world are faced with increasing

pressure to scrutinise incalculable sources of conventional and emerging food contaminants and tracing and recalling impacted products from international markets.

According to McConnell (2003), governments are reluctant to get involved in difficult issues unless there is a benefit in doing so. They will only step in when a crisis has attracted a certain level of public attention and their important political interests are at stake (McConnell, 2003; Vos, 2000). Such a public crisis can therefore reveal policy and procedural problems that an organisation and its staff previously chose to ignore (Galloway, 2016). Under such crisis circumstances, politicians are willing to “be seen to do something” (Lodge, 2011, p. 25). Appropriate government interventions in many cases can help the public regain confidence in a crisis-struck organisation or even an industry (Smith, 1990). Management of public food safety crises involves efforts by multiple stakeholders. The government is undoubtedly a crucial party when such a crisis arouses public concerns. Food safety regulations and enforcement involve systematic approaches, including farm-to-fork supervision, communication and cooperation with food businesses in times of food safety concerns, risk assessment, effective and efficient product tracing and recall and reviewing and improvement of food safety standards and the regulatory system (Chen et al., 2015). However, according to Rosenthal and Kouzmin (1997), government agencies as bureaucratic machineries tend to interpret information in their “familiar and routine categories” (p.293), a pattern too cumbersome and time-consuming to respond to crisis events.

Governance of food safety issues has been a major challenge for governmental agencies (Dreyer & Renn, 2009; McConnell & Stark, 2002). In crisis scenarios, competent management of food safety incidents requires not only a rigorous regulatory system and effective quality control surveillance but also public food safety awareness (WHO, 2020, April 30). Government agencies with regulatory

duties in food safety will feel the heat from public pressure to respond and manage such crises efficiently and effectively because their actions in many cases can make the difference between life and death (Broekema et al., 2017). Coping with a major food safety crisis can arouse public questions about the food safety authority's governance capacity and legitimacy (Christensen & Lægreid, 2016). The crisis landscape in the food industry is ever-changing and traditional response approaches sometimes fall short in handling emerging problems (Robert & Lajtha, 2002). It requires governmental agencies to be aware of both conventional risks like contamination, adulteration, accidents, and pesticide residue and emerging risks like genetically modified foods, newly discovered viruses and their variants. For food safety authorities like the FDA, coping with various food safety risks and concerns has become one of its daily routines (Pisano & Mantus, 2008).

Food safety governance is to satisfy one of the basic social needs or expectations. Its failure can result in widespread public concern or even outrage. In many real-life scenarios, food safety authorities were blamed by the media and the public for lax regulation, inefficiency, or lack of transparency. In the wake of a series of BSE beef recalls in the 1990s, the EU food safety authority was faced with public inquiries demanding for effectiveness, efficiency, and transparency in its decision-making procedures (Dreyer & Renn, 2009). The UK and Canada food safety authorities were criticised by the public for being slow in enforcement of food safety regimes due to their bureaucratic structures (Martinez et al., 2007). CFSA in China was denounced for being ineffective and corrupt in handling a series of food safety crises, and NZFSA was criticised for its deficiencies in handling the Fonterra case.

3.4.2 Divergence in food safety crisis response approaches

There are no uniform approaches for government agencies to employ in response to crisis situations. According to McConnell (2003), food safety authorities, depending on their political and socio-economic contexts, manage food safety crises with divergent approaches and capacities due to the restrictions of their scope of responsibilities and statutory power. Martinez et al. (2007) echoes the observation and suggests food safety regimes and authorities are social products influenced by socio-cultural contexts, political systems and the phases of economic development they are working in. Therefore, different food safety authorities and regulatory systems impact on the industry and food manufacturing practices in different ways. The food safety regulators also often change approaches in response to new food safety concerns. In 1990s, the OECD countries began to employ new approaches to handle the emerging food safety concerns (Roberts & Unnevehr, 2005). Lodge (2011) conducted a comparative study examining food safety regulations in Denmark, Germany, and the USA and found diverse food scare response patterns. Germany was found to be following risk-based regulation. The German food safety authority responded more immediately to public pressure with food legislation. Though a typical blame-shifting pattern was identified between vertical levels of food safety agencies, they were found to be characterised as mutual and cooperative in their relationship. The FDA in the USA stressed on strengthening regulatory authority, the agency was also flexible enough to adopt “regulation of self-regulation” (p.46) in certain cases. Denmark relied more on intensive and punitive inspection. The relationship between food safety agencies were found to be more hierarchical than the other two counterparts. Rosenthal and Kouzmin (1997) note discrepancies between government interventions are also restricted by other factors including personnel and financial resources, crisis response training and plans, and expertise and experience learned from handling past crises.

The EU undertook a systematic reform on the General Framework for the Precautionary and Inclusive Governance of Food Safety to address food safety issues raised by BSE, genetically modified crops and food products, potential genotoxic substances from cloning animals (Dreyer & Renn, 2009). The British government was criticised by the public for its inefficient response to BSE and consequently updated its food safety regime with the 1990 Food Safety Act to address the new food safety threats (Hobbs et al., 2002). The researchers found similar changes in Australian and Canadian food safety regulations. The former was induced by the Garibaldi incident which killed one and sickened 24 consumers in 1995, and the latter was to meet food safety standards of the importing countries, especially the USA. Canada enforced the Safe Food for Canadians Regulations in January 2019. According to Canadian Food Inspection Agency (2020, October 30) (CFIA), the food safety agency still needed to change consistently to match the rapidly changing risk situations in the global food market.

The organisational design of a food safety authority is also a key element in deciding its approaches and capacity when handling a major crisis. Most of the food safety authorities in the world have undergone reorganisation, merger, or other forms of reform in the past a couple of decades to meet demands of the new food safety landscape they were faced with (Alemanno, 2010; Broekema et al., 2017; Chen et al., 2015; Winter, 2003; Zhou, 2017). Many reorganisations aimed to integrate segmented regulatory functions throughout the years. The processes kept happening in different countries throughout the past two decades, such as the Australia and NZ Food Authority in 1991, CFIA of Canada in 1997, the French Agency for Food Safety²⁰ in 1999, the UK Food Standard Agency in 1999, the Food Safety Authority of Ireland in 1998, and the EU Food Safety Authority in

²⁰ It is known as Agence Francaise de Securite Sanitaire des Aliments (AFFSA) in French.

2002. Though the FDA is recognised as one of the most effective and efficient government agencies in ensuring food safety (Chen et al., 2019), food product recalls in the USA, 88% of which were avoidable, have not declined and food safety remains a major public concern in the country (Kumar & Budin, 2006). To ensure smooth coordination between 12 food safety-related federal agencies and the FDA, George W. Bush's government built the President's Council on Food Safety in 2001 (Roberts & Unnevehr, 2005). In 2011, the Food Safety Modernisation Act was passed to give the FDA more statutory power as well as responsibilities for handling food safety issues (Jia & Jukes, 2013). To facilitate food products trade among member countries, the World Trade Organisation (WTO) constructed a food safety framework, the Sanitary and Phytosanitary Agreement (SPA), after the Uruguay Round of negotiation to set a multilateral food safety standard in 1995 (Wilson & Otsuki, 2003).

MPI in NZ was a merger of three ministries in 2012, including the Ministry of Agriculture and Forestry, the Ministry of Fisheries, and NZFSA (MPI, 2020, September 22). Currently, the NZ food safety regulator consists of eight branches and four business units overseeing and regulating food, farming, forestry, fishing, animal welfare, and biosecurity. CFDA in China also experienced several rounds of reorganisation. Food safety regulation is currently under the watch of SAMR which was founded in March 2018 as a result of the merger of three ministries, including CFDA, SAIC, and AQSIQ. The governmental conglomerate's responsibilities include but not are limited to regulating and supervising market registration, food and industrial product safety, drug administration, and anti-monopoly enforcement. CFSA was made up of five governmental agencies overseeing food production and distribution prior to the outbreak of the Sanlu case (Gong & Jackson, 2012). In NZ, MPI has been the sole governmental food safety watchdog, supervising food safety along with the third-party verifiers and self-regulating food operators within the country.

3.4.3 Governmental learning from food crises

Publics around the world have been plagued by frequent occurrences of food safety scares and many of the crises have kept repeating themselves. It suggests a need for learning lessons at the organisational and individual levels in government agencies and the food industry as well. Antonacopoulou and Sheaffer (2014) suggest organisations have an urgent need to achieve a better understanding of dynamics between crisis and learning before they can make improvements if they are suffering from repeating similar mistakes. Can governments learn from crises? The question was posed by a well-known political psychologist Etheredge (Stern, 1997). The answer seems self-evident at first glance. However, many research findings indicate public organisations are often poor learners (Broekema et al., 2017; Deverell, 2010; Smith & Elliott, 2007; Stern, 1997). Learning in public organisations is faced with multifaceted challenges from cumbersome decision-making processes, complex and often ambiguous statutory power and regulations, political rules, public pressure, and budget restraints (Visser & Togh, 2016).

To facilitate organisational learning and improvement, Pearson and Mitroff (1993) argue that a public probe is a core part of crisis management efforts in the wake of a public crisis. Besides public accountability, public inquiry processes should aim to identify loopholes in the regulatory system as well as governmental organisations and make recommendations for relevant improvements. According to Elliott (2009), such recommendations, as proved in many cases, can result in updates in many areas including legislation and regulations, standards and good practice for an industry, and structural design of organisations which in turn can lead to changes in organisational norms, processes, crisis response plans and business behaviours. From their empirical study of learning in the NVWA, Broekema et al. (2017) have found solid learning evidence in the Dutch food safety

authority through learning processes including public inquiries triggered by a series of food safety crises. The researchers emphasised the identified improvements could lead to more effective government actions which could make “a difference between life and death” (p. 326) in food safety scenarios.

Broekema et al. (2017) also note organisational learning from food safety crises is a complex process. They have identified three levels of influencing factors in organisational learning processes: external factors including political-economic context and social emotional understanding, internal factors such as organisational culture and organisational structure, and process-related factors including crisis management stage and organisational forgetting. The study has also established factors inhibiting organisational learning in food safety authorities, including loss of crisis response expertise or knowledge due to reorganisation, sacking employees, or retirement in the government agencies. The researchers warn reorganisation in the wake of a crisis could be “disastrous” (Broekema et al., 2017, p. 335) because it could disrupt learning culture in an organisation and induce organisational forgetting. Politics and budget cuts are also the considerations related to the political-economic context of a food safety authority. Government agencies often feel themselves stuck in a dilemma when they have difficulties to learn from crises due to the uniqueness and unpredictability of the crises on the one hand and pressure from publics demanding they learn and improve on the other hand (Larsson et al., 1998; Smith & Elliott, 2007; Ward et al., 2004). Organisational culture, communications, structures, reward system, and configuration have all been identified factors contributing to the process of organisational learning (Garvin, 1993, July 1; Smith & Elliott, 2007). Mihăila (2012) highlights the role of the top management of a public organisation in crisis management and organisational learning and suggest the leadership should put properly designed

organisational structures for each level of the organisation in place first so that it can tackle the problems in a calculated and goal-oriented way.

Organisational learning can lead to multiple significant outcomes, such as better response plans for future crises and restored reputation and reintegrated legitimacy of the crisis impacted organisation (Coombs, 2010a; Veil, 2007). Unlike business organisations, the learning objectives of public organisations are mainly focused on achievement of policy goals (Visser & Tøgt, 2016). According to Smith and Elliott (2007), crisis-induced learning in crisis-prone organisations in most cases generates superficial level changes, such as organisational structure, routine procedures, or short-term plans as a result of single-loop learning. Little evidence of double-loop learning outcomes, such as changes in the missions, values, or assumptions of organisations can be identified. A case in point is the the food safety policy changes that turned the Ministry of Agriculture, Fisheries, and Food (MAFF) into the Department of Environment, Food and Rural Affairs (DEFRA) in the UK triggered by the foot-and-mouth disease in 2001 and a series of other food scares (Vos, 2000; Ward et al., 2004; Winter, 2003).

3.5 Research gaps surrounding the two food crises

Due to the ever-changing nature of the food safety landscape, crisis-induced learning is a continuous process for food safety authorities (Broekema et al., 2017). In a sense, food safety crises create opportunities for food safety regulators to keep learning and improving their crisis management capabilities. However, most of the research focus has been on topics related to crisis containment strategies, crisis response approaches and reputational restoration techniques (Smith & Elliott, 2007). Such efforts have mainly been attempts to address problems of public relations, organisational structure, power relations, stakeholders, and cultural issues (Antonacopoulou &

Sheaffer, 2014), leaving organisational learning from food safety crisis experiences an under-researched area. Broekema et al. (2017) noted that few empirical theories had been developed to analyse or facilitate food safety crisis-induced learning in public organisations.

A Google Scholar search found more than 2,000 academic articles, books, and other forms of research results published between 2008 and 2018 on topics related to the 2008 melamine infant formula scandal in China. A majority of the studies in social science (Alemanno, 2010; J. Chen, 2009; Ding & Wu, 2014; Feng et al., 2012; Gong & Jackson, 2012; Gossner et al., 2009; Pang et al., 2018; Pavlovich et al., 2016; Veil & Yang, 2012) were in management studies focusing on corporate social responsibility (CSR), public relations strategies, media coverage, consumer behaviour and confidence, and the social implications of the crisis. Many scholars (J. Chen, 2009; Gossner et al., 2009; Liu, 2009; Pei et al., 2011; Ross, 2012; Zhou, 2017) also viewed the crisis from the perspective of food safety governance and legislation. None investigated crisis-induced learning in CFSA triggered by the food safety crisis in China. The same search approach applied to the China National Knowledge Infrastructure (CNKI), the most influential Chinese scholarly search engine, found academic studies by Chinese scholars on the incident focused mainly on enterprise management like supply chain management, CSR, food products quality control, and public relations in crisis management (Gong, 2008; Li & Fang, 2009; Wang et al., 2012), or legislation or legal issues such as food safety legislation, consumer right protection, and litigation and compensation to victims' families (Du, 2009; Wu & Tian, 2009). Some authors (Guo et al., 2016; Li, 2009) analysed the Chinese food safety governance issues in China. Food safety governance failure was identified as a major factor leading to repeated occurrence of food safety scares. As a major food exporting country, food safety problems in China pose serious threats to the health of consumers at home and abroad (Ross, 2012). In the wake of the 2008 melamine infant formula scandal, the Chinese government was

called on to overhaul CFSA, the food safety system, and the whole food industry as well (Pei et al., 2011). No attempt has been made by researchers to examine changes or improvements in CFSA and Chinese food safety regulatory system triggered by the 2008 melamine infant formula scandal.

A search for academic publications between 2013 and 2018 on the Fonterra case on Google Scholar showed only 83 results. Most studies in focused on the economic implications of the crisis, especially its impact on NZ's dairy exports (Hussain & Dawson, 2013; Pavlovich et al., 2016; Stojkov et al., 2016), reputational management (Galloway, 2015; Pang, 2017), crisis communication (Galloway et al., 2019), and corporate sustainability (Aras, 2015), and food product traceability issues (Welsh, 2018). Research surrounding the biggest-ever food safety incident in NZ has been neglected by academic researchers. In the wake of the two food safety crises, both CFSA and NZFSA were faced with pressure from central government and the public to draw lessons from their mistakes in handling the two crises. No academic research has been found to elaborate on crisis-induced changes in NZFSA or CFSA. In addition, no researchers have ever examined the two food safety crises together for a comparative study. This study seeks to address these research gaps by putting the two food safety crises under the lens of crisis-induced organisational learning theory to investigate what lessons CFSA and NZFSA have learned from handling the two food safety crises in question. A comparison will be made to find out similarities and differences in crisis response approaches and crisis-induced organisational learning in the two food safety authorities and influencing socio-economic and political factors leading to the similarities and differences.

3.6 Research questions

Instead of exploring detailed processes of organisational learning, this research focuses on examining organisational and policy changes that have occurred in the two food safety authorities and

regimes as evidence of organisational learning induced by the two crises. At the same time, the research aims to find out and analyse influencing factors facilitating or inhibiting crisis-induced organisational learning in CFSA and NZFSA. It is beyond the scope of this study to investigate individual level organisational learning. Instead, it focuses on identifying organisational level learning in the two food safety authorities and regimes, including but not limited to changes in organisational structure, food safety legislation and regulation, and food safety enforcement.

Social researchers using the interpretive paradigm usually design research questions rather than hypotheses to explore research outcomes (Croucher & Cronn-Mills, 2014). Qualitative studies with this approach analyse data and establish findings through the means of logic and reasoning. To achieve the research goals mentioned above, this study proposes the following research questions:

- RQ 1: How did Chinese Food Safety Authority and New Zealand Food Safety Authority handle the 2008 melamine infant formula crisis and the Fonterra case respectively?
- RQ 2: What is the evidence of crisis-induced organisational learning in CFSA and NZFSA?

To address RQ 1, this study will first construct analysis contexts through establishing the two food safety regulatory and crisis response systems and their underlying political systems and the socio-economic contexts prior to the outbreaks of the two food safety crises. It will be followed by unfolding of the two food scares in question, regulatory responses from the food safety authorities at each stage of crisis management, and public inquiries into the crises and crisis response approaches. Through examining each food safety authority's crisis response approaches against its regulatory system and reports of public inquiries, loopholes in CFSA and NZFSA will be identified.

To answer RQ2, this study will examine how the two food safety authorities receive recommendations from the government inquiries and appeals of the publics in China and NZ. More importantly, it will investigate what they have done during or after the crises to address the identified loopholes in themselves, the food safety government agencies, and the regulatory systems under their watch. In accordance with the definition of crisis-induced organisational learning in this study, any relevant changes in the two food authorities, other related government responders, and food safety legislation and regulatory policies, including the organisational design of the two food safety authorities, the dairy food safety standards and product surveillance procedures and enforcement of the two countries, the food safety crisis response plans and protocols, and other behavioural or policy changes in response to the loopholes identified during and after the crises in question, will be identified in this study as evidence of crisis-induced organisational learning. This research will also look at what proposed changes have not happened yet and find out related causes leading to the delay or cancellation. It will be followed by an analysis and discussion of socio-economic and political factors influencing learning or unlearning in CFSA and NZFSA. A comparison between the two cases can generalise loopholes in food safety authorities and regimes in handling and controlling food safety crises and socio-economic and political factors facilitating or inhibiting organisational learning induced by such food safety crises, laying a foundation for building a theoretical framework or model to analyse crisis-induced organisational learning in the domain of public crisis management.

CHAPTER 4 METHODOLOGY

This chapter elaborates on the research methods that will be employed in this study. It starts with rationalising the use of multiple case study as the design. It will be followed by a brief review of qualitative content analysis as a data analysis approach being employed in academic research and why it is good for this study. Then, the next section defines the scope and components of the data corpus for this research and the methods being used to collect the data. Finally, it details data exploration, coding, and interpretation processes using NVivo, a software program widely used for qualitative research.

4.1 Multiple case study design

Case study is a widely used method has been widely used in crisis management studies. According to Taylor (2010), a majority of crisis studies has been conducted using a combination of case study method and content analysis, or another couple of discourse analysis approaches. However, case study design is often questioned for its credibility (Hyett et al., 2014) due to flawed “rigor, comparability, and replicability” (Barzelay, 1993, p. 305). It has artificial impacts on data collection and analysis (Yin, 2014). Generalisability of case study findings is problematic (Carroll, 2009). Despite the claimed shortfalls, some researchers suggest case study is a flexible approach that can apply to a variety of data collection techniques and document analysis approaches. It is recognised as a productive approach to examine a phenomenon before using more rigorous methods to test existing theories. Hartley (1994) advocates case study is a tailor-made design to explore new behaviours or processes in organisations. It can be employed to investigate dynamics of a network (Halinen & Törnroos, 2005; Shih & Linné, 2016) to figure out “what works and what does not” (Corcoran et al., 2004, p. 10). As a result, case study approach is widely used by researchers in

qualitative inquiries (Yin, 1981), especially when the qualitative inquiry aims to investigate a complex phenomenon within a context using different sources of data (Baxter & Jack, 2008). The case study approach is more flexible and open in the use of theories or conceptual categories, compared to ethnography and other qualitative research approaches (Hyett et al., 2014; Meyer, 2001). The complexity of this study is embodied in the dynamics of multifaceted political and societal factors in shaping the food safety government agencies' crisis response decisions and influencing crisis-induced organisational learning in the agencies. Through conducting in-depth content analysis of the data corpus, this study can address the research questions by constructing the contexts of the two crises, identifying approaches employed by CFSA and NZFSA in handling the crises, and examining factors facilitating or inhibiting organisational learning in the two food safety agencies.

A review of research literature indicates that multiple case study design, compared to single case design, can generate and validate more reliable and trustworthy research findings (Stewart, 2012; Yin, 2014). The design in question is in line with the critical qualitative paradigm as well (White & Marsh, 2006). Yin (1984) defines case study method as an empirical inquiry that examines an existing phenomenon within its "real life context" (p.23). The author emphasises the importance of examining an issue in the situation in which it takes place, especially when there is a blurred boundary between phenomenon and context because the researcher needs to use multiple sources of evidence to verify facts. The case study approach is believed to be a rigorous approach with which to explore and understand complex issues such as food safety crises through in-depth investigation (Crasnow, 2012). In addition, a multiple case design, or a case study analysing more than one case (Stake, 1998; Yin, 2003, 2014) can overcome weaknesses. Analysis of multiple cases can alleviate subjective judgements in the processes of data collection, coding and interpretation, which ultimately strengthens the research findings (Huang et al., 2016; Yin, 2014). Such a design can investigate

generality and particularity of issues in question through examining similar cases against their historical and societal backgrounds (Stake, 1995, 1998). Research findings using multiple case study can be “robust and reliable” (Baxter & Jack, 2008, p. 550). As a result, multiple case design is frequently used by researchers (Yin, 2014), especially doctoral students (Stewart, 2012).

A critical case is one that can produce analytic generalisation (Patton, 2014). Such a case can be “most likely” or “least likely” to confirm or disprove propositions (Flyvbjerg, 2006, p. 231). Logical generalisation can be achieved in crucial cases to the point that “if it is true of this case, it is likely to be true of all other cases in its category” (p.276), due to the significance of such cases (Patton, 2014). This reasoning applies to the two dairy product incidents as critical cases in this study because they are recognised as the food safety crises in the two countries. The two incidents revealed characteristic problems in the food safety authorities and regulatory systems in China and NZ. Researchers (Flyvbjerg, 2006; Seale et al., 2004; Yin, 2003) also suggest a critical case is one that can justify generalisation. A critical case study can reveal strategically important factors related to a general problem in an inquiry (Flyvbjerg, 2006). Bhavnani et al. (2014) believe critical qualitative research can refine research concepts and generate knowledge of social reality. Akins et al. (2019) employed this approach in an organisational learning study to explore interactions between barriers to and drivers of organisational learning. Similarly, this study examines two food safety incidents that sparked organisational learning in CFSA and NZFSA.

The case study approach is widely used in the field of organisation studies for detailed investigation of a phenomenon within certain contexts (Meyer, 2001). After reviewing literature focusing on product-harm crisis management in mainland China, Wang and Laufer (2019) found that case study and a content analysis approach were the most used research design and data analysis

technique in food safety topics in the past two decades. Many researchers (Bender, 2014, January 8; M. F. Chen, 2008; Coombs & Holladay, 2010; Demeke et al., 2008; Ding & Wu, 2014; Galloway, 2015; Guo et al., 2016; Tran et al., 2013; Veil & Yang, 2012) have conducted in-depth case studies to explore certain crisis situations, investigate social contexts, and evaluate the outcomes of food safety crisis management issues. Crisis management and organisational learning scholars (Argyris, 1994, July 1; Coombs, 2010a; Galloway et al., 2019; Millar & Heath, 2003; Mitroff & Alpaslan, 2003, April 1; Veil, 2011) employed case studies to help scholars and practitioners develop insights into organisational activities and generate new understanding of crisis management. Some scholars (Broekema et al., 2017; Deverell, 2010; N. Schiffino et al., 2017) used qualitative case study to examine how government agencies learn from food safety crises. These studies show the qualitative case study design is capable of developing insights into organisational behaviours and crisis-induced organisational learning.

China and NZ have distinctively different political systems and are at different socio-economic development phases. These kinds of contrasts pose no problems to research using the same analysis approaches to examine them under the same theoretical framework. According to Croucher and Cronn-Mills (2014), research theories are free from cultural boundaries. The lens of crisis management and organisational learning theories can be used to examine the two crises in question despite of political and societal differences. Instead, the differences are necessary elements to compare and generate influencing factors on organisation learning in the food safety authorities in question. Each of the two dairy product incidents was significant enough to be a critical case to examine organisational learning induced by food safety crises. Full involvement of CFSA and NZFSA in handling the crises provides an opportunity to investigate the dairy food safety regulatory systems, crisis response mechanisms, and organisational learning occurred in the government

agencies. The multiple case study design can facilitate a comparison of socio-political factors contributing to food safety crises and organisational learning in public organisations within China and NZ.

4.2 Qualitative content analysis approach to the data corpus

This research applies content analysis to explore and interpret a data corpus consisting of news article and government documents for meaningful outcomes. Krippendorff (2004a) defines content analysis as “a research technique for making replicable and valid inferences from texts or other meaningful matters to the contexts of their use” (p. 18). According to Croucher and Cronn-Mills (2014), the very core of the interpretive paradigm is subjective and logic perception and interpretation of information and reasoning is the main source as well as test of knowledge. For Patton (2014), the interpretivist paradigm can generate meaningful content through handling written communication data to inquire into human behaviours within an organisational, political, or other societal contexts. Qualitative content analysis has been employed to make inferences for meaning, intentions, consequences through objectively and systematically identifying characteristics of information against a context (Downe-Wamboldt, 1992; Graneheim et al., 2017). It is a scientific tool to examine textual data abstracted from any texts, images, and sounds obtained from interviews, observation, survey questions, media reports in verbal, print, or electronic forms (Hsieh & Shannon, 2005; Krippendorff, 2004a). Zhang and Wildemuth (2009) highlight content analysis as a rigorous approach to examine documents or other forms of textual data systematically for manifest or latent meaning, patterns, and themes. Hardy et al. (2004) suggest the text contents abstracted from its context are supposed to be consistent and stable in meaning which allow researchers to code and analyse.

As an empirically grounded research method, content analysis approach is widely employed to analyse perceived social problems (Krippendorff, 2004a), including interpreting meaning from textual data within its socio-historical context (Chadwick et al., 1984; Hsieh & Shannon, 2005). The approach is a highly flexible method fit for various research goals and purposes (White & Marsh, 2006). It can literally be applied to analyse all kinds of information in various forms (Lombard et al., 2002; Neuendorf, 2016). Qualitative content analysis technique is therefore one of the most employed analytical tools in handling textual data (White & Marsh, 2006). Findings from content analysis can be powerful arguments to advocate and indicate social changes (Drisko & Maschi, 2015). Qualitative analysis of textual data in case studies can help explain complexities of real-life situations that other research methods may fail to capture (Crasnow, 2012). Qualitative content analysis is in line with this case study design in its capacity to analyse textual data such as documents, news releases, or a combination of them (Yin, 2014). The two high-profile crises in question were fully covered by news media and documented by related government agencies. These news reports and government documents can also present the socio-economic and political contexts of the two food safety crises in China and NZ, the approaches employed by CFSA and NZFSA to handle the crises, and related changes that occurred in the two food safety government agencies and food safety regimes during and after the crises. Corpus data from these sources provide abundant relevant content for qualitative analysis in this study.

Nathalie Schiffino et al. (2017) found food safety government agencies were faced with a pressure to learn and change when food safety crises strike. Galloway (2016) indicates crises can reveal policy and procedure shortfalls existing in an organisation and potentially lead to remedies. Qualitative interpretation of news articles and government documents can reveal long-standing problems in the food safety authorities and regulatory systems as well as missteps taken by the two

government agencies in handling the crises in question. According to Krippendorff (2004b) and Stemler (2001), a qualitative content analyst needs to clarify what constitutes the data, the context of an analysis, the scope of an analysis, and the goals of data interpretation. To do so, the analyst needs to develop a conceptual framework for a qualitative study explicitly or implicitly (Woolf & Silver, 2017). To conduct qualitative content analysis, this study applies the following conceptual components developed by Krippendorff (2004a):

- Body of data: the data corpus consisting of news articles and government documents on the Sanlu case in China and the Fonterra case in NZ
- Context of data analysis: the socio-economic and political contexts of the two food safety scares and the food safety authorities and regulatory frameworks in China and NZ
- Research question-oriented data analysis: qualitative content analysis of the data corpus to identify approaches employed by CFSA and NZFSA in handling the two food safety crises in question and changes in the authorities and systems as evidence of organisational learning induced by the crises
- Interpretations of the data corpus: to answer the research questions of this study, data will be coded into themes and units in line with three-stage crisis management model and crisis-induced organisational learning theories to identify loopholes in the dairy food safety systems which will be used to establish evidence of organisational learning sparked by the two crises in question.

To sum up, the goal of interpretation of the data corpus in this study is to identify evidence of organisational learning in forms of behavioural and policy changes in CFSA and NZFSA induced by the two food safety crises in question. It includes but is not limited to changes in dairy food safety

legislation and regulations, food safety surveillance enforcement, and crisis response programs in China and NZ. The qualitative content analysis approach will be utilised in this study to analyse the data corpus consisting of news media reports and government documents recording the two food safety crises. This study will construct meaning under the framework of crisis-induced organisational learning theory through systematically depicting, categorising, and interpreting the data corpus. As a descriptive study, it will mostly present what the government agencies did before, during, and after the crises in question and what they have learned and changed induced by the crisis experiences. The underlying socio-economic and political factors leading to the crises and crisis-induced organisational learning in CFDA and NZFSA will be identified and discussed.

4.3 Data collection methods

Any empirical research starts with collecting data (Krippendorff, 2004a). The success of data collection is subject to the research questions and the aims of the study that determine what to analyse and what to construct (Elo et al., 2014). As previously mentioned, the data corpus of this study consists of two main sources. One from news articles covering the two food product crises by the most circulated and influential newspapers in the two countries, the other is documents released by business organisations and government agencies. As suggested by N. Schiffino et al. (2017), press articles, crisis evaluation reports or minutes, and public inquiry reports can be included in data corpus to examine crisis-induced learning in public organisations. In addition, government documents in this study includes, but is not limited to government dairy food safety-related laws or acts, crisis response programs and food safety regulatory policy documents before and after the two food safety crises. Most of the news articles and documents could be retrieved and downloaded from official

websites of the involved news media or public organisations. The search engines *Google* and *Baidu*²¹ were also used to retrieve related data documents, especially when some related articles and documents could not be retrieved on their publishers' original webpages due to website mergers, contents updates, or other reasons. This study did not conduct interviews to collect supplementary data because of several concerns, including availability of sufficient participants due to staff turnover over the years after the crises, participants' partial involvement and accuracy of their memories of the crisis responses, and legal and ethical concerns given the sensitivity of the topic.

Krippendorff (2004a) warns data collecting methods such as interviewing, focus groups, and surveys are vulnerable to contaminated observations caused by researchers' interferences. The data collection method in this study is free from such problems because the method involves no direct contact with participants (Bernard, 1994; Given, 2008). In social science studies, unobtrusive methods draw meanings in human behaviours or other physical traces from available sources such as written, audio, and visual records (Liamputtong & Ezzy, 2005). According to Kellehear (1993), methods of this kind are justified in the following situations: answers to research questions can be found in literature or other existing data, data collection is unfeasible due to political sensitivity or participant unavailability, or approaching certain vulnerable people is considered ethically inappropriate. For content analysts, the obvious advantages of the data collection methods are comparatively easier accessibility, shorter time, and less ethical concerns (Silverman, 2006). Corpus data, either paper-based or computer-mediated, includes written contents and other elements like images, photos, graphs, and diagrams embodied in documents (Rapley & Rees, 2018). These ready-made source of data for qualitative research exist in printed materials or websites in forms of

²¹ The most prominent internet search engine in China.

newspaper accounts, government documents, and corporate records (Merriam & Tisdell, 2009). Corpus data collected in this manner is normally free from personal privacy, reliability, cultural values, and political factors (Silverman, 2006).

Stemler (2001) suggests data corpus for qualitative content analysis should have the following characteristics: a population intact enough for a grounded study, appropriate records aligned with the defined data collection criteria and intact contents clear enough for coding. According to Coombs and Holladay (2004), during a public crisis people tend to seek information from media coverage of the event to find out the causes and make attributions based on the information they have received. The news media can shape the public's interpretation of news events by selecting the contents of reports (Hallahan, 1999). Such news coverage impacts on the public's perception which in turn exerts influence on people's evaluation and attributions of responsibility to the crisis-impacted organisations or individuals (An & Gower, 2009; Coombs, 2006a). It is therefore important to look at how the crisis events were framed by news outlets.

Government documents can provide facts of past events and reliable data sources for a case study (Patton, 2014; Yin, 2003). Patton (2014) suggests data triangulation, or data collected from multiple sources allows the researcher to crosscheck facts and in qualitative research can help develop a comprehensive understanding of a phenomenon and ensure accuracy and completeness of information. This data check approach increases credibility and confirmability of a qualitative study (White & Marsh, 2006). The data corpus in this study, being collected from different sources or databases, can therefore achieve the advantages of data triangulation, and thus improve the validity of the research findings.

In this study, data for the Sanlu case covers the timeframe between May 2008 when a blogger first exposed the melamine infant formula problem and June 2020 when reorganisation of CFDA had finished. Data for the Fonterra case follows the time frame between February 2012 when WPC80 products were contaminated in Fonterra's Hautapu plant and February 2018 when the Food Safety Law Reform Act (FSLRA) was passed. Though the data corpus for this study is composed of textual contents created around 10 years ago, researchers (Bartman, 2018; Christensen, 2018) consider data from historical documents are appropriate to use for content analysis. Stern and Sundelius (2002) emphasise some critical crises can lead to political and societal trauma dragging on years or decades after the events. Both crises in this study, especially the Sanlu melamine scandal in China, plagued the governments and the publics in a profound and prolonged manner. The two dairy product crises have become an unavoidable reference point for food safety reforms in each of the two countries. Public organisations in many cases are not quick learners (Deverell, 2010). To discover crisis-induced learning in the two food safety authorities, a data collection period covering such a timeframe fits the characteristics of such a drawn-out societal process.

The reliability of data sources for this study was assessed with reference to four criteria recommended by Scott (2014), including authenticity, credibility, meaning, and representativeness. To obtain data for the Sanlu case in China, the Chinese characters “三鹿事件”, “三聚氰胺奶粉”, “毒奶粉”, and “结石奶粉” meaning “Sanlu Incident”, “melamine milk powder”, “poisonous milk powder”, and “calculus milk powder”, most used words in news reports at the time, are used as key words to search Chinese language news media websites widely circulated in China, including *www.people.cn*, *www.xinhuanet.com*, and the website of *the Oriental Morning Post*, which first reported the Sanlu scandal. The English key words translated above were used to search news articles

on English language news media *ChinaDaily.com.cn*. News articles from the *China Daily*²² gave more detailed accounts of the Sanlu melamine scandal from different perspectives. There are more in-depth discussions of the dairy industry-wide problems and food safety issues in China. The English media publishes more critical thinking viewpoints mainly because it targets audience from overseas. These news media in China fully covered the Sanlu case and the articles are mostly retrievable at the time of data collection for this study. Though there were occasions that some news articles were no longer retrievable on their original websites, they could be found on alternative websites, therefore ensuring the intactness of the data population for the study. According to Lindgren (2018) merging data from different digital data sources can lead to improved precision and predictive power which result in in-depth assessment of human behaviours. To ensure the authenticity and credibility of the data, the researcher made sure all news reports on the Sanlu melamine event were from the Xinhua news agency. The Xinhua news agency is the most influential and agenda-setting news agency in China (Cai et al., 2009; Pang et al., 2018; Ye & Pang, 2011; Zhang, 2011). As a result, the study collected 424 news articles (see Table 6) on the Sanlu melamine scandal.

The same key words were also used to search relevant government websites, including *www.gov.cn*, websites of CFSA, then MOH, AQSIQ, SAIC, MOA, and SAMR, to collect government documents or statements of their commitments and responsibilities in food safety, government regulations in food safety, responses to the Sanlu melamine scandal, releases and announcements during the incident. This study also searched the website of the National People's Congress (NPC), the legislation body in China, to collect legal texts and laws in food safety before

²² Or 中国日报 in Chinese. Established in 1981, it is the first Chinese national daily newspaper in English.

and after the Sanlu case. As a result, 170 government documents (see Table 6) were collected. A huge data corpus was required for this study because the official investigation report on the Sanlu case has never been released. The researcher had to collect all related media coverage and government releases to put all segmented parts of the scandal together to get a full picture of the incident.

Table 6 Corpus data and its sources of the two food safety crises

Case	Categories of data	Source	Number of items	Language
The Sanlu case	Government documents	Government official websites	170	Chinese
	News articles	Xinhuanet	41	Chinese
		People.cn		
		State Council news release		
China Daily	383	English		
The Fonterra case	Government documents	MPI website	29	English
		Parliament website		
	News articles	NZ Herald	146	English
		Dominion Post		
		NBR		

As a complement to data unavailable online, the researcher visited the National Archive Administration in Beijing and Hebei Provincial Archive Administration in Shijiazhuang city, trying in vain to get a copy of the government investigation reports on the Sanlu case and Sanlu board meeting minutes. These documents were still confidential. The researcher was told these documents would remain inaccessible to the public for 30 years, according to Chinese laws and regulations in archive management. Despite this, there are plenty of related official releases available from national

and local government websites. The whole picture of the scandal and government response can be put together using the segmented records.

To collect data on the Fonterra case, the key words “Fonterra botulism scare”, “Fonterra botulism”, “Fonterra WPC80 incident”, “Fonterra WPC80 recall”, and “2013 Fonterra product recall” were used to search the websites of three leading newspapers: *NZ Herald*, *The Dominion Post*, and *National Business Review*. Since there is no national daily newspaper in NZ (Strong, 2011), news reports were collected from the three main metropolitan dailies. *NZ Herald* and the *Dominion Post* are two newspapers with the largest circulations in NZ (Fountaine, 2016; Strong & Hannis, 2008). They both fully covered the Fonterra case and government responses. The weekly *National Business Review*, a top “specialist business” and “pro-market” journal, is an important source to outsiders to understand the thinking of current elites and is famous for investigating questionable corporate activities often connected with government in NZ (Kelsey, 1995, p. 20). The researcher obtained 246 news articles (see table 4.3.1) covering the Fonterra case, government responses, and changes in the food safety regulatory system triggered by the incident. The same key words were also applied to the websites of Fonterra Cooperative Group, MPI, and the NZ Parliament to search for independent inquiries of the Fonterra WPC80 incident, government releases and statements during the event, new programs and legislation around food safety induced by the incident. The study collected 29 government documents (see table 4.3.1) for analysis.

From various sources and databases, the study came up with a data corpus of 609 news articles and 166 government documents on the Sanlu case, and 267 news articles and 33 government

documents on the Fonterra case. Most of the data corpus was collected by NCapture²³ from the Chrome web pages. For the purpose of data cleaning, the researcher chose the option of “article of PDF” rather than “web page as PDF” when documents were collected from webpages using NCapture. The former option automatically removes all irrelevant contents but titles, authors, and contents of the articles while the latter includes irrelevant parts like images, advertisements, symbols, and other related linkages.

The collected news articles and government documents gave detailed accounts of the crises and responses from business and government organisations. Multiple sources of data can minimize the risk of self-serving or white-washing narratives from interested groups or organisations. Data collection for this study has reached the ideal goal of saturation advocated by Merriam and Tisdell (2009). It is obvious that no new information or insights into the food safety induced government learning can be produced by further data collection.

4.4 Data analysis processes

Data analysis attempts to find answers to research questions through making sense of data for a study (Merriam & Tisdell, 2009). It should be conducted in accordance with the purposes of the study, research design, and data handling techniques available for researchers (Hsieh & Shannon, 2005; Knafl & Howard, 1984). For qualitative research, answers to research questions come in the forms of categories, themes, and findings (Merriam & Tisdell, 2009). The central question of this study is how the Chinese and NZ Governments and their food safety authorities handled the crises

²³ NCapture is a powerful tool to gather various web content for NVivo platform analysis. The data collecting tool it is only compatible with the web-browser Chrome at present.

in question, and what evidence of organisational learning can be found in the two public organisations and food safety regimes induced by the two crises. To address the research questions, qualitative content analysis of the data corpus was processed in twofold. The first part of the analysis was to map the events of the two dairy products crises and the handling of the crises by the two food safety authorities in China and NZ. From qualitative content analysis of the collected news articles and government documents, the study identified the causes of the two food safety crises, responses of the dairy manufacturers and other stakeholders, and the approaches of the Chinese and NZ food safety agencies in handling the crises. The findings in this part laid a solid foundation for the second part of analysis which aimed to identify loopholes and problems in the two countries' food safety regimes and government agencies. It was a necessary step to identify evidence of any crisis-induced organisational learning that occurred in the two food safety authorities and regimes.

According to Krippendorff (2004a), the qualitative content analysis approach entails a systematic examining of a textual corpus consisting of texts, images, and other meaningful symbols, and making inferences from the perspectives of data analysts rather than the authors of the textual data. Through the process of systematic analysis, large volumes of textual data can be compressed into fewer content categories due to explicit rules of coding (Stemler, 2001). Qualitative content analysis is therefore a process of subjective interpretation of the content of textual data through a systematic process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). This study follows an inductive reasoning process, in which themes and categories emerge from the raw data when the researcher examines and compares the data carefully (Zhang & Wildemuth, 2009). Data analysis in qualitative study starts simultaneously with data collection (Merriam & Tisdell, 2009).

To examine the huge data corpus for this study, the qualitative data analysis software NVivo was used to code and analyse the data sets. NVivo is a text processing software designed to undertake qualitative content analysis (Bazeley & Jackson, 2013). Computer applications in research can only be used as aids rather than replacement of the human brain (Nacos et al., 1991) because text processing applications are inherently interactive processes in conjunction with users' reading of textual materials (Krippendorff, 2004a). NVivo is recognised by social scientists as a “representative” (p.36) application of its kind for qualitative content analysis (White & Marsh, 2006), and a reliable computer tool for systematically analysing large volumes of text in qualitative content analysis (Krippendorff, 2004a). Using NVivo in qualitative analysis, especially when handling large data sets, can strengthen rigor of the study (Leech & Onwuegbuzie, 2011). NVivo has features common to many other qualitative software programs that can help researchers record, store, index, sort, and code qualitative data (Richards & Morse, 2012).

To examine the data corpus in a systematic and logical manner, the researcher first created a PhD data analysis project on the NVivo platform. This research follows Adu (2019)'s six-step NVivo-based data coding processes, including data cleaning, data importing, data reorganisation, data exploration, data coding, and themes generating. The researcher conducted manual data cleaning on documents collected without using NCapture. All irrelevant contents but authors, time of publication, documents or article contents were removed. Duplicated documents and articles with overlapping content details were removed from the data corpus.

Then two folders were created under the *Data Files*, one for the Sanlu case in China and the other for the Fonterra case in NZ. To illuminate different sources of the textual data, the government documents and news articles were reorganised and stored in two separate subfolders under each of

the two cases. After importing the two sets of data corpus into the designated folders, the researcher explored the two datasets using the same “word frequency” approach for possible themes. The details of data exploration are reported in Chapter 5 and 6 for each of the two cases.

After data exploration, all data articles were coded into the nodes named “Sanlu scandal” and “Fonterra botulism scare” using “paragraph styles” with the tool *Auto Code Wizard*. A careful examination of each data article allowed the emergence of themes. The researcher coded textual data for this study in units of complete meaning rather than by paragraph or entire article. Two criteria were applied for each coding unit: revealing information relevant to research questions, and information complete in meaning within its context. To make the two crises comparable, the researcher designated themes and categories with similar terms when possible. As mentioned above, qualitative content analysis of the data corpus will be examined in line with the three-phase crisis management theoretical framework developed by Coombs (2014). Each unit was coded into a theme under the pre-crisis, the crisis stage, or the post-crisis category.

To achieve a thorough understanding of the content of each coding unit, the researcher inserted interpretation of the content into its *Annotation tab*. Data was then further coded into emerging themes (See Figure 3) related to answering research questions. After all coding units

Figure 3 Data coding process with NVivo

1. Sanlu scandal			2. Fonterra botulism scare		
Name	Files	References	Name	Files	References
1 Pre-crisis stage	115	219	1 Pre-crisis stage	46	155
1.1 Chinese dairy food safety framework and others	77	125	1.1 New Zealand dairy food safety framework and others	18	52
1.2 Unethical business behaviours leading to the scandal	54	89	1.2 Fonterra's misbehaviors	31	103
2 Crisis stage	254	601	2 Crisis stage	114	438
2.1 Outbreak and consequences of the crisis	134	274	2.1 Outbreak and consequences of the crisis	99	259
2.2 Government handling of the crisis	169	327	2.2 Government handling of the crisis	53	179
3 Post-crisis stage	432	1528	3 Post-crisis stage	103	462
3.2 Identified loopholes in the food safety regulatory system	175	405	3.2 Identified loopholes in the regulatory system	19	101
3.3 Evidence of OL in the government agencies	224	526	3.3 Evidence of OL in the MPI induced by the scare	25	106
3.4 Recommendations	205	440	3.4 Recommendations	72	226
3.1 Accountability	74	157	3.1 Accountability	21	29

in a theme were interpreted and inserted into the annotation tabs, the node of the theme was exported and saved under the “Entire Content” option in the html format (see Figure 4), which finally generated

Figure 4 A sample of exported coding node

2.1 Initiating precautionous recall of affected products

Summary | PDF

Overview

TYPE	Node
COLOR	
AGGREGATED?	No

Content

PDF

FILE & LOCATION	REFERENCES	COVERAGE	
Files\NZ\Government Documents\WPC-2013-MPI-Traceability-and-Verification-Report	29	4.95%	view details
Files\NZ\Government Documents\Government-Whey-Inquiry-Report-November-2014	30	1.09%	view details
Files\NZ\Media reports\Key promises probe into Fonterra - NZ Herald	1	4.39%	view details
Files\NZ\Media reports\Milk scare angers parents - NZ Herald	1	4.38%	view details
Files\NZ\Media reports\Fonterra apologises to consumers - NZ Herald	1	5.88%	view details
Files\NZ\Media reports\Contaminated stock under control, says Fonterra boss - NZ Herald	3	12.33%	view details
Files\NZ\Media reports\Ministry mulling closer tabs on dairy - NZ Herald	1	22.81%	view details
Files\NZ\Media reports\Editorial- Fonterra scare report leaves key questions unanswered - NZ Herald	1	6.00%	view details
Files\NZ\Media reports\Botulism botch-up- Nutricia ponders legal action - NZ Herald	1	5.86%	view details
Files\NZ\Media reports\9000 bottles in Fonterra cream recall - NZ Herald	2	19.44%	view details
Files\NZ\Media reports\Fonterra botulism crisis was false alarm - NZ Herald	1	4.80%	view details

several documents in PDF format (see Appendix 2). The number of PDF documents was the same number of references coded into the node. These exported documents were coded outcomes of each theme, which concisely demonstrate in the theme sources of the coding units, content of the analysis units, and the researcher’s interpretation of each analysis unit. The coding process continued theme by theme until the two food safety cases were exported and transformed into documents. These coding results were analysed to generate findings in Chapter 5 and 6.

4.5 Summary

This chapter rationalizes the multiple case study design and its advantages compared to a single case design in terms of credibility of the research findings. It then moves to specify the paradigm of the research. It is qualitative research within the interpretivist paradigm. The content analysis technique employed in this study is a widely used data handling approach in social science. Finally, it elaborates on handling the data corpus for this study, including what constitutes the data, the scope

and timeframe it covers, approaches to data collection, data coding and analysis processes on the NVivo platform.

CHAPTER 5 CRISIS-INDUCED ORGANISATIONAL LEARNING IN CFSA

According to Hsieh and Shannon (2005), a qualitative content analysis covers several key aspects, including the research questions to be answered, the coding process, thematic categories, supporting data evidence to the themes, and interpretation of data evidence. Qualitative findings can be presented in the form of data visualization and textual content interpretation (Mayring, 2014; Morgan, 1993; Patton, 2014). This chapter presents the findings from the NVivo project in both visual and textual interpretation forms. It answers the two research questions regarding the Sanlu case in China: How did the Chinese government and CFSA manage the melamine scandal? What is the evidence of crisis-induced organisational learning in CFSA?

In line with the three-stage crisis management model developed by Coombs (2014), the theoretical framework employed in the data coding process, this chapter elaborates on the outcomes of the qualitative data analysis following the sequence of crisis prevention and preparation at the pre-crisis stage, crisis response and containment at the crisis event stage, and recovery and crisis-induced learning at the post-crisis stage. The first section of the chapter reports outcomes of the data exploration and content analysis context constructs. The second section elaborates on the approaches of CFSA in handling the Sanlu incident at different stages of the crisis. The third section shows the loopholes identified in the food safety regulatory system and the chapter concludes with evidence of organisational learning in CFSA induced by the biggest food safety scandal in China.

Exploration of the data corpus sheds light on the organisational framework of the Chinese food safety regulatory system for crisis response, including the organisational structure and dynamics of

the Chinese food safety agencies in the process of decision-making. The presentation of the dairy food safety agencies and the regulatory regime constructs a context for analysing and assessing CFSA's performance in handling the Sanlu case. Content analysis in this context resulted in identification of shortfalls in the regulatory system and organisational changes in the regime induced by the crisis. Data analysis shows CFSA employed significantly different approaches at various stages of crisis management:

- At the pre-crisis stage, AQSIQ and other food safety agencies buried their heads in the sand and did not respond to any of the consumers' complaints and whistle-blowers' reports
- When the scandal was brought to light and the Chinese central government triggered the Level-I emergency plan²⁴, CFSA agencies were able to collaborate to identify the contaminant, trace down the tainted products, respond to victims, clean up the dairy industry, and provide financial support to affected dairy farmers
- Evidence of organisational learning in CFSA was identified both during and after the crisis, such as the abolition of the inspection-exemption policy in the food industry, re-organisation of CFSA, and the passage of the first food safety law.

5.1 Data exploration and content analysis setting construct

5.1.1 Data exploration

This section elaborates on exploration of the dataset for the Sanlu case. After the data corpus were imported into the NVivo project and categorised in two case folders, the researcher first

²⁴ The highest crisis response program in China.

explored “Word Frequency” queries to identify themes and categories of the two sets of textual data. The researcher first explored the Sanlu case. This set of data corpus consists of 114 government documents and 392 news articles. The two categories of documents were explored separately because all the government documents are in Chinese, while only 19²⁵ out of 392 news articles are in Chinese. Since a single Chinese character in most cases does not convey any significant meaning, the minimum length of display word was set as 2. Displayed characters except for nouns and verbs were added in the “Stop Words²⁶” list and would not appear in the word cloud. The outcome of the first query on government documents of the Sanlu case was exported and demonstrated as below (see Figure 5). The higher the frequency of a word in a data corpus, the bigger the display of the word in the word cloud. The “Word Frequency” query on government documents includes the following most frequently used terms: 食品(food), 安全(safety), 部门(government agency), 生产(production), 监督(regulation), 奶粉(milk powder), 监管(inspection), 质量(quality), 管理(management), 企业(enterprise), 规定(rule), 检验(testing), 国务院(State Council), 国家(nation), 标准(standard), 法律(law), 事故(accident), 风险(risk), 添加剂(additive), 许可(licensing), 婴幼儿(infant), 制度(system), 加强(enhance), 政府(government), 卫生(health), 完善(improve), 处置(handle), 召回(recall), 应急(crisis response), 质检(quality control), 实施(implement). The Chinese name of Sanlu, 三鹿, is not a phrase in Chinese. It therefore was not recognised and displayed in the outcome though the name of the dairy company is a phrase of high frequency in the textual data. The same approach was applied to explore the 392 news articles. The outcome of the

²⁵ 19 news articles covering the scandal were retrievable in the selected Chinese media.

²⁶ NVivo provides a list of default stop words like conjunctions or prepositions that are not so meaning for some analysis. It also allows researchers to add/remove words in/from the list so that some words cannot/can appear in word frequency outcomes.

There are only 19 out of 392 news articles in Chinese. Nearly all articles are from the website of the *China Daily* and in English. As a result, there is no Chinese character displayed in the word cloud.

The outcomes of word frequency queries on the data corpus of the Sanlu case clearly demonstrate the highlights of the scandal, such as “food safety incident”, “dairy industry”, “infant formula”, and “melamine contamination”. The word cloud shows Chinese dairy giants, including Sanlu, Mengniu, and Yili, were all involved in the melamine-tainted infant formula scandal. The incident can be related to topics including quality control, food additives, food standards, food safety laws, regulation and inspection of enterprises, and tightened regulation in the wake of the crisis. These most frequently used words in government documents and news article can shape an outline of the Sanlu case. However, the word clouds cannot generate themes from the data without in-depth examination.

Themes and categories emerged after merging overlapping categories and deleting the ones that did not stand out. The themes of Chinese government approaches in handling the Sanlu case emerged as demonstrated below (See Figure 7): 94 references from 54 documents indicating food safety agencies’ action or inaction towards unethical business practice in the dairy industry at the pre-crisis stage; 333 references for Chinese government handling of the melamine infant formula crisis during the crisis stage, including initiating Level-I emergency plan, holding the food safety law violators and responsible public officials to account, recalling and destroying melamine contaminated products, providing medical treatment and compensation to victims, and providing supports to affected milk farmers; 743 references indicate regulatory shortfalls in the food safety system and evidence of organisational learning in the government agencies induced by the crisis at the post-crisis stage,

including updating food safety legislation and standards, reforming the hierarchical design of the agencies, re-planning the dairy industry, and unlearned lessons by the government agencies at the

Figure 7 Coded themes in analysis of the Sanlu case

1. Sanlu scandal			
Name	Files	References	
1. Pre-crisis Food safety agencies actions or inaction towards unethical business behaviors	54	94	
2. Crisis-stage Government handling of the crisis	140	333	
2.1 Initiating Level I emergency plan	68	141	
2.2 Holding offenders and responsible public officials to account	114	280	
2.3 Recalling and destroying melamine contaminated products	30	50	
2.4 Providing medical treatment and compensation to victims	49	125	
2.5 Supporting affected milk farmers	28	58	
3 Post-crisis stage Organizational learning induced by the melamine scandal	258	743	
3.1 Identified loopholes in the food safety regulatory system	160	372	
3.1.1 Segmented hierarchical design and lax regulation	50	106	
3.1.2 Backward food safety standards	17	27	
3.1.3 Ineffective testing capacity and whistle blowing system	10	14	
3.1.4 Problematic consumer right protection and transparency	53	96	
3.1.5 Chaotic recalling and handling of affected products	10	16	
3.2 Evidence of OL in the government agencies induced by the crisis	162	371	
3.2.1 Changes in food safety standards, legislation, and law enforcement	148	289	
3.2.2 Changes in hierarchical design of food safety agencies	28	45	
3.2.3 Higher threshold to the dairy industry	136	349	
3.2.4 Unlearned lesson by the food safety agencies	79	195	
4. Roots of food safety issues in China	204	605	
4.1 Bureaucratic problems and controversial accountability	80	142	
4.2 Regional protectionism & corruption	33	59	
4.3 Unethical practices in the dairy industry	169	389	
4.4 Limited role of news media	14	15	

post-crisis stage. To find out the societal roots attributed to the scandal, this study obtained 605 references from 204 documents covering four aspects of factors related to the political system, industrial practice, and roles of news media. With a qualitative analysis approach, the number of references does not necessarily suggest the importance of a theme or category. For example, there are small numbers of references coded for food safety standards, testing capacity, products recall,

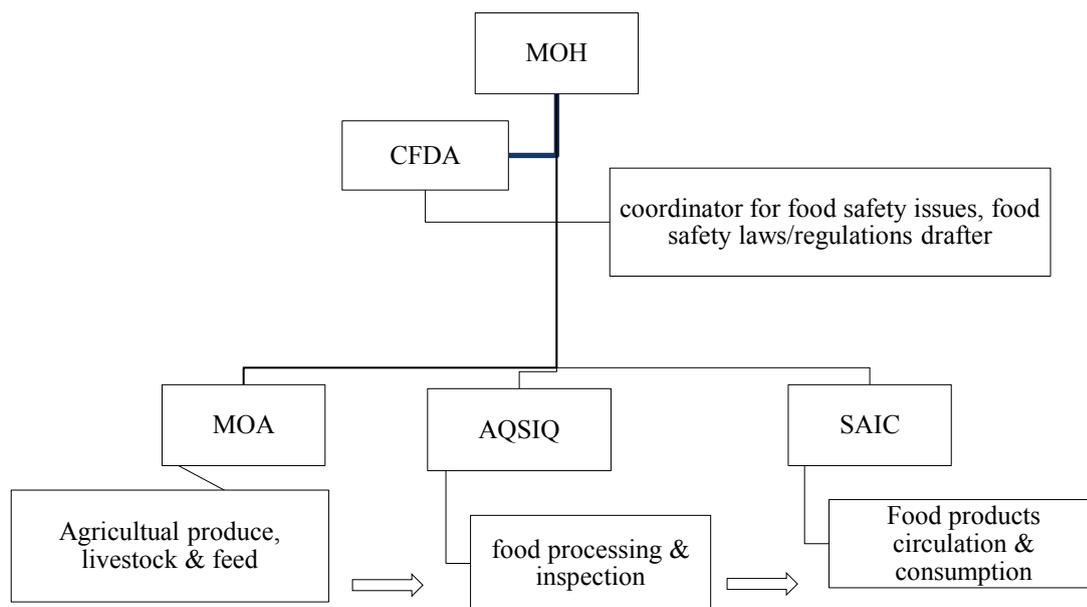
and role of news media, but they are recognised in the content of the documents as especially important themes for this study.

5.1.2 Data analysis construct

Researchers can only make sensible interpretation of crisis behaviour against its historical, institutional, and political contexts (Stern, 1999). To analyse the crisis management performance of CFSA at three different stages of the Sanlu case, it is necessary to present its contexts including the Chinese dairy food safety framework, its food safety crisis response mechanism, the hierarchical structure of the food safety agencies and the organisational dynamics between the agencies and the dairy industry and between different agencies. At the time the Chinese dairy industry was regulated by a segmented food safety regulatory system consisted of four ministries: MOH, AQSIQ, MOA, and SAIC (see Figure 8). The ministries were empowered respectively by the 1995 FHL, the 1993 PQL, the 2006 APQSL, and the 1993 Law on Protection of Consumer Interests and Rights. Each ministry had specific departments responsible for food safety. CFSA was rebranded from the SFDA in the aftermath of a food safety crisis leading to the execution of its former head Zheng Xiaoyu, who was convicted of taking bribes from food and drug companies (S. Chen, 2009; Wu et al., 2017). According to a State Council's administrative regulation²⁷ passed on July 25, 2007, the independent vice-ministerial level government agency was reorganised as CFDA and became a subsidiary of MOH. CFSA was to be responsible for overall supervision of food safety issues in China, coordinating food safety agencies across different ministries, and communicating related information

²⁷ State Council Special Decision on Food Safety Supervision and Management

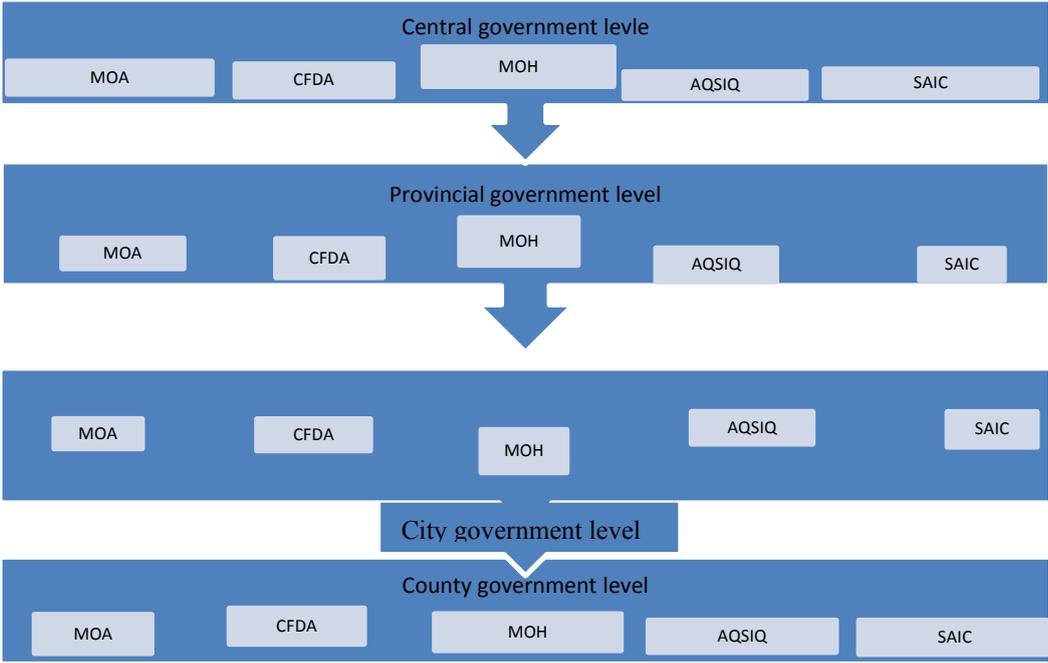
Figure 8 Segmented food safety governance system in China



Source: Adapted from Jia and Jukes (2013) and Zhou (2017)

to the publics in times of major food safety crises. MOA was to be responsible for the food safety regulation of agricultural produce, AQSIQ in food products processing, SAIC in food products circulation, MOH in food safety standard setting, food consumption in catering businesses and cafes, and CFDA in overall supervision of food safety and coordinating departments across ministries in handling big food safety issues. The State Council’s regulation empowered local governments at all levels as primary leaders of food safety inspection and supervision activities and the first responder in times of food safety crises in their jurisdictions (see Figure 9). Under the 4-layer bureaucratic hierarchical structure, there were 34 food safety authorities at the provincial level, 333 at the municipal level, and 2826 at the county level (Jia & Jukes, 2013). The fragmented design of the food safety supervisory system required all food safety agencies to coordinate seamlessly from upstream materials to downstream products in supervision to ensure food safety. They were fully accountable for food safety problems in their jurisdictions.

Figure 9 Hierarchical structure of the China Food Safety Authorities



Source: adapted from Jia and Jukes (2013)

Drawing from the three-phase crisis management model developed by Coombs and Holladay (2010), this section analyses how Chinese food safety authorities handled the Sanlu case in three chronological stages: the pre-crisis, the crisis event, and the post-crisis. This study found they employed different approaches at different phases of the crisis. The pre-crisis stage started with AQSIQ, which was responsible for quality control of manufactured products in China, having received complaints on its website about urinate problems in young babies potentially caused by consuming the Sanlu infant formula products. This stage ended with outbreak of the Sanlu case triggered by the news report by *The Oriental Morning Post* on September 11, 2008. It was the first time that Sanlu was named in the news media with the allegation that its products potentially caused kidney stones in the hospitalised babies in the Gansu province. The crisis stage starting from the outbreak of the Sanlu case triggered by the news report lasted for 11 months until the announcement of the bankruptcy of Sanlu. At this stage, CFSA and the local government responded quickly and

handled the crisis effectively under the supervision and guidance of the Chinese central government. The post-crisis stage in this study covers the period from the government agencies handling the aftermath of the Sanlu scandal after its bankruptcy to the end of data collection of this study in June 2020, including compensation to the victims, business consolidation in the dairy industry, reorganisation of the food safety authorities and the revision and overhaul of food safety legislation.

5.2 CFSA's approaches to handing the Sanlu case

5.2.1 The head-in-the-sand approach at the pre-crisis stage

Almost every crisis has signs of its coming before its outbreak (Fink, 1986). During the pre-crisis stage, the main task of crisis management in an organisation is to detect the signs of risks and respond quickly to prevent them from developing into a crisis or at least get a response plan ready for its outbreak (Coombs & Holladay, 2010; Mitroff & Alpaslan, 2003, April 1). There were multiple red flags signalling the coming of the Sanlu melamine scandal. However, CFSA agencies chose to take a head-in-the-sand approach rather than step in early to prevent the crisis or diminish its impact.

The signs of the Sanlu melamine contamination had emerged long before the outbreak. In fact, AQSIQ received numerous threads of solid information with all details pointing to melamine contamination in the Sanlu infant formula products. The melamine contamination was exposed on July 16, 2008 when 16 babies were diagnosed with kidney stones after consuming Sanlu infant formula products (People's Daily, 2008, October 26b). A parent reported Sanlu of its problematic infant formula products to AQSIQ on the regulator's website.

According to a news report from the CNTV²⁸, in July 2008, a paediatrician named Feng Dongchuan reported to AQSIQ about the Sanlu infant formula product issue after he treated nine babies who had kidney stones after consuming its products. He heard of more such cases from his counterparts in other regions. Dr Feng blew the whistle. According to China Network Television (2010, November 18), Dr Feng reported the Sanlu infant formula issue to AQSIQ using his personal identity, hoping AQSIQ could organise experts to investigate the cause of the disease. The report suggests he complained to AQSIQ that many of his patients were suffering from kidney stones, and they all had consumed the same brand of infant formula products manufactured by Sanlu. He urged AQSIQ to inspect Sanlu before it could harm more babies. AQSIQ did not respond to Dr Feng's report (State Council Information Office, 2008, September 13b). In despair, he posted and updated regularly all his findings on his 博客 [Blogger], an influential Chinese social media platform. According to a CNTV article:

他决定采取自己的方式发出警示，那就是他的博客：（2008年07月24日13:59）是不是奶粉有问题？为什么婴幼儿肾结石肾衰会爆发出现？（7月24日20:30:00）简直令人心惊肉跳 又有两例和奶粉有关的幼儿肾结石情况似乎越来越糟糕。（7月25日凌晨2:53）我希望大家为了孩子的健康，暂时不要给孩子吃 SL 奶粉了。（China Network Television, 2010, November 18)

²⁸ CNTV, or China Network Television, is the web-based TV broadcaster China Central Television (CCTV). CCTV is one of the most important official mass media in China with more than 1 billion viewers throughout the world.

He decided at the same time to warn the public in his own way, using his Blogger account— (Posting at 13:59 on July 24, 2008) Could it be the infant formula? How could the outbreak of kidney stones and kidney failure happen among young babies? (Posting at 20:30:00 on July 24) It is so frightening. Two more babies with kidney stones. The situation seems to be worsening. (Posting at 2: 53 on July 25) For the sake of your baby's health, I hope folks will not feed them with SL infant formula. (China Network Television, 2010, November 18)

His postings attracted wide attention, including doctors being frustrated by similar cases. Dr Feng was increasingly concerned about his patients and other consumers of the Sanlu infant formula products. To prevent inviting legal trouble from the dairy company, he used capital letters of *pinyin*²⁹ for the brand name Sanlu in his postings rather than its full name. None of CFSA agencies responded to his postings online. Ironically, Dr Feng was described as a national hero for his courage in defending the rule of law in China (China Network Television, 2010, November 18) though he could not change anything at the time. Food safety regulators and law enforcement agencies who were responsible to defend the rule of law did not respond properly at this stage.

Another thread of data also shows AQSIQ did not respond to the consumers' complaints on this issue. Nor did it respond to reports from the management of the Sanlu group. At a special news conference held by the State Council on September 13, 2008, a reporter from Hong Kong raised the topic to a deputy head of AQSIQ:

²⁹ The official Romanized system for Mandarin in China.

质检总局的网站上三月份已经有留言反映三鹿奶粉的情况，而且三鹿集团董事长田文华在 12 号也向一家媒体表示过，他是在 7 月初发现这个问题之后到农村调查的，而且调查以后，他也向上级主管部门汇报了。(State Council information Office, 2008, September 13a)

There were complaints in March on AQSIQ website about the Sanlu infant formula problem. Tian Wenhua, Sanlu chairperson, told news media she investigated the problem in rural areas in July and reported the results to government authorities. (State Council information Office, 2008, September 13a)

It suggested both AQSIQ and local CFSA have been reported by consumers and the Sanlu group CEO about the melamine contamination in infant formula products, but CFSA at both levels neglected the concerning food safety issue. The top AQSIQ official responded:

在质检总局的网站上看到了有关消费者的投诉...今年 6 月份确实有一个食用了三鹿奶粉的消费者投诉...我们负责在网站上答复消费者提问的，及时给了回复，希望他详细提供相关的信息，以便我们进一步详查。遗憾的是，后来我们再没有得到较为详细的信息，也没有再得到回复。(State Council information Office, 2008, September 13a)

AQSIQ noticed complaints from consumers on the official website...there were indeed complaints from a consumer of the Sanlu dairy products in June this year (2008) ...our staff replied in a timely manner, asking for details before we could conduct further investigation. Unfortunately, we were not provided with detailed information and received no more reply. (State Council information Office, 2008, September 13a)

The senior CFSA official confirmed the agency had received multiple complaints on its website on the Sanlu infant formula product problems at least in June 2008 but did not explain why the regulator had not reacted to reports from the CEO of Sanlu. The public found AQSIQ's online messages responding to complaints were removed from its website.

In fact, it was not the first time that AQSIQ turned a blind eye to consumers' complaints on dairy product issues. Years earlier, a prominent whistle-blower named Jiang Weisuo, an entrepreneur in the dairy industry, reported to AQSIQ and other dairy food safety government agencies for several times, including face to face reports to the local dairy food safety officials about the spread of chemical adulteration in the industry. A news article published by *People's Daily* reported:

Jiang, originally a farmer from Xianyang, Shaanxi Province, published an investigative report in 2006 on the status quo of western China's dairy industry, revealing for the first time the counterfeit issues in this business and how dairy farmers were exploited by large corporations. (People's Daily, 2012, November 23)

Jiang found exploitation of dairy farmers was the root of evil leading to repeated food safety problems in the Chinese dairy industry. He tried to make a difference and protect the dairy industry by revealing the problem. His reports were wilfully ignored by the local food safety authorities. Instead, he received death threats from outlaws in the industry. His investigative report attracted attention from a Chinese top leader. News media reported Premier Wen Jiabao, in response to Jiang's report, later sent working groups to investigate the situation in the dairy industry. However, there were no follow-up reports on the investigation and decisions from the top leadership. Despite his consistent efforts, Jiang, a sole hero, could not make the Chinese public aware of the shady practices in the industry before his tragic death in 2012.

AQSIQ ignored all the alarms in the dairy industry, raising questions about why it had remained irresponsive throughout the years. At a special news conference on September 13, 2008, AQSIQ senior official did not tell the Chinese public that Sanlu's products were exempted from inspection. According to a press release of AQSIQ (2008, September 17), the regulator implemented Inspection-exemption policy in the food industry since 2000. A news article by *China Daily* reported Chinese companies with "a reputation of quality products, big market shares and strict safety controls" (*China Daily*, 2008, September 19) did not have to undergo certain inspections after being approved by AQSIQ.

Those involved Chinese dairy giants, including Sanlu, Mengniu, Yili, and Bright, were listed as "quality product" manufacturers and their products were exempted from inspection. The following data contents suggest AQSIQ revoked the inspection-exemption policy for food manufacturers six days after the outbreak of the Sanlu case. The policy failure underscored AQSIQ's malfeasance and dereliction of duty. It was the food safety regulator's personnel who neglected all the signs of an upcoming food safety crisis and led to this catastrophic incident. The Chinese central government therefore decided to hold the regulator accountable:

考虑到食品的特殊性和导致食品安全事故因素的复杂性...停止实行食品类生产企业国家免检。

considering the special nature of food products and complexity of causes leading to a food safety incident...to abolish inspection-exemption policy to food manufacturers. (AQSIQ, 2008, September 17)

但从整个事件看, 国家质检总局负有□产监管缺失的责任. 为此, 李长江以□度负责的态度, 向党中央、国务院提出引咎辞职。

From the whole incident, AQSIQ should be held to account for its absence of inspection duty. Li Changjiang (head of AQSIQ), with a highly responsible attitude, has decided to take the blame and resign. (AQSIQ, 2019, October 22)

The forced resignation of Li Changjiang was a milestone of the crisis. It was interpreted by the Chinese news media as the central government's resolve to wage a war against food safety scandals and hold the responsible accountable.

According to the hierarchical design of the food safety regime in China, a local government was the first responder to food safety issues in its jurisdiction. Before Jian Guangzhou's news article, two news articles on the issue were published in the local newspaper *the Lanzhou Morning Post*. The one on September 9 entitled *14 babies suffering from the same "kidney stones"* indicated all patients consumed the same brand of infant formula products, but it did not mention the brand name (Shen, 2008, September 9). The follow-up article on the next day reported that seven parents urged the local MOH officials to investigate the cause of their children's kidney stones. The following data suggests the local AQSIQ deputy head told news media that the regulator took measures in response to the issue raised by the news reports.

省质监局从新闻媒体获知“三鹿奶粉事件”后...展开调查和监督检查, 第一时间向省政府和国家质检总局做了报告, 并向河北省质监局和省内兄弟部门发出了协查函。(State Council Information Office, 2008, September 22)

Upon news reports on the Sanlu case from the media, AQSIQ Gansu provincial office started an investigation immediately and reported the issue to the provincial government and AQSIQ national office. We also sent a letter to the Hebei AQSIQ, requesting them for assistance and coordination (State Council Information Office, 2008, September 22).

However, the local AQSIQ officials, as the first crisis responder, did not reveal why they did not release the news to the public. Sanlu made a dramatic claim in front of news media that the dairy company got testing results from the Gansu provincial AQSIQ office, reporting the products had met food safety standards (Guangzhou, 2008, September 11). The local regulator denied Sanlu's claim and told the news media the agency had never been contacted by Sanlu to test its products (Xinhua News Agency, 2008, September 12).

Sanlu was headquartered in Shijiazhuang city, the capital of Hebei province. There was reportedly a large number of victims within the jurisdiction of Shijiazhuang city (Xinhua News Agency, 2008, September 18; Zhu & Cui, 2008, December 30). The Shijiazhuang Municipal Council, a first responder under the food safety regulatory framework, was therefore obliged to investigate the cause of the kidney stones and complaints of consumers of Sanlu's infant formula products. Multiple data sources in this study suggest Sanlu first reported the melamine contamination issue to the Shijiazhuang municipal government on August 2, 2008, five months after it had identified the presence of melamine in its products (State Council of China, 2008, September 22):

'I would never hide any such news ...' she submitted two written reports on the contamination to the local government on August 2 and 29 and claimed to have discussed the matter with the local officials several times during that month. (China Daily, 2009, January 1a)

Leading government officials in the Shijiazhuang city...knew about the toxic milk in early August but said nothing to higher authorities...delayed reporting the contamination to authorities of provincial and state levels until September 9. (China Daily, 2008, September 22c)

河北省人民政府9月8日接到石家庄市政府的报告，这是事实。

The Hebei Provincial government had not received any report (of the issue) from the Shijiazhuang Municipal Council until September 8. It was fact. (State Council Information Office, 2008, September 13b)

The news report and government news release above indicate the Shijiazhuang Municipal Council did not respond to the food safety incident appropriately. Instead, the local food safety officials led by a deputy mayor reportedly held a meeting with Sanlu board, during which the council officials reportedly rejected the board's decision to publicly recall the tainted products (China Daily, 2008, September 22):

8月2日，...王玉良代表三鹿集团向市政府请示提出实行产品召回，但王的提议遭到与会政府官员的明确反对。他们还提出，要以人盯人的方法，安抚家属，‘拿钱堵嘴’。

On August 2...Wang Yuliang on behalf of Sanlu requested the municipal government to recall the impacted products but was rejected by the senior officials at the meeting. They advised instead to appease the families of the victims using man-to-man approach and ‘gag their mouths with money.’ (China Youth Daily³⁰, 2009, January 7)

³⁰ China Youth Daily is the official newspaper run by Communist Youth League of China. The widely circulated paper is well-known for revealing sensitive news information to the public.

The government later said the dairy company at the centre of the crisis knew as early as 2007 that its products were contaminated and that the company and local officials covered it up ahead of the Beijing Olympics. (China Daily, 2009, March 24)

The senior officials' cover-up was revealed in news articles (Feng et al., 2012; Ye & Pang, 2011). However, the cover-up was not mentioned by the government investigation. The Hebei provincial government only blamed the Shijiazhuang officials for delaying reporting the incident and failing to ultimately handle the situation.

“The Shijiazhuang government did not inform the public about this major food safety incident on time,” Yang (vice governor of Hebei Province) told reporters in Beijing, “they should bear a major part of the responsibility for the scandal”. (China Daily, 2008, September 18)

The Central government sacked the party chief of Shijiazhuang Municipal Government based on the same accountability attributed to the Hebei provincial government (State Council of China, 2008, September 22).

In the Sanlu case, the systemic failure by the Chinese food safety authorities blocked all opportunities to prevent the biggest food safety incident from happening. Both AQSIQ and the Shijiazhuang Municipal Council received multiple complaints and reports about the infant formula contamination problem several months before the outbreak of the scandal. They both had the opportunity to act and prevent the tainted infant formula products from entering the market. Unfortunately, they all turned a blind eye to the signs of an upcoming major crisis. The head-in-the-sand approach, if not worse, together with AQSIQ inspection-exemption policy, bred an

unprecedented catastrophe that sickened more than 300,000 babies. The Chinese dairy industry was left in ruin for years.

5.2.2 Industry-scale cleaning up at the crisis phase

According to crisis management theories, an organisation's main task at the crisis event stage is to contain damage to a shorter period and prevent it from spreading to other areas of its business (Coombs & Holladay, 2010; Jaques, 2007; Pearson & Mitroff, 1993). When coding the data corpus, five themes related to the Chinese government and the food safety authorities' approaches to handling the crisis emerged, including triggering the Level-I food safety emergency plan, recalling and destroying melamine-contaminated dairy products, providing medical treatment and compensation to victims, holding criminals and responsible officials to account, and providing support to affected milk farmers. Rather than focusing only on handling the Sanlu problem, the Chinese government decided to wage a war against unethical practices in the whole dairy industry.

When the Sanlu case hit headlines at home and abroad, the Chinese government and food safety authorities were swift and collaborative in their response. The central government immediately sent a joint investigation team to the epicentre of the scandal, the headquarters of Sanlu in Shijiazhuang city. The Hebei provincial government and the Shijiazhuang Municipal Council, first responders to food safety issues in their jurisdictions, were assigned supporting roles in handling the scandal (China Daily, 2008, September 13; State Council of China, 2008, September 22). The decision was interpreted as loss of trust by the central government. When Sanlu denied in front of news media any problems with its products and its connection with kidney stones on September 11, 2008, MOH refuted the company's claims on the same day at a press conference by announcing it as being suspected of having caused the scandal (State Council of China, 2008, September 11).

Medical teams were sent to hospitals of the impacted areas to screen and treat sickened children (China Daily, 2008, September 12a; MOH, 2008, September 12). At the same time, MOH spokesperson confirmed to the news media the ministry had sent investigators to the headquarters of Sanlu:

A joint investigation team has arrived at the production site of the infant formula to find out the cause of the contamination with assistance of the local government ... Under the leadership of MOH, the joint investigation team was made up of staff and experts from MOA, AQSIQ, SAIC, CFDA, and police departments.

The Sanlu group was in the epicentre of the incident. Shijiazhuang Municipal Council, the primary food safety responder of the crisis, had been replaced by the food safety agencies from the central government due to the implementation of the Level-I crisis response program, which at the same time could prevent potential regional protectionism from undermining efforts to hold the biggest taxpayer of the local government accountable.

In addition to crisis containment decisions, the Chinese top leaders decided it was time for CFSA to learn the lesson and overhaul the whole dairy industry. Government news release below indicated the Chinese central government specified tasks in all fronts to address immediate problems and get ready to solve the industrial chaos in the long run.

国务院总理温家宝主持召开国务院常务会议，决定在全国全面检查奶制品，整顿奶制品行业。

Premier Wen Jiabao presided over an executive meeting of the State Council, which decided to have overall scrutiny of all dairy products in the market and overhaul the Chinese dairy industry. (State Council Information Office, 2008, September 13b)

一，全力救治患者，落实免费治疗政策…二， 不合格的产品要全部下架、封存和销毁…三，对奶制品进行全面检查，整顿奶制品行业…四， …对每一批次出厂产品进行严格检验… 五，尽快修订监管法规，严格法律追究制度。六，对奶农实施扶持政策，支持产品质量好的企业增加生产…七，彻底查明事故原因，及时公布调查结果。

First, provide free medical treatment to sickened victims... Second, remove all affected products from shelves and destroy the contaminated dairy products. Third, inspect all dairy products in the market and clean up the whole dairy industry ... Fourth, tighten regulations and inspections of all dairy firms and test all batches of dairy products. Fifth, speed up reviewing and revising of food safety-related laws/regulations and reinforce law enforcement. Sixth, provide financial support to dairy farmers and ethical dairy firms. Seventh, thoroughly investigate the incident and release the report in a timely manner. (State Council of China, 2008, September 17)

The dairy giant was ordered to halt its production activities immediately. Under enormous pressure from the public and the central government, Sanlu finally owned its responsibility and apologised to the public (State Council of China, 2008, September 18b). The dairy giant announced at a press conference it would recall 700 tons of its infant formula products from the market (China Daily, 2008, September 12b).

AQSIQ tried to prove it had taken active and even proactive approaches in response to the infant formula scandal. At a press conference held by the State Council, a senior official from the provincial

AQSIQ told the media the local regulator responded quickly to the incident. The regulator reportedly tested 491 batches of infant formula products in the market made by 109 domestic manufacturers (China Daily, 2008, September 19a). A government news release and a new report below suggest AQSIQ tried to implicate that it responded to the scandal in a timely manner before and after its outbreak.

9月9日，该局从有关新闻报道获悉，甘肃省发现有婴幼儿疑因食用三鹿奶粉引发肾结石等疾病…当日即组织开展调查，并对产品进行抽样检验。

The AQSIQ of Gansu province office learned from the news media on September 9 that some kidney stones among babies were suspected of having been caused by the Sanlu infant formula products... The regulators started an investigation on the same day by sampling and testing the products from the company. (State Council of China, 2008, September 11)

The Chinese inspectors have found the chemical melamine in 69 batches of baby milk powder produced by 22 companies nationwide, the country's quality watchdog said. (Xinhua News Agency, 2008, September 17)

The scandal escalated from Sanlu to almost the whole dairy industry covering all kinds of domestic dairy products (China Daily, 2008, September 12a; State Council of China, 2008, September 17). The 22 culprit companies named by the ASQSIQ included all leading dairy giants in China (China Daily, 2008, September 17c; The AQSIQ, 2008, September 30; Zhu & Cui, 2008, December 30). Household brands like Yili, Mengniu, and Bright became names of infamy overnight.

Under the Level-I emergency plan, CFSA and other law enforcement agencies were able to rapidly to track down and recall tainted dairy products from the market (Xinhua News Agency, 2008, September 16). MOH released updated information about screening and treatment of victims through news conferences and other channels (China Daily, 2008, September 12a; State Council Information Office, 2008, September 13b). MOA sent out teams to milk farms and milk collecting stations to inspect quality of raw milk as well as cow feeds. More than 4,000 milk collecting stations were forced to cease operation during the industry-wide crackdown (China Daily, 2009, June 3). SAIC was responsible for tracking down impacted products in dairy plants and the market (Xinhua News Agency, 2008, September 16). Thousands of tons of contaminated milk products were recalled and seized by SAIC (China Daily, 2008, September 23a). After revoking the inspection-exemption policy in the food industry, AQSIQ sent out more than 1,000 inspection teams throughout the country to test and inspect all batches of dairy products (The AQSIQ, 2008, September 17, 2008, September 19). Test results suggested the problematic Chinese dairy products seemed to have turned overnight into contamination-free products (China Daily, 2008, November 11).

Free medical treatment for victims was prioritised by the Chinese leadership during the crisis. The Chinese government promised to get all medical bills of the 300,000 babies covered (MOH, 2009, January 24). According to the MOH (2009, January 24), a full scale of screening of the affected babies and early treatment of the 53,000 hospitalised babies saved at least 891 seriously sickened babies. The 22 involved dairy companies set up a special fund of 1.1 billion *yuan* to cover the medical bills of the victims (China Daily, 2008, December 31b). The fund reportedly would be managed by

China Life³¹ (China Daily, 2008, December 31b). A total of 200 million *yuan* of the fund was to cover medical bills until the sickened babies turned 18 years old, and the remaining 910 million *yuan* was to compensate the victims' families (China Daily, 2008, December 31b). On behalf of the 22 dairy companies, CDIA designed a one-off deal compensation plan. The plan was tailored to three levels of harm caused by the melamine-tainted products, 200,000 *yuan* for each family of the six dead babies, 30,000 *yuan* for each of the 5,300 hospitalised, and 2,000 *yuan* for each of the remaining victims with minor symptoms (China Daily, 2008, December 31b, 2012, May 17). Acceptance of the compensation plan was subject to the condition that parents had to drop legal procedures against the dairy companies. Since the compensation plan were bound with medical coverage, more than 90% of the victim families accepted the plan (MOH, 2009, January 24), partly for fear of loss of medical coverage. CDIA reported 271,869 families of victims accepted the one-off compensation plan by the end of 2010, the rest allegedly did not show up due to wrong contact details (China Daily, 2011, June 8). However, there were news reports on protesting parents and their lawyers who refused to accept the compensation plan.

While the Chinese dairy industry experienced unprecedented financial and consumer confidence losses, milk farmers took the worst hit. They were, and still are, the most vulnerable group in the supply chain of the Chinese dairy industry (China Daily, 2008, September 21). According to statistics released by CDIA during the 2008 industry-wide crisis, there were 14.3 million milk cows raised by 2 million milk farmers (China Daily, 2008, November 20). Chinese milk farmers were mostly family-run businesses. Without being in farmer cooperatives, unions, or any other forms of such

³¹ China Life, or 中国人寿保险公司, was founded in 1949. It is one of the largest insurance companies in China and has been listed in the Fortune 500 multiple times.

organisations, they were extremely vulnerable to exploitation by dairy firms, as reflected in a news article during the scandal:

The farmers have become the largest casualty in the scandal, second only to the children...In the whole production-marketing chain from farming to consumption, farmers always bear the brunt whenever a disaster, whether natural or artificial, occurs during the procedure. They are the most vulnerable to risks but the least powerful when it comes to profit-sharing. (China Daily, 2008, October 15a)

Under the circumstances, when demand for domestic dairy products nose-dived in the wake of the Sanlu scandal, a surge of imported dairy products amounted to 90% supply of the Chinese infant formula market (China Daily, 2011, March 10). Milk demand from the dairy firms plummeted drastically. Milk farmers throughout the country could not bear the heavy losses from the devastating situation (China Daily, 2009, April 24). In desperation, Chinese milk farmers began to dump milk and slaughter milk cows (Jia et al., 2012; Yang et al., 2009). In response, some local governments in Hebei province helped the impacted farmers obtain supply contracts from other dairy firms. Some of the former Sanlu milk suppliers reached new supply agreements with local governments. The Hebei provincial government encouraged milk farmers to raise their cows in organised farms³² (China Daily, 2008, September 21). The State Council set aside 300 million *yuan* to subsidise milk farmers (China Daily, 2008, October 15b). However, the bailout was far from enough to support the milk farmers.

³² Or boarding milk farms run by big dairy companies. Milk farmers raise cows in the dairy companies' big farms and sell milk to them. But they need to facility fees.

Holding those responsible to account was a prominent theme in the data corpus. At the first press conference hosted by the State Council, MOH minister Gao told the news media:

三聚氰胺是不法分子为增加原料奶或奶粉的蛋白含量而人为加入的...对违法犯罪分子要依法严惩，对失职的工作人员要严肃追究责任。

(The investigation found that) melamine was deliberately added into raw milk or milk powder products to increase protein content (readings). (The Chinese government is determined to) bring severe punishments to related criminals and hold responsible officials to account. (State Council Information Office, 2008, September 13b)

According to Coombs (2007a), preventable crises, or human-error inflicted crises, lead to stronger crisis responsibility in the accountability process. The arrest of Sanlu's top executives was a landmark event. It happened two days after the outbreak of the crisis. A total of 60 suspects were arrested (China Daily, 2009, January 11) during the scandal and 21 of them were later convicted. Tian Wenhua was sentenced to life in prison; three other top executives of Sanlu were sentenced to various jail terms (China Daily, 2009, January 23). On December 24, 2008, the Shijiazhuang Intermediate Court announced Sanlu was in the process of bankruptcy liquidation (China Daily, 2009, February 12; China Youth Daily, 2009, January 7). Two convicts were sentenced to death for manufacturing 776 tons of "protein powder" and using 434 kg of melamine-laced powder to adulterate 900 tons of watered-down milk (China Daily, 2009, January 23).

The public was outraged at the food safety agencies' dereliction of duty in the early stage of the crisis and urged to hold food safety authorities accountable. The then Premier Wen Jiabao apologised

to victim families and the Chinese public on September 22 (China Daily, 2008, September 24). On the same day, the central government made decisions on punishment of the responsible officials:

国家质量监督检验检疫总局监管缺失，对此，局长李长江同志负有领导责任，同意接受李长江同志引咎辞去国家质量监督检验检疫总局局长职务的请求。

Li Changjiang, the head of AQSIQ, should take the responsibility for the food safety regulator's absence in its duty. His resignation from his job has been approved. (State Council of China, 2008, September 22)

对事件未及时上报、处置不力负有直接责任，经党中央、国务院批准，免去吴显国同志河北省省委常委、石家庄市委书记职务

Wu Xianguo (the Shijiazhuang city party chief) was responsible for failing to report the incident to upper-level authorities and for failing to effectively handle the incident. The CPC central committee and State Council have decided to remove him from all his posts in the Shijiazhuang Municipal Council. (State Council of China, 2008, September 22)

The sack of top officials including Li Changjiang, the head of AQSIQ, and the party chief of the Shijiazhuang city was a monumental moment during the crisis. On top of the two most senior officials, the Hebei Provincial Government fired almost all top public officials of the Shijiazhuang Municipal Council, ranging from the mayor, and deputy mayors, to heads of the local food safety agencies (China Daily, 2008, September 17a, 2008, September 24; State Council of China, 2008, September 22). By the end of the scandal, 191 public officials from the food safety agencies across the country were punished for dereliction of duty (China Daily, 2011, January 14a). Such accountability action

could obviously help release public pressure induced by the scandal and set example for other officials on the central government's resolve to hold the responsible accountable. It also paved the way for changes in CFSA.

5.3. Identified loopholes in the dairy food safety regulatory system

To establish evidence of crisis-induced learning in CFSA, the first step is to identify loopholes and underlying problems in the organisation that led to the outbreak of the Sanlu incident. This process normally happens in the form of systematic investigations or government inquiries (Coombs, 2014; Dreyer & Renn, 2009; Fearn-Banks, 2016). For example, in the wake of the Fonterra case, the NZ Government first initiated a government inquiry to review the rigour of the dairy food safety system and identify loopholes in the regime. It was followed by examination of causes of the incident and recommendations to MPI and the industry to address their problems through making changes in their food safety culture, practice, and legislation and regulations. Public accountability in food safety governance would include competent authorities' obligations to explain and justify their responses to a particular food safety incident (Coombs, 2007b; Devaney, 2016). Chinese government and its food safety agencies responded to the Sanlu case in the same manner. Though the official investigation report is unavailable to the public, the crisis management process can be traced from news reports, official press releases, and other government documents posted on the websites.

When punishment of criminals was implemented and accountability of responsible officials was allocated, compensation to the victim families was left as the most complicated issue. On January 23, 2009, MOH posted on its official website a news article from the Xinhua News Agency, reporting the compensation work was drawing to its end after most parents accepted the compensation (MOH,

2009, January 24). It indicated the focus of CFSA's efforts had turned from containing the crisis to resilience and learning from the crisis.

In the wake of the Sanlu case, the Chinese government made continuous efforts to minimise the negative effects of the scandal and restore the reputation of Made-in-China products. In addition, the central government and Chinese legislature urged CFSA agencies and food safety crisis responders to learn from the costly lesson to prevent such a crisis from repeating itself (NPC, 2008, November 10; State Council information Office, 2008, September 13a; Xinhua News Agency, 2009, March 1b). To do so, CFSA and the NPC undertook a comprehensive review of the food safety regulatory system, including the dairy food safety standards, the testing regime, the organisational design of CFSA, the food safety laws and enforcement, profit distribution in the supply chain, media and public scrutiny of food safety issues (Guo et al., 2016; Lerbinger, 2012; Li, 2008; National People's Congress, 2007, December 21; Tong, 2011; Wang et al., 2012; Zhou, 2017). The comprehensive review identified multiple loopholes in the Chinese dairy food safety regulatory system, including segmented organisational design of CFDA, overlapping food safety standards, backward food safety legislation, varied enforcement, chaotic food product recall system, and lack of protection for consumer rights.

5.3.1. Problematic bureaucratic design of the food safety regulatory system

The Chinese food safety regulatory system was set up as a segmented framework consisting of four government ministries. A clear definition and division of power and responsibilities among the government agencies should have been the first step of such an organisational design (Zhou, 2017). However, it was not the case for the Chinese food safety agencies. The segmented bureaucratic design was blamed for lack of compliance due to overlapping or disjointed responsibilities between government agencies (China Daily, 2008, September 23b). The segmented design was denounced by

both government officials and the public as root cause of CFSA's inefficiency and dereliction of duty. Chinese lawmakers, as reported in the news article below, attributed problems existing in product quality control and collaboration between food safety agencies to the segmented design of the system:

“三鹿事件” 可谓是这一监管体制弊端的集中暴露：奶源收购运输环节无人监管；在消费者投诉产品质量问题后，相关部门之间没有信息互通。（Xinhua News Agency, 2009, March 1b)

The “Sanlu Incident” intensively exposed the systemic defects in the food safety regulatory system: absence of surveillance in the process of milk collection, lack of sharing information between agencies when receiving complaints about the product quality. (Xinhua News Agency, 2009, March 1b)

These were only two of many problems caused by segmentation of responsibilities among the food safety agencies. A lawmaker who once was a deputy governor in charge of the agricultural sector in Guangdong province commented on the organisational design:

多头管理，有利就抢着管，无利就让着管，这种管理体系，不出问题是不正常的，出问题才是正常，这是体制决定的。（NPC, 2008, November 10)

The segmented (food safety) governance design incentivises food safety agencies to fight for power that can bring them benefits and shirk responsibilities to each other when no benefits can be generated. It is rather abnormal if no problems occur under such a system. I would be surprised if it played out otherwise. It has been predetermined by the (segmented supervisory) system. (NPC, 2008, November 10)

The lawmaker brought up conflicts of interest underpinning the segmented design of CFSA. Regulatory power brings vested interest to food safety agencies. Food safety enforcement in most cases brought about infringement fees, and such fines or other coercive charges turned into a form of departmental benefit or income of the food safety agencies. The conflict of interest provoked arbitrary regulatory decisions or compromised enforcement being traded off by the hidden briberies. The benefit-motivated food safety governance system was also criticised for burdening food manufacturers with too much cost (NPC, 2008, November 10).

Under the segmented supervisory system, it remained an unanswered question, according to the news report below, as to which agency was responsible for what section of the food safety supervisory system. :

Even after the deadly Sanlu scandal, people still have difficulty finding out exactly how many government offices are responsible for food safety... without placing liabilities on someone, there is no way to regulate the regulators. (China Daily, 2010, March 12)

The blurred boundaries between the ministries turned accountability into a game of pointing fingers (China Daily, 2008, September 23b). For example, after the head of AQSIQ was forced to resign, one of his deputies reportedly complained to news media that the agency should not take sole responsibility for the Sanlu case (China Daily, 2009, March 9a). He said, “his institution alone cannot guarantee what we eat and drink is safe because it is only one of many agencies in charge” (China Daily, 2010, March 12). The complaint made the senior AQSIQ official an object of ridicule because the food safety watchdog failed to pick up the open secret of “protein powder” existing in the dairy industry for years and ignored multiple complaints from consumers and doctors (China Daily, 2009, January 6). The AQSIQ’s inspection-exemption policy gave way to the melamine-contaminated

infant formula products and other contaminant-tainted food products. The regulator's inspection-exemption policy was criticised by lawmakers, being reported by news media, as dereliction of duty and money-driven:

实行免检制度是监管部门主动放弃监管职责，给食品安全埋下了隐患，‘三鹿牌婴幼儿奶粉事件’暴露了这一制度的弊端。

The implementation of the inspection-exemption policy means the food safety watchdog abandoned its quality control duty, leaving food safety hazards to the public. The systematic shortfall was exposed in the Sanlu case. (Xinhua News Agency, 2009, February 28b)

Consumers also discovered that quality inspectors and supervisory agencies were keener to make money from issuing quality exemption certificates to “famous brands” and conducting symbolic examinations of samples, than in doing spot checks in the market. (China Daily, 2014, March 15)

The analysis in the news reports can also explain why AQSIQ turned a blind eye to complainants, whistle-blowers, and doctors who reported face-to-face to its officials and on its website about the melamine contamination problem over the years (State Council Information Office, 2008, September 13b).

The AQSIQ was not the only food safety agency who tried to escape accountability. When the investigation reached the conclusion that melamine was added into milk at collection stations, a deputy governor of Hebei province told Xinhua News Agency that no government agencies were assigned any role responsible for quality control in the milk collecting process (Xinhua News Agency, 2008, October 17). However, it was regarded as an act of shirking responsibility for MOA who was

responsible for quality control ranging from upstream livestock feeds to downstream raw milk transaction. The systemic failure was not limited to dairy. In reviewing the legislation of food safety regulatory system, some lawmakers reportedly quoted satirical remarks of the public on the segmented regulatory system:

“六七个部门管不住一头猪”

“More than half a dozen government departments were incapable of handling a pig”

“十几个部门管不了一桌菜”的怪现象，急需立法来规范”

“More than a dozen government departments cannot ensure the food safety of a table of dishes.”

Food safety legislation is dreadfully needed to regulate such a bizarre. (NPC, 2008, November 7)

In the process of pork production, as being cited above, veterinary medicine was regulated by both MOA and SAIC, feed by MOA, live pig sale and slaughter by SAIC, pork sale by MOH, AQSIQ, and SAIC. But meat contamination is still a big issue in China. In times of food safety crises, CFDA had difficulty coordinating actions across so many government departments (Xinhua News Agency, 2009, February 28b). For example, MOH instructed doctors during the Sanlu case that victims' parents were told no fees would be charged for medical examination and treatment, but some hospitals still charged parents fees (China Daily, 2009, January 3). There was conflicting information regarding who should be hospitalised. MOH ruled babies with kidney stones smaller than 4 millimetres in diameter would not be hospitalised (China Daily, 2008, September 17b). Some doctors had different opinions on the standard. A mother of a two-year old was frustrated by the confusing instructions from MOH and the doctors' suggestion. “My daughter's doctors were worried as the

stones might not be washed out and they told me to transfer her to the provincial hospital” (China Daily, 2008, September 17b). Government news releases suggested parents should not feed children with powdered milk products, but they did not clarify whether liquid milk was safe. When liquid milk products tested melamine-positive, AQSIQ quoted unnamed scientists and informed the public the contamination level would not pose a health threat to adults (China Daily, 2008, September 19c).

During the process of compensating victims, some parents reportedly said they had no knowledge of the fund for the victims:

Nobody has ever reached me to tell me about this fund. I learned about it through the media. “But it is reported that families must prove the illness was caused by the tainted formula, which would be really hard for us.” Lawyers representing victims said they hope the door will be open for civil lawsuits so parents can seek additional compensation. (China Daily, 2009, November 25)

CDIA explained the failed communication was caused by inaccurate contact details. They were still trying to contact the rest of the 23,651 affected families through multiple channels (MOH, 2009, January 24).

SAIC was responsible for scrutinising circulation of goods in the market, including tracking down affected products and taking them off shelves in times of product recall. The Law on Protection of Consumer Interests and Rights empowered SAIC to protect consumers’ rights when they were or would potentially be harmed by any commercial products. However, SAIC failed to stand up for the victims from the start to the end of the Sanlu melamine scandal. SAIC pledged not to leave a single bag of melamine-contaminated infant formula to the market (Xinhua News Agency, 2008, September 16). However, hundreds of tonnes of the recalled products were found being adulterated into dairy

products and re-emerging in the market one year later (China Daily, 2010, July 10). No explanation was made as to why and how the seized melamine-contaminated products found their way back to the market.

Chinese lawmakers identified three major shortfalls when reviewing the food safety regulatory system and two of them were caused by the segmented design of CFSA. Some members of the NPC standing committee, according news report below, urged law makers to address the segmented regulatory system:

Firstly, vaguely defined and overlapping responsibilities led to loopholes in the food safety regime. Secondly, conflicting food standards and inconsistent food safety information confused manufacturers and consumers. (Xinhua News Agency, 2009, March 1a)

Without a change to the current regulatory system, it would be difficult to prevent Sanlu incident from repeating itself and the food safety situation expects no better future. (Xinhua News Agency, 2009, February 28a)

Besides the lawmakers, the majority of the Chinese public and food safety researchers accused the segmentation as a major loophole in the regulatory system leading to overlaps and gaps in the system. It was established as a key lesson for CFSA to learn from the crisis.

The crisis response design authorising a local government as the first crisis responder in its jurisdiction proved to be problematic. During the Sanlu case, the Shijiazhuang Municipal Council's delay was perceived as attempt to protect Sanlu or even cover up its top taxpayer's scandal (Ye, 2009, January 1). When asked by the news media if the local government was a shareholder in Sanlu, the deputy governor of Hebei province plainly denied the accusation (State Council Information Office,

2008, September 13b). However, Sanlu had been reported previously by a national news media as a SOE (China Daily, 2008, December 26, 2013, December 14, 2013, October 22). In addition, the CEO of Sanlu was sacked from her position by the local government rather than by the board of the company (State Council of China, 2008, September 18a). Furthermore, in the process of bankruptcy liquidation, the dairy company's assets were handled by the Hebei State-owned Assets Supervision and Administration Commission (SASAC)³³ (China Daily, 2008, September 27). To support local enterprises, local governments were known for their efforts to set the stage for local SOEs' rapid growth and expansion (China Daily, 2011, September 6). In return, the enterprises contributed to local governments in terms of employment, taxation, and GDP growth. These were primary indicators of local senior officials' governance performance and an important means of promotion to higher positions. In a time of crisis, such as the Sanlu scandal, there were potential conflicts of interest for the local government to uphold regulatory rules and hold responsible local SOEs accountable. Therefore, regional protectionism was accused as part of the reason for the Shijiazhuang Municipal Council to have failed to respond to the scandal in an efficient and effective manner. In the wake of the Sanlu case, investigators and food safety researchers agreed that overhaul of the segmented design of CFSA was a must (China Daily, 2008, September 23b; Guo et al., 2016; Li, 2009; Xinhua News Agency, 2009, February 28b).

5.3.2 Chaotic food safety standards and backward food safety legislation

Food safety is an ever-changing landscape due to rapid development of agriculture aiming to feed the growing world population (Carvalho, 2006). The food quality and safety situation demand related

³³ A government agency taking charge of assets of state-owned companies and institutions.

changes in food safety standards, testing techniques and equipment, and food safety legislation (Beulens et al., 2005; Chen et al., 2019). The Chinese government and the public were plagued by frequent food safety incidents caused by adulteration and other contaminations. The 2004 Fuyang infant formula incident and the Sanlu case were two major incidents in the dairy industry. The industry-wide government probe in the wake of the Sanlu case found backward and segmented food safety standards was a big shortfall in the system.

During a court hearing, Sanlu's CEO Tian Wenhua stated the dairy company sent samples to multiple testing authorities at both national and provincial levels in July 2008, but none of them found melamine in the products (Ye, 2009, January 1). Results from the testing reports suggested the products in question were up to food safety standards. Chinese lawmakers and food safety experts finally attributed the testing failure to antiquated food safety standards (China Daily, 2008, December 20, 2008, September 19a; NPC, 2007, December 21). Taking pesticide residue controls for example; the FHL in China stipulated a standard scrutinising pesticide residue of 291 chemicals in food products, while the number for the internationally recognised Codex Alimentarius³⁴ was 2439 (Xinhua News Agency, 2009, March 1b). A food safety lawmaker remarked, as quoted in the news reports below, that the standard itself was substandard and obsolete.

我国食品安全标准“不标准”一直是我国食品安全监管的软肋...我国的标准太老太少。

The food safety standard in our country has been a food safety regulatory shortfall for its 'substandard' standard...the standard was too outdated and too few. (Xinhua News Agency, 2009,

³⁴ Or Codex, is a collection of internationally recognised standards, guidelines, and codes of practice for food safety in production and distribution. The Codex Alimentarius Commission is a under the watch of the Food and Agriculture Organisation and the World Health Organisation.

March 1b)

The existing rules on milk quality, implemented in the 1980s, are now outdated and fail to take into account the existing market conditions. (China Daily, 2008, September 19b)

The dairy food safety standard was a regime consisting of 31 testing criteria at the time, and only three of them were for infant formula products (Xinhua News Agency, 2008, September 18).

Making the situation even worse, the food safety agencies were allowed to stipulate their own regulatory standards and rules such as the food hygiene standard by MOH, the food product quality standard by AQSIQ, the agricultural food standard by MOA, and some special standards by CDIA (China Daily, 2012, February 9; The AQSIQ, 2009, March 20). This led to overlaps and contradictions in standards or regulations from different ministries (NPC, 2008, November 10). It was identified by food safety lawmakers as a big problem as well. Those standards varied further when they were applied as national or local-level standards. The divergent standards and regulations led to confusion among food product growers and manufacturers and varied enforcement by the food safety agencies (NPC, 2008, November 7). Food safety lawmakers cited food safety rules on dried daylily blossom³⁵, in the news reports below, as an example to demonstrate how chaotic the standards were:

另一方面，我国食品标准又太多太乱…各标准间重复交叉、层次不清。(Xinhua News Agency, 2009, March 1b)

³⁵ Dried daylily blossom is used as a cooking material in China.

On the other hand, there are chaotic and excessive number of food safety standards in our country...they are repetitive and overlapping without coherence and unity. (Xinhua News Agency, 2009, March 1b)

同样的“黄花菜”，根据不同的标准却有不同命运：根据卫生部门的标准，它不属于“干菜”，不得有二氧化硫残留；而根据质检、农业部门的规定，“黄花菜”又属于“干菜”，且明确了其二氧化硫残留标准。(Xinhua News Agency, 2009, February 28b)

Current overlapping food safety standards lead different to definitions of dried daylily blossoms: They are not categorised as a dried vegetable by MOH; no residue of sulphur dioxide is permitted. While AQSIQ and MOA list them as a dried vegetable; and there is a standard of sulphur dioxide residue for it. (Xinhua News Agency, 2009, February 28b)

Aligned with the organisational design, the dairy product legislation was segmented, consisting of the 1993 PQL, the 1995 FHL, the 2006 APQSL, and the Law on Protection of Consumer Interests and Rights (China Daily, 2009, March 3). In reviewing the food safety regulatory system, the 1995 FHL was criticised as too outdated to address new food safety issues in China (China Daily, 2009, July 1). It scrutinised too few contaminants, compared with Codex Alimentarius (Xinhua News Agency, 2009, March 1b). It could not detect conventional food additives, not to mention emerging food safety risks from genetic modified food products (China Daily, 2012, June 16). Similar problems existed in the 1993 PQL. For example, AQSIQ's standards and rules in approving “famous brand” and “inspection-exemption policy” failed to capture unethical practices in the food industry (China Daily, 2013, September 2). The criminal law was also recommended to be updated to impose stronger punishments or penalties on crimes related to food safety (China Daily, 2011, February 24). The 1994 Law on

Protection of Consumer Interests and Rights was found not to be able to regulate food products sold online. As a result, it was a consensus for lawmakers and the Chinese public, as indicated in the government document and news report below, to have a new food safety law.

In fact, representatives submitted more than 3,000 food safety legislation proposals during the 2003 NPC sessions. According to the news reports below, the Chinese legislature was urged to prioritised food safety law on its legislation agenda after the outbreak of the 2004 Fuyang infant formula scandal.

2005年的全国人代会期间，30名全国人大代表提出：借鉴发达国家的经验，制定一部符合我国国情的食品安全法。

During the 2005 NPC session, more than 30 representatives proposed to learn from the developed countries and pass a food safety law fitting the situation in China. (Xinhua News Agency, 2009, March 1a)

没有食品安全的核心法食品安全法,是我国食品安全法律制度的重大缺失。

It is a major shortfall in the food safety regulatory regime without the very core of the system, a food safety law. (Xinhua News Agency, 2009, March 1a)

In the wake of the 2004 Fuyang infant formula scandal, some lawmakers urged the NPC to pass a new food safety law incorporating practice of food safety regulatory system design, standards, and enforcement in developed countries. In 2006, the food safety law was listed on the legislative agenda. In the 2007 NPC session, 445 representatives pressed the legislative body to replace the 1995 FHL with Food Safety Law.

The Chinese public complained about existence of double-standard in food safety regulation and enforcement, one for the domestic market and another for overseas markets (Zhou, 2017). During the Sanlu case, no melamine contamination was found in the products exported to overseas and Hong Kong markets (China Daily, 2008, November 3, 2008, September 17d). When many labs in China could not detect any contaminants in Sanlu infant formula products, it was the Entry-Exit Inspection and Quarantine Bureau³⁶ of Hebei province that first found melamine contamination in 15 out of 16 samples. It indicates Chinese food safety regulators scrutinising importing and exporting products had the knowledge and capabilities to detect melamine contamination in food products. But such knowledge was not applied to products for the domestic market.

This double-standard in food safety regulation put Chinese dairy exporters into an awkward situation. On the one hand, the quality of raw milk was quite poor but could meet domestic standard. On the other hand, they had to meet the high standard of foreign markets under the Sanitary and Phytosanitary (SPS) Agreement for WTO member countries because CFSA was implementing the higher standard for foreign markets (China Daily, 2008, December 20; Zhang et al., 2018). CFSA seemed able to make it work.

the rules do not insist on testing for the presence of certain minerals, which would be mandatory in many other countries...A considerable proportion of the raw milk deemed as fit under Chinese rules would not qualify for further processing in some overseas countries. (China Daily, 2008, September 19b)

³⁶ It was a government department of AQSIQ between April 2001 and March 2018, taking charge of duties including quality control of importing and exporting products.

The dairy supply for the Beijing Olympic Games and Paralympic Games was untainted by melamine. (China Daily, 2008, September 17c)

The dairy industry analyst comments and AQSIQ news release of the test report above indicated the existence of double standards in the dairy products. Chinese lawmakers were frequently questioned by the public about the double food safety standards. A reporter once asked an AQSIQ official of the Guangdong province, “Why 99.8 percent of exported food products could pass safety tests, but the rate for domestically-consumed products was only 70 percent (China Daily, 2008, December 20)?” The senior official brutally replied that Chinese people could not afford higher safety standard food products. The China Daily news article interpreted the arrogance as an indication that food safety in China was not a technical problem.

The good news is that we know that China has the capability to produce high quality food, but the problem is that for a long time it has maintained double standards: one for export and another for home market. We have left the inferior quality for ourselves, and the better quality for the international market. (China Daily, 2008, December 20)

More precisely, the unsafe dairy products were sold and claimed victims in vulnerable poor rural areas. The double-standard system could ensure food safety to the rich and powerful and was regarded as an underlying factor leading to repeated food safety scandals in China.

5.3.3 Problematic product recall system and consumer right protection

Though melamine-tainted products were exported to overseas markets (China Daily, 2008, September 18), there were no reports or records of recalling products from those markets due to the double-standard quality control system. All product recalls happened in the mainland and Taiwan

markets. SAIC pledged not to leave a single bag of melamine-tainted dairy products in the market (Xinhua News Agency, 2008, September 16). Only one year later, the recalled products found their way back to the domestic market again.

During the crisis, the then Premier Wen Jiabao directed CFSA to recall all affected dairy products from shelves and destroy the contaminated dairy products, leaving no stone unturned (State Council of China, 2008, September 17). According to the announcement from MOH, 25,000 tons of contaminated milk powder were recalled from the market and destroyed by February 2010 (China Daily, 2010, July 14). However, no one knew how the seized products were handled due to lack of transparency.

In January 2010, thousands of tons of melamine-tainted dairy products re-emerged in the Chinese market (China Daily, 2010, July 10). There were speculations on the origin of the new cases coming from newly manufactured melamine products. But it was later “traced back, again, to that killing scandal” (China Daily, 2010, July 10). An official investigation later found the bulk of melamine-tainted products were shipped to north-eastern provinces (China Daily, 2010, February 6). A senior official in CDIA said:

It should have been thoroughly destroyed but instead it was secretly stored... Companies can just transfer products to other locations, adding that most dairy companies involved in 2008 issued recalls but none of them had ever said the tainted products had been destroyed. (China Daily, 2010, July 10)

No news reports or government documents provided accurate statistics on how much melamine-tainted product was recalled and destroyed in the wake of the Sanlu case. However, some 100,000

tons of seized product allegedly remained undestroyed (China Daily, 2010, February 6). A court investigation found a dairy company³⁷ concealed more than 30 tons of melamine-tainted products and resold it after the 2008 crackdown (China Daily, 2011, April 30). MOH minister told the media most of the recalled products were under the control of related government agencies (China Daily, 2010, March 9). The re-emerged melamine case in early 2010 led to 96 arrests and 17 convictions; and another 191 public officials were held accountable, including 26 who were fired from their positions (China Daily, 2011, January 14a). The stunt of shirking responsibility between government agencies was replayed in this scenario again because the responsibility for overseeing destruction of recalled products was not clearly defined between MOH, AQSIQ, and SAIC (China Daily, 2010, July 10). Official statements identified it as another loophole in the quality control system for dairy products.

Given the scale and lasting time of the melamine adulteration in the Chinese dairy industry, there were more contributing factors, such as the failed public crisis alert system (Xinhua News Agency, 2009, March 1a), celebrity influencers' unethical role in advertisements (Xinhua News Agency, 2009, February 28b), lack of random inspection mechanism for food products, weak food quality control capacity at the grass-root level agencies (Xinhua News Agency, 2009, March 5), lax regulation, and malfunction of oversight from the news media and other stakeholders (State Council of China, 2008, October 10). Even the legal system was not on the victims' side. Parents of victims were not allowed to attend the court hearing during the trials of the Sanlu case (China Daily, 2009, January 1b). A

³⁷ It was the Yukang Dairy Company based in Zhaoxian County, Shijiazhuang city.

newly appointed party chief of Shijiazhuang city attributed more responsibility to lax regulation of the local food safety officials (People's Daily, 2008, October 26a).

5.4 Evidence of crisis-induced organisational learning by CFSA

Given organisational crisis is a perceived event with continuous crisis effects, it is difficult to decide a precise time dividing a phase of a crisis (Coombs & Holladay, 2010). However, from a crisis management point of view, the phases of a crisis can be identified by different major tasks in the process of crisis management. A crisis breaks out when the incident or scandal hits headlines of news media, putting tangible and intangible assets of an organisation at stake. The impacted organisation is under the pressure to respond quickly to contain the damage (Coombs & Holladay, 2010; NyBlom, 2003). When the focus of managing the crisis is over and turned to handling its aftermath, a crisis is considered drawing to its end (N. Schiffino et al., 2017). The main tasks of an organisation in the post-crisis stage are to recover from damage and learn from the crisis event (Coombs, 2007b; Mitroff, 1994). Organisational learning is therefore the last phase of crisis management focusing on “adequate reflection and critical examination of the lessons” (Pearson & Mitroff, 1993, p. 54) to be learned from a crisis. Though the post-crisis stage is the critical period for organisations to learn from a crisis, organisational learning can theoretically occur at any phases of a crisis (Elliott et al., 2000; Jaques, 2007). The learning process can last from years to decades in the wake of a crisis (Stern & Sundelius, 2002).

An indispensable part of a government inquiry is to identify lessons from failure and prevent such happening from occurring again (Elliott, 2009). The dairy food safety scandal in China taught the Chinese government and CFSA a heavy lesson. Then Chinese Premier Wen Jiabao and his successors urged food safety agencies at all levels to learn from the crisis and ensure food safety

from farm to fork (China Daily, 2009, July 1, 2010, September 16, 2011, April 26; Xu, 2016, March 23). Prompted by the Sanlu case, the Chinese top leadership was determined to overhaul the food safety regulatory regime and clean up the whole dairy industry (State Council of China, 2008, September 17).

Food crisis-induced organisational learning in government agencies can lead to comprehensive changes in terms of bureaucratic design, leadership, organisational culture, legislation and regulation, risk assessment, crisis response plans, and bilateral agreement in food trade (Elliott, 2009). Data coding in this research found 45 references for changes of CFSA organisational structure, 291 references for updated food safety legislation, standardisation, and enforcement, and 346 references for changes in the dairy industry. Interpretation of the data contents has identified considerable evidence of crisis-induced organisational learning in CFSA and the food safety regulatory system. The first notable change in the system was the abolition of inspection exemption policy in the food industry. It followed by a series of changes including new food safety legislation/regulation, reorganisation of food safety agencies, update of the food safety standard, stricter food safety surveillance and scrutiny, and game-changing rules in the dairy industry. On top of these, the Chinese government also increased the number of food safety personnel, boosted the food safety budget, and renewed its food safety crisis response plans.

5.4.1 New food safety legislation and regulations

It was in 2006, in the wake of the 2004 Fuyang infant formula scandal, that the Food Safety Law was first listed on the Chinese legislative agenda (Xinhua News Agency, 2014, June 23). The draft was submitted to the NPC for the first reading in 2007 (China Daily, 2009, February 28). The Sanlu case triggered systemic review of the food safety system, including food safety regulations and laws.

It led to further revision of the Food Safety Law before its passage (NPC, 2008, November 10; State Council of China, 2009, November 8). The lawmakers reportedly invited public opinions on the new food safety law.

2008 年，食品安全法草案公布，广泛征求各方面意见和建议。后因三鹿奶粉引发的“三聚氰胺事件”爆发，又进行了多方面修改。

In 2008, the draft food safety law was released to the public for suggestions and comments. It underwent multiple revision based on lessons drawn from the melamine incident triggered by the ‘Sanlu milk powder scandal’. (Xinhua News Agency, 2014, June 23)

“The food safety regulatory system” was reportedly the most frequent term in the contents of more than tens of thousands of feedback messages from the public (Xinhua News Agency, 2009, March 1a). On February 28, the long-awaited food safety law was finally passed (China Daily, 2009, February 28, 2009, March 2). The Sanlu case sped up the passing of the food safety law (National People's Congress, 2009, March 1) and led to comprehensive improvements in the upcoming food safety law (China Daily, 2009, March 2; NPC, 2008, November 10).

The Food Safety Law reportedly embodied “systematic innovation” to address the loopholes in food safety regulation (Xinhua News Agency, 2009, February 28a). One of the most important missions of the first food safety law, according to a lawmaker, was to sort out collaboration between food safety agencies (Xinhua News Agency, 2009, February 28b). Some lawmakers suggested addressing the controversial segmented regulatory structural design in the new food safety law.

The state should set up a state-level food safety commission to oversee the entire food monitoring system, whose lack of efficiency has long been blamed for repeated scandals. (China Daily, 2009, February 28)

一些全国人大常委会委员提出，应对现有分段监管体制进行调整，...食品安全法在明确各部门职责的基础上，明确‘国务院设立食品安全委员会’，作为一个高层次的议事协调机构。

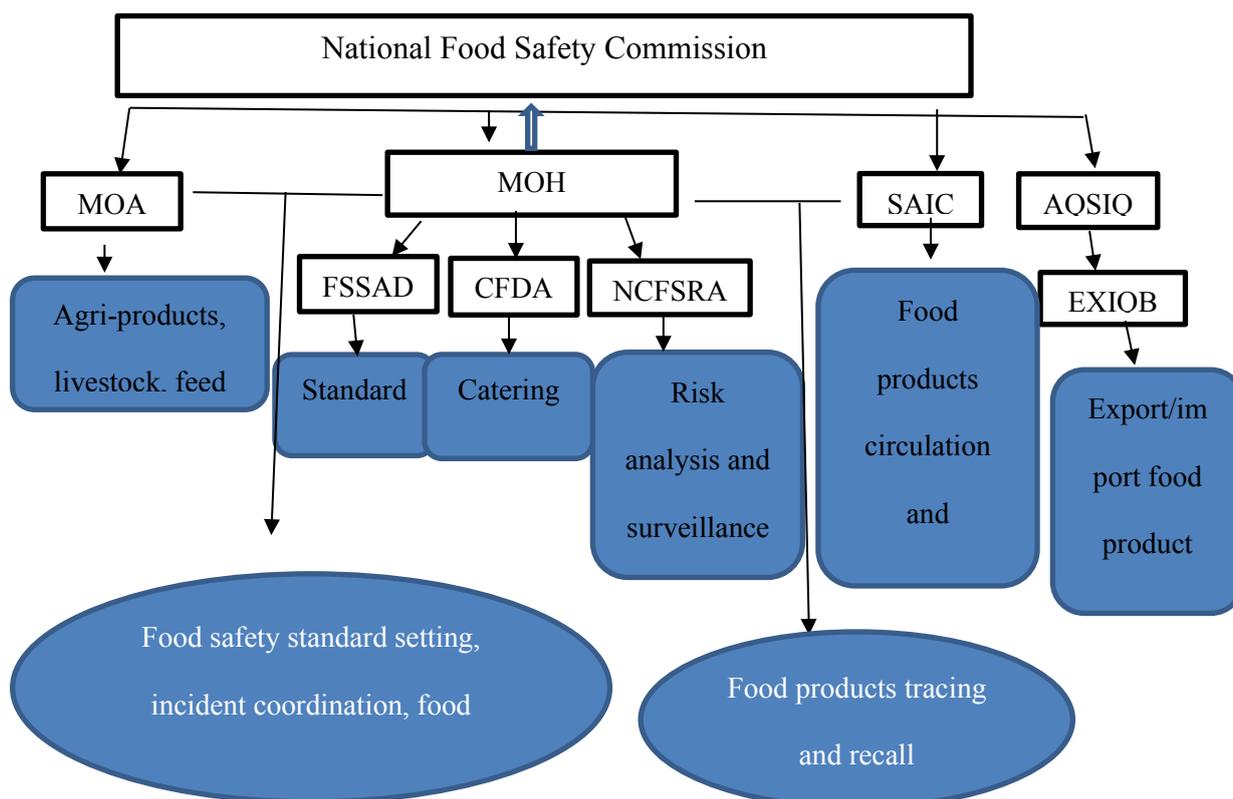
Some NPC standing committee members suggested adjusting the current segmented regulatory system...The food safety law has defined the responsibilities of related food safety agencies, on top of which it has stated to set up a Food Safety Commission under the State Council as a high-level advisory and coordinating institution. (Xinhua News Agency, 2009, March 1b)

It suggests the top Chinese lawmakers had no intention of totally removing the segmented structural design. Instead, they decided to solidify it with a supervisory commission. The new hierarchical design of the food safety regulatory system (see Figure 10) aimed to achieve better coordination and more clarified responsibilities of the food safety agencies. A year after the new food safety law passed, the Food Safety Commission was established and the then vice Premier, Li Keqiang, became the first food safety commissioner. Under the new organisational structure, the 2009 Food Safety Law empowered MOH with more power and responsibilities in food safety:

国务院卫生行政部门承担食品安全综合协调职责，负责食品安全风险评估、食品安全标准制定、食品安全信息公布、食品检验机构的资质认定条件和检验规范的制定，组织查处食品安全重大事故。(Xinhua News Agency, 2009, February 28b)

The health department of the State Council (MOH) is responsible for coordinating duties, assessing food safety risks, setting up food safety standards, releasing food safety information, qualifying food test institutions and investigating major food safety incidents. (Xinhua News Agency, 2009, February 28b)

Figure 103 New segmented food safety regulatory agencies



Source: Adapted from Jia and Jukes (2013), Chen et al. (2015), and Zhou (2017)

According to the 2009 Food Safety Law and directions of the State Council, other food safety agencies like AQSIQ, SAIC, and CFDA are respectively responsible for quality control in food manufacturing, distribution and consumption, and catering services. MOH set up two divisions, the Food Safety Standard and Assessment Division (FSSAD), in charge of food safety standard setting and verification of new food additives, and the National Centre of Food Safety Risk Assessment

(NCFSRA), responsible for food risk analysis and surveillance. The new food safety law also outlined the responsibilities of local governments:

此外，食品安全法还加强了地方政府的监管职责：县级以上地方人民政府统一负责、领导、组织、协调本行政区域的食品安全监督管理工作。(Xinhua News Agency, 2009, February 28b)

Besides, the Food Safety Law has also enhanced regulatory responsibility of local governments. All local governments above the county level are unitarily liable to lead, organise, and coordinate food safety regulatory work in their jurisdictions. (Xinhua News Agency, 2009, February 28b)

Local health departments above the county levels are responsible for food safety surveillance and monitoring and reporting risk analysis results to higher level government and food safety authorities (State Council of China, 2012, July 13). The content analysis found evidence of organisational learning in the new structural design. To address the coordination difficulty faced by CFSA revealed in the 2008 melamine infant formula scandal, the Chinese lawmakers capped the old hierarchical structure with the overarching National Food Safety Commission led by a vice premier as the top-level agency. The new law and the State Council food safety rules further defined and clarified responsibilities between different agencies to remove overlaps and shortfalls in the system (China Daily, 2009, February 28). Though the segmented food safety regulatory system was blamed as defective, it survived the crisis: the five government agencies remained in the system (Zhu, 2009, February 28). The local governments also remained responsible for food safety in their jurisdiction. Local branches of MOH were empowered to handle food safety crises with primary responsibility while other food safety agencies were obliged to report to its health counterpart immediately (China Daily, 2008, October 24). According to the 2009 Food Safety Law, imported and exported food

products were still under the quality control of the CEIQA of AQSIQ (The AQSIQ, 2009, March 20), meaning there remained double food safety standards for domestic and overseas markets.

Though the reform of the food safety regulatory system was praised as “overall innovation” (The AQSIQ, 2009, March 20), there were polarized comments on the new regulatory structural design. Establishment of the National Food Safety Commission was regarded as the greatest progress in improving coordination and eliminating loopholes between the agencies (China Daily, 2009, March 2). MOH minister, Chen Zhu, told the news media that coordination and oversight from the National Food Safety Commission made MOH’s food safety work smoother (China Daily, 2010, March 9). But a senior researcher from the National Institute of Nutrition and Food Safety had a different opinion:

We do not know what exactly the national food commission would do. Since the draft law has failed to fundamentally change the current food safety supervision mechanism, (the issues of overlapping responsibility and law-enforcement still remain. (China Daily, 2008, October 24; Zhu, 2009, February 28)

Though the establishment of SAMR integrated CFSA, CIQA, GAC and some departments from another three ministries and aimed to eliminate overlapping legislation and enforcement in these government agencies (Legal Daily, 2018, December 17), it did not uproot the segmented structure of CFDA. The dairy food safety regulatory system was under the watch of the updated segmented regulatory system made up of SAMR, NHFPC and MARA.

5.4.2 Updated food safety Standard

Another key change to the dairy industry which extended to the whole food production industry was the chaotic co-existing food safety standards. During the 2008 melamine scandal, the State Council started to implement *Regulation on the Supervision and Administration of the Quality and Safety of Dairy Products* and *Outlines of the Restructuring and Revitalisation Plan for the Dairy Industry*, which stated CFSA would review and revise food safety standards on dairy products within one year. In the wake of the scandal, the State Council urged CFSA to revise the national food safety standard for dairy products, aiming to address missing or overlapping standards from different government agencies and the dairy industry and re-establish a unified and robust food safety standard for the industry (State Council of China, 2009, March 9). According to the 2009 Food Safety Law, MOH was empowered as the only agency responsible for integrating those standards into a unified national food safety standard, allowing no other compulsory food safety standards (Xinhua News Agency, 2009, February 28b).

The Chinese State Council also required CFSA to revise food safety standards on pesticide residue, contaminants, pathogenic microorganisms, and more than 1,800 food additives through learning from international standards (MOH, 2010, April 22) (Xinhua News Agency, 2009, March 1b). When releasing information on the Sanlu melamine incident, an AQSIQ senior official told state media that CFSA was working on a new food safety standard to update the 31 testing items for dairy products (Xinhua News Agency, 2008, September 18). On April 22, 2010, MOH released the new food safety standard for dairy products:

新的乳品安全国家标准包括乳品产品标准 15 项、生产规范 2 项、检验方法标准 49 项...新的乳品安全国家标准基本解决了现行乳品标准的矛盾、重复、交叉和指标设置不科学等问题...形成了统一的乳品安全国家标准体系。(MOH, 2010, April 22)

The new national standard on dairy products safety includes 15 items on product quality, 2 on production protocols, and 49 on testing methods...The new national standard has fundamentally addressed problems caused by contradictory, overlapping, and ambiguous standards...A unified national standard for dairy product safety has been in shape. (MOH, 2010, April 22)

The new dairy product safety standard was a production of the collaboration and compromise between MOH and MOA (China Daily, 2009, March 3). The newly released national standard was slammed as “the lowest in the world ever” for allowing low protein content and loose regulation on bacteria (China Daily, 2012, June 22). An outspoken CDIA senior official Wang Dingmian revealed to the news media that the “worst in the world” national dairy product standard was set by a couple of dairy giants (China Daily, 2011, July 6). Regarding melamine, the culprit of the scandal, the Chinese public and some CDIA officials thought there should be zero tolerance of the chemical in any food products (China Daily, 2010, July 10). However, MOH’s started to apply a controversial standard with melamine content limits, legitimating its existence in all dairy products (Wu, 2008, October 9).

The update of the dairy food safety standards was not well received by the Chinese public. Due to domestic products’ declining market share and public dissatisfaction, Premier Li Keqiang, who was also the head of the NFSC, urged CFSA at a meeting in 2013 to update food safety standards for infant formula products:

Baby milk powder safety is not only an issue concerning people's livelihood, but also a major economic and social issue affecting the nation's future. It is urgent for the government to upgrade the safety standard of domestic baby milk powder. (China Daily, 2013, June 1)

The Chinese top leadership obviously was concerned about the dairy food safety situation and urged CFSA and to further improve standards for infant formula products. To restore consumer confidence in domestic dairy brands, the dairy industry was making its own efforts to improve industry good practice and product quality. Mengniu reportedly signed a cooperation agreement with NZ's food safety verifier, AsureQuality, to implement the quality control model of NZ and international dairy manufacturing good practice (NZ Herald, 2014, July 9).

5.4.3 Enhanced food safety scrutiny

The Chinese publics suggested the most efficient way to improve the food safety situation in China was to strengthen "government supervision" (Zhu, 2009, February 28). Chinese lawmakers emphasised that putting regulatory system and laws in place was only the first step. Enforcement of the food safety laws and regulations were much more important for the food manufacturers and food safety agencies. Reflecting on lax regulation leading to the outbreak of the 2008 melamine scandal, Chinese lawmakers reminded food safety regulators, to quote an ancient reformist Wang An'shi, "the thorny problem under the heaven is not about legislation but about strict enforcement of the laws" (Xinhua News Agency, 2009, March 1b). Chinese governments at all levels allegedly started to pay much more attention to food safety ever since the 2008 melamine scandal (China Daily, 2012, August 3).

In alignment with the new standard system, CFSA set up enforcement facilities at local levels. MOH established 31 food safety monitor centres at the provincial and 312 at the county level, MOA established 259 quality control monitoring centres in large and medium-sized cities (China Daily, 2010, September 3). According to rules stipulated by *Regulation on the Supervision and Administration of the Quality and Safety of Dairy Products*, AQSIQ was to sample and test dairy products regularly and release results to the public. Dairy product producers or manufacturers breaching the regulations would be put on a blacklist and cleared away from the dairy industry (State Council of China, 2008, October 10).

The first major change in enforcement triggered by the 2008 melamine scandal was the abolition of the exemption-free policy implemented by AQSIQ for dairy products, then to all food products (The AQSIQ, 2008, September 17). A decision was put into the 2009 Food Safety Law to prevent this exemption from being reactivated (The AQSIQ, 2009, March 20). The central government also launched nationwide campaigns for food safety scrutiny (China Daily, 2009, January 6). The AQSIQ paid close attention to the quality of dairy products and updated its testing list in the wake of the Sanlu case (China Daily, 2011, February 18). To strengthen food safety scrutiny on infant formula products, the government subjected the products to drug manufacturing processes:

The government will tighten supervision of baby milk powder quality in accordance with the same standards used for drugs by applying drug electronic supervision codes to monitor each step of the production process of the powder. The supervision system of online sales of baby milk powder and milk powder imports will be worked out to ensure safety... (China Daily, 2013, June 1)

CFSA recognised online transactions of dairy products as a loophole and put it under scrutiny. Some dairy giants even installed surveillance cameras and GPS devices in dairy farms and milk collecting stations to ensure the safety of raw milk (China Daily, 2009, January 6).

With full-scale quality control scrutiny and food safety law enforcement, melamine disappeared in dairy products for quite a while (China Daily, 2008, September 26). In 2010, MOA tightened up its food safety tests in response to the melamine scandal, and it declared that “the quality of raw fresh milk has improved significantly” (China Daily, 2012, September 25). A senior official from the NFSC told a news media in 2010 that the food safety situation in China was steadily improving and no big food scandals happened in that year (China Daily, 2011, March 2). But he also said it would take a longer time for the situation to reach a satisfying level. In 2012, AQSIQ’s quality control tests picked up a toxin at a Mengniu dairy plant and a Yili infant formula product before they entered the market and became new scandals (China Daily, 2011, December 29, 2013, March 8). For a while, CDIA claimed domestic dairy products were superior to imported products in quality (China Daily, 2013, May 2).

The food safety law also added in compulsory recall on contaminated food products. According to Xinhua News Agency (2009, March 1a), the Food Safety Law clarified incident reporting rules and introduced a forced recall system, as an amendment to address dairy product recall problems revealed by the Sanlu incident. The new law mandated dairy manufacturers to remove the impacted products immediately from the market (State Council of China, 2008, October 10; Xinhua News Agency, 2009, February 28b). As a backup of the recall system, the Ministry of Commerce and some cities reached agreement in tracing food products from the market (China Daily, 2010, October 22).

To increase food manufacturers' financial costs for violating of food safety laws/regulations, the 2009 Food Safety Law imposed a fine ranging from 5 to 10 times the sales prices for convicted manufacturers in addition to compensation of 10 times of the purchase price for the buyer (China Daily, 2009, June 2; The AQSIQ, 2009, March 20; Xinhua News Agency, 2009, March 1a). The law also specified accountability measures for officials from food safety agencies and qualification verifiers (Xinhua News Agency, 2009, March 1a, 2009, March 1b) to hold "indifferent and negligent" government officials to account (China Daily, 2008, October 9). Celebrities featured in fake or unsafe food product advertisements would be held accountable by the new food safety law (China Daily, 2013, May 6). To strengthen food safety surveillance, especially in rural areas, the Chinese central government increased budget for building an extensive food safety risk assessment and monitoring system (China Daily, 2010, September 3; State Council of China, 2012, July 13). CFSA prioritised food safety in the 12th five-year ³⁸ plan and decided to allocate more resources to vulnerable underdeveloped regions (China Daily, 2010, October 12, 2011, February 16; Zhou, 2017).

5.4.4 Transparency and whistle-blower protection efforts

The melamine scandal would not have spread to the whole industry and sickened 300,000 young children had the food safety agencies picked up complaints and whistle-blowing messages from consumers and entrepreneurs within the dairy industry. Learning from the failed alarm system revealed by the Sanlu case (Xinhua News Agency, 2009, March 1a), the Chinese government decided to build up a so-called "pre-emptive" monitoring system featuring "early detection, early warning,

³⁸ From the year 2011 to the year 2015.

and early intervention” (China Daily, 2008, December 31a). The Chinese Premier Li Keqiang vowed at a meeting:

The government will firmly adopt the accountability system for baby milk powder manufacturers and intensify the crackdown on milk powder-related violations...China will establish a baby milk powder standard system according to international standards, improve the quality monitoring of such products in the market in an open, transparent and standardised manner. (China Daily, 2013, June 1)

The question is how? A deputy general director of NHFPC commented that transparency in the reporting system was the key for its success (China Daily, 2008, December 31a). The State Council finally decided that involvement of the public and mass media was a necessary part of the food safety supervisory system:

充分调动人民群众参与食品安全治理的积极性、主动性...支持新闻媒体积极开展舆论监督，客观及时、实事求是报道食品安全问题。(State Council of China, 2012, July 13)

Fully mobilize the masses' initiative and enthusiasm to get involved in food safety supervision and governance...Facilitate the news media to actively oversee food safety issues and report such incidents in a timely and objective manner. (State Council of China, 2012, July 13)

It suggests the Chinese government understood the significance of transparency in supervising the unethical practice of food operators and lax regulation of food safety agencies. The State Council's decisions also included pressing local governments to build up a whistle-blower protection and rewarding system to facilitate reporting of food safety issues. The 2009 Food Safety Law allocated

responsibilities of different food safety agencies in handling reporting and testing, risk assessment, information sharing, and product recall to ensure seamlessly synchronized and coordinated actions (Xinhua News Agency, 2009, March 1a). It means agencies responsible for handling whistle-blowing efforts would be held accountable if such efforts were neglected as they have been before the outbreak of the Sanlu case.

5.4.5 Lifted threshold to the dairy industry

According to the *Outlines of the Restructuring and Revitalisation Plan for the Dairy Industry* implemented by the State Council during the Sanlu case, the Chinese government was committed to restricting milk collection stations using a licensing system:

只有取得工商登记的乳制品生产企业、奶畜养殖场、奶农专业生产合作社，才有资格开办奶站，奶站应当依法取得生鲜乳收购许可证。(State Council of China, 2008, November 19)

Only SAIC registered dairy manufacturers, dairy farms, and dairy farmer cooperatives are qualified to operate milk collecting stations. And it is compulsory the stations are licensed first for raw milk collection. (State Council of China, 2008, November 19)

The *Outlines of the Restructuring and Revitalisation Plan for the Dairy Industry* aimed to finish licensing milk collection stations by October 2009 and scale up dairy farming by late 2011. To further ensure infant formula products' safety in the process of distribution and transaction, the licensing system was later extended to distribution and retail sectors, requiring dealers to gain a pharmacy license (China Daily, 2011, March 30). If they were found dealing with substandard or contaminated infant formula products, the pharmacy license would be revoked. Food safety violators would be

blacklisted and expelled from the industry (State Council of China, 2008, October 10). As a result, 701 dairy firms were qualified by the licensing system; and 475 firms failed and were removed from the industry (China Daily, 2012, September 25). Dairy manufacturers from overseas could feel the pressure from the higher threshold to enter the biggest dairy market in the world (NZ Herald, 2014, March 7).

According to Waymer (2020) and Waymer and Heath (2007), organisations' failure to take into account key stakeholders' interest can lead to crises which in turn create opportunities for the marginalised stakeholders to bring forth their disregarded plight. To address the unbalanced allocation of profits between dairy farmers and firms, which was revealed as a major root of melamine adulteration during the Sanlu case (China Daily, 2008, November 20), the outlines specified raw milk transaction procedures to protect dairy farmers' interests, preventing dairy firms from devaluing milk or depressing purchasing prices:

有关部门要督促企业增强社会责任，切实履行收购合同，坚决制止随意拒收生鲜乳的行为，维护奶农利益。(State Council of China, 2008, November 19)

Related government departments should stand up for dairy farmers' interests and keep an eye on dairy firms' corporate social responsibilities, making sure they fulfil their purchasing contracts with dairy farmers and stop rejecting milk without solid reasons. (State Council of China, 2008, November 19)

The State Council encouraged dairy farmers to set up cooperatives or associations to enhance their power in price-setting negotiation with dairy firms. Dairy manufacturers and milk collecting stations were prohibited from charging farmers for food safety testing with a vision of building up a third-

party testing system. Similarly, food safety agencies were not allowed to charge testing fees to manufacturers. In addition, the plan included policies to subsidise dairy farmers who were faced with losses from slaughtering cows with infectious diseases or dumping milk due to food safety crises.

5.5 Discussion: The melamine scandal and organisational learning in CFSA

Among a series of food safety crises over the years, the Sanlu case was the biggest-ever food safety scandal in China. The industry-wide melamine adulteration was an open secret in the industry for years. The unethical business practice did not come under the spotlight until six Chinese infants died and more than 300,000 were sickened by kidney stones it caused. The catastrophic incident bankrupted Sanlu and paralyzed the whole Chinese dairy industry. Consumer confidence could not be restored despite years of efforts from the government and the industry. CFSA tried to restore its reputation as a competent food safety authority and consumer confidence in Chinese food products (China Daily, 2010, September 3, 2010, September 8, 2011, February 16, 2011, March 30). In addition to revocation of the inspection-exemption policy for the food industry, CFSA launched a series of campaigns to crackdown on food adulteration and other malpractices to strengthen dairy food safety control (China Daily, 2011, February 18). Despite government efforts, a majority of traumatized young Chinese mothers still turned to foreign infant formula brands. According to a 2013 online survey investigating Chinese consumers' choice on infant formula products, almost 90% of respondents expressed their concern over the safety of domestic products and expressed a preference for foreign products (China Daily, 2018, February 22).

This section discusses the social-economic and political roots of food safety problems in China, such as local protectionism, double food safety standards, and overexploitation of dairy farmers. Qualitative content analysis of the data corpus indicates these pre-existing problems were defects in

the Chinese dairy food safety governance system, causing repeated dairy food safety incidents. A discussion of the evidence of organisational learning induced by the crisis can find out to what extent the underlying problems have been addressed by the changes in CFSA. It can also shed light on what socio-economic and political factors influence crisis-induced learning in the food safety government agencies in China.

5.5.1 Socio-political roots underlying the food safety problems

Numerous academic research findings have attributed the pervasiveness of dairy food safety scandals in China to various socio-economic and political roots in the country, such as rapid industrialisation and urbanisation, the short history of the dairy industry, backward dairy food safety technology, and the underdeveloped regulatory system (J. Chen, 2009; S. Chen, 2009; China Daily, 2015, January 20; Custance et al., 2012; Fu & Nicoll, 2011; Gale & Hu, 2009; Guo et al., 2019; Ji et al., 2014; Jia et al., 2012). However, these arguments could not explain the repeated food scandals in the cooking oil and meat sectors, which had much longer histories. Nor could it explain how Chinese exported food products could meet the most robust food safety regulations in Japan, the USA, and the EU. In fact, almost all food safety incident victims were from socio-economically disadvantaged groups.

The in-depth qualitative analysis in this study established local protectionism, double dairy food safety standards, and exploitation of dairy farmers' interests as the underlying socio-political roots contributing to repeated dairy food safety incidents. They were also identified as factors influencing the process and outcomes of crisis-induced learning in CFSA. According to Cheng (2012), the Chinese food industry, in the context of globalisation, was running under a so-called "cheap capitalism model" (p.254) designed and controlled by a triple helix consisting of political, economic,

and intellectual elites who conspired with transnational capitals to exploit cheap labour and other resources in China. When dairy farmers were exploited and marginalised in the profit-share mechanism, a prevalence of food safety crimes resulted. According to Lu and Wu (2014), the consecutive years of 2010, 2011, and 2012 saw substantial increase in food safety incidents and criminal convictions in China. Cheng (2012)'s study found a crucial factor leading to food crimes was the pressure to survive faced by the offenders who in most cases were marginalised stakeholders in the supply chain like farmers or small dealers.

5.5.1.1 Regional protectionism and conflict of interest

Regional or local protectionism in China started with initiation of its economic reform in 1978. When the central government decentralised its fiscal power to provincial governments, the local governments were incentivised to develop its local SOEs as an important source of political capital as well as tax revenues (Bai et al., 2004). Development of SOEs has become a key indicator in evaluating local officials' political careers in China (Qian, 1996). It became a widespread practice for local governments to give their own local SOEs asymmetric competition advantages through offering favourable policies and financial support to them and setting up barriers for outside competitors. Besides protecting local SOEs from inter-provincial competition, local governments in many cases were involved in operating SOEs, including to help them out of crises or scandals (Wang, 2016). More than 150,000 SOEs across the country were regarded as the backbone of China's transitioning economy regarding their contributions in generating financial revenue, increasing employment, and supplying other public goods (Lin et al., 2020). However, the SOEs were also found to be inefficient in business, shirking CSR (Kao et al., 2018), and infringing public interests

(Brødsgaard & Li, 2013; Eaton & Kostka, 2017). Instead of providing public goods, many of them were involved in corruption crimes (Bakken & Wang, 2021).

Due to local protectionism, consumers often found themselves unprotected in food safety scenarios when their complaints were ignored by regulators, as happened in the pre-crisis stage of the Sanlu case. Investigative reporters were cautious in reporting SOE scandals during to their powerful socio-political influences (L. Chen, 2008). Online complaints were often deleted or classified as rumours (China Daily, 2014, March 15). In this case study, Sanlu, the biggest SOE in Shijiazhuang city, was qualified by AQSIQ as an inspection-exemplification company. The investigative reporter Jian Guangzhou said in an interview he could not sleep well the night *the Oriental Morning Post* published his news article. In the wake of the crisis, Jian was praised as a hero and won an award for his courage in exposing the scandal in China (State Council of China, 2009, November 8).

In such circumstances, food safety in the Chinese dairy industry was literally at the mercy of food manufacturers' willingness to uphold CSR and ethical values. Unfortunately, the Sanlu case showed that Chinese dairy firms, many of whom were SOEs and joint ventures, had already prioritised profits over food safety. It was not the first time for Sanlu to be involved in a major food safety scandal. The dairy giant was blacklisted as one of 45 culprits in the 2004 Fuyang infant formula incident which killed 12 babies and sickened another 16,000 (State Council of China, 2005, August 9; Xiao, 2011). The dairy giant managed to get its name removed from the blacklist. The seized Sanlu infant formula products were tested and identified as counterfeits. The food safety authority in Fuyang city issued a formal apology to Sanlu (People's Daily, 2004, n.d). The Shijiazhuang Municipal Council was accused of having intervened and cleared its name (Ye & Pang, 2011). When the melamine scandal

bombshell was dropped, the Hebei provincial government was in a dire situation and was asked whether the local government had tried to cover up the scandal (State Council Information Office, 2008, September 13b). In the end, all senior officials of the Shijiazhuang municipal government were removed from their position for dereliction of duty in handling the Sanlu infant formula crisis (State Council of China, 2009, March 26).

The Sanlu case indicates political and economic interest-driven local protectionism tends to undermine local governments' role as regulator and crisis responders who are supposed to prioritise public interests in time of food safety or other public crises. To tackle the inherent conflict of interests and restore governments' role in protecting public interests, the Chinese central government launched several waves of SOE reforms aiming to separate local governments from operating local SOEs. SASAC was established to implement the political and economic reforms. However, the reform efforts were allegedly impeded by various interest groups (SASAC, 2020, October 1, 2020. March 8). Faced with backlashes, the former head of SASAC Li Rongrong warned reformists should not give in and fall back (China Youth, 2013, April 8). It has become a long-term self-cleaning process with few signs of success in the near future.

5.5.1.2 Differentiated standards tailored for certain social groups

Research findings in this study indicate double standards in food safety regulations and enforcement were key contributing factors to the devastating food safety situation in China (China Daily, 2008, December 20; Zhang et al., 2018). According to Zhou (2017), double-standard food safety regulation and implementation in China were tailored for four consumer groups; a rigorous system for the politically privileged, the rich, and foreign consumers, and a broken one with lax regulation for the general public. This study has identified the biased double-standard system as the

key root cause responsible for repeated food safety incidents claiming victims exclusively from disadvantaged socio-economic groups in China. It explains why the involved companies' dairy products supplied to the aforementioned protected consumer groups were not melamine-contaminated. CFSA reported no melamine contamination in products for athletes attending the Beijing Olympic Games.

The Chinese public attributed the repeated occurrence of food safety scandals to a special supply channel that provided safe foods solely to senior officials and other social elites. Chinese officials denied the existence of such a special channel. However, numerous newspaper articles and academic studies (Chen, 2011, July 11; He, 2011, n.d; Lin, 2012, April 10; Liu, 2014) suggest otherwise. According to these news reports and research findings, a farm was established in the late 1950s in Mount Xiangshan near Beijing, producing and supplying agricultural products for top officials in the central government. The practice was introduced from the former Soviet Union. The system was officially abolished in 1989. Luo and Yang (2013) found in their study many central and local government agencies began to re-establish special supply channels for their employees when food safety increasingly became a public concern in the 1990s. The Chinese public thinks the special supply channels have protected senior public officials from food safety concerns which discouraged them from taking the issue seriously. Food product quality control in China was therefore implementing a double-standard system. One standard was for the ordinary public and the other was for the privileged and overseas markets. For foreign markets, CFSA would ensure food products were being manufactured in accordance with the SPS Agreement (WHO, 2020, April 30) or specific standards of the importing countries. For the domestic market, food products were manufactured to lower standards, with poor regulation enforcement (China Daily, 2008, December 20; Zhang et al., 2018).

Zhou (2017) identified the political privileged as senior government officials or other political elites who got safe food products through an “exclusive supply system” (p. 98) using their power and organisational authority. The institutionalised supply chain was made up of food sector SOEs for the central government level and appeared as farm clubs or training bases for the local level. Zhou’s study included entrepreneurs from SOEs, listed companies, financial organisations and those from well-off families in the rich consumer group. In 2008, there were more than a million of millionaires in China with another hundreds of new billionaires added in the rich social group each year (Petras, 2008). This high-income group became the target market for premium food products. Hundreds of so-called community-supported farms produce and provide safe foods for the privileged groups. The general public was politically and economically powerless (Zhou, 2017). People living in poverty-stricken rural areas were the group most vulnerable to unsafe food products.

Food exports are an important sector for the Chinese economy. As one of the largest food exporter countries, China is an important food product supplier to Japan, the EU, and the USA, markets known as most stringent in food safety regulations (Chen et al., 2008; Liu & Guo, 2019). The CEIQA, a branch of AQSIQ, was the sole regulator, independent from the segmented regulatory system, ensuring food safety for foreign markets (Zhou, 2017). The agency worked effectively to ensure exported food products met food safety standards under the WTO frameworks and various additional standards in importing countries (Jin et al., 2008; Zhou, 2017).

The outbreak of the Sanlu case proved the existence of a double-standard food safety system in China. Under the biased system, consumers in foreign countries were protected by their robust regulatory systems and the privileged social groups in China were not affected by unsafe food products. CFSA was more likely to face pressure from local protectionism when trying to uphold the

standards. In this case, the Sanlu group, a SOE and an inspection-exemplified company, was under the umbrella of protection from local government and AQSIQ. The local CFSA, subordinate to both the local government and the upper-level food safety agencies, had no power or motivation to verify the dairy giant's products.

This study therefore identified the double-standard food safety system as a key root cause of the broken regulatory system and lax regulation which exposed the socio-economically disadvantaged public to food safety risks. It is important for this study to evaluate if the underlying problem was addressed by any changes in CFSA and the dairy food safety regulatory system.

5.5.1.3 Overexploitation of dairy farmers' interest

The Chinese dairy industry emerged with rapid growth of the national economy and increase of in people's income (Wu et al., 2018). Raw milk production experienced a nearly 20% annual increase for 25 years prior to the outbreak of the scandal in 2008. Within three decades, China had become one of the world's top dairy producers (Ahmad, 2018). However, the industry expanded in an unsustainable manner. Chinese dairy farmers were found to have been exploited by dairy companies to an extent that sustainability of the industry was problematic. This was recognised as a fundamental factor leading to the outbreak of the incident (Qian et al., 2013).

On the eve of the 2008 melamine scandal, China was the third largest dairy producer in the world on the back of 200 million dairy farmers (Zhu et al., 2019). Unlike organised dairy farming in OECD countries, most dairy farms in China are small, scattered, unorganised, and under-regulated household businesses (J. Chen, 2009; Jia et al., 2012; State Council of China, 2008, November 19; Wu et al., 2018; Zhu et al., 2019). Sanlu was collecting 6,800 tons of raw milk every day from 60,000

households in 5,500 villages (China Daily, 2008, September 22). Dairy companies in China were growing quickly. Sanlu's net profit had been growing at an annual rate of 20% for eight consecutive years before the scandal that led to its bankruptcy (China Daily, 2008, October 15a). Chinese dairy farmers obtained only 10% of the industry profit when the market was growing but were exposed to a disproportionate share of the risks of the industry (China Daily, 2015, January 20). When the market was down, dairy farmers had to dump milk or slaughter cows because dairy companies stopped collecting milk from them (China Daily, 2008, October 15a), as what happened nationwide in the wake of the 2008 melamine scandal. Some dairy farmers reportedly complained, in vain, to local governments about the unethical practices of the dairy firms (China Daily, 2008, September 21, 2011, July 6). Jiang Weisuo, a well-known dairy entrepreneur, was concerned about the situation in the industry. He published an investigation report in 2006, revealing for the first time how Chinese dairy farmers were ruthlessly exploited by dairy companies (People's Daily, 2012, November 23). Many dairy farmers reportedly raised milk cows on bank loans (China Daily, 2015, January 20). Chinese farmers historically lived in a self-sufficient mode, having no social welfare. They could not afford bankruptcy. When they were struggling to survive, there would be problems for the industry.

Sanlu primarily accused dairy farmers of adulterating melamine into milk. Dairy farmers said they had never heard about the chemical (China Daily, 2008, October 15b). Government investigations found most of the adulteration happened in milk-collecting stations because cows were milked by milking machines there, suggesting milk farmers had no chance to adulterate melamine into raw milk. One of the executed convicts, a milk-collecting station owner, told the court he had no intent to add protein powder into raw milk until he suffered heavy losses when Sanlu rejected his milk several times for low protein content readings (China Daily, 2008, September 15). It turned out dairy farmers could only afford cheap feed products leading to low protein content in raw milk (China

Daily, 2008, October 15b). The whole Chinese dairy industry was caught in a vicious cycle due to exploitation of dairy farmers' interests.

Therefore, exploitation of Chinese dairy farmers' interests was identified by this study as another socio-economic root cause of the outbreak of the 2008 melamine scandal. To eliminate the breeding ground of adulteration in the dairy industry, the Chinese government needs to create a sustainable development environment which provides Chinese dairy farmers with fair profit share necessary to ensure standard quality of raw milk for the industry. Policy changes in this regard can serve as an important indicator of organisational learning in CFSA and the dairy food safety regulatory system.

5.5.2 A critical reflection on crisis-induced organisational learning in CFSA

Due to the scale and magnitude of the impact of the Sanlu case, the crisis triggered the most profound changes in CFSA and the Chinese dairy food safety regulatory system. In an effort to restore consumer confidence in Chinese dairy products, the Chinese government and lawmakers passed a series of dairy food safety-related legislation and regulations in the wake of the Sanlu crisis (Liu et al., 2019). This study established strong evidence of organisational learning in the food safety authority and the dairy food safety regulatory system induced by the Sanlu case.

5.2.2.1 Outcomes of the crisis-induced organisational learning

To address problems in CFSA and the dairy product regulatory system exposed in the Sanlu case, the Chinese government and lawmakers introduced a number of laws and government regulations (see Appendix 3). Firstly, the scandal led to a comprehensive review and update of the 2009 Food Safety Law and accelerated its passage (NPC, 2009, June 9). The enactment of the first food safety law passed in China, on Children's Day, was regarded as the most significant change ever made to

address food safety problems in China. Different from the 1995 FHL focusing on scrutinising food safety in catering and consumption stages only (Yang et al., 2020), the 2009 Food Safety Law began to embrace the concept of overseeing the whole supply chain, from farm to table. The 2009 Food Safety Law enacted in China addressed multiple loopholes in the regulatory system. It updated dairy food safety standards, strengthened protection of consumer rights, reinforced responsibility and accountability of food safety officials, enhanced food product testing, imposed a food product recall system, and harshened penalties for food safety crimes (Li et al., 2010; NPC, 2009, June 9). To address the overlapping standards and coordination problems between agencies due to the segmented food safety regulatory system, the NFSC was established as the top government agency to supervise collaboration and communication between different CFSA agencies. MOH was assigned to integrate overlapping and divergent dairy food standards imposed by different government agencies. A version of updated and unified dairy food safety standards was released in April 2010. CFSA started to strengthen scrutiny of the quality of dairy products. Through implementation of the new food safety law, the Chinese government tightened food quality scrutiny. To fill up the loopholes exposed by melamine adulterers in the milk collection process, a new regulation on dairy product quality and safety was put in place so MOA could ensure safety and quality control for raw milk. The AQSIQ was to test and verify dairy products regularly. Food safety breachers would be blacklisted and then expelled from the dairy industry. Another good lesson the Chinese government and CFSA learned was the importance of protecting and responding to whistle-blowers. A system was established to receive reports of wrongdoings and reward whistleblowers. The 2009 Food Safety Law specified which food safety agencies should be responsible for responding to whistle-blowing efforts effectively. Accountability measures were put in place for those who failed to handle such efforts in

a timely manner. The public and news media were encouraged to work with government agencies to ensure food safety and transparency of the regulatory system.

At the same time, the Chinese government decided to re-plan the dairy industry and raise its entry threshold. The Government announced a dairy industry restructuring and revitalisation plan during the Sanlu case. Drawing from lessons learned from the scandal, the plan required dairy operators to register with CFSA for a qualification to run a raw milk collection station. The certification was open to dairy firms, dairy farms, or dairy farmer cooperatives only. Individuals and outsider organisations were prohibited from entering the business. The licensing system was extended to distribution channels for infant formula products. Dairy products for young babies were re-categorised as medical-level goods. Only retailers with a pharmacy license were eligible to deal with infant formula products. A cognitive learning outcome in CFSA induced by the scandal was the importance of protecting dairy farmers, which was recognised in the *Outlines of the Restructuring and Revitalisation Plan for the Dairy Industry*. The government encouraged farmers to form cooperatives or associations to enhance their price-negotiation position and their ability to protect dairy farmers' interests against exploitation by big dairy companies. The government also made sure no food safety testing fees would be charged of farmers in the raw milk collection process. Similarly, CFSA was prohibited from charging testing fees from dairy manufacturers. According to the dairy restructuring and revitalisation plan, dairy farmers would be subsidised by the government in times of crises caused by infectious diseases or other food safety incidents.

For a period, China saw improved domestic dairy product quality and restored dairy industry ambition due to changes in the dairy industry. However, news media in China reported in 2020 that melamine-contaminated products had re-emerged in the market (China Daily, 2011, January 14b).

CFSA confirmed the new melamine contamination was caused by the recalled products during the 2008 melamine scandal. The poisonous products from Guang Dong province in South China had made their way to the economically disadvantaged northern and western regions. The re-emergence of the seized melamine-contaminated dairy products smashed consumers' trust in competence and integrity of the Chinese food safety regulators. The Chinese public has to live with the fact that crisis-induced organisational learning cannot solve a deep-rooted social problem once and for all. The crisis-included learning induced by the Sanlu case was apparently far from capturing the complexity and depth of the food safety problem resulted from intertwined societal, political, and CSR factors (Yan, 2012).

5.5.2.1 A critical evaluation through the lens of double-loop learning theory

Organisational learning can be categorised into single-loop learning and double-loop learning, depending on the learning process and outcomes. Single-loop learning is an error-correction process that aims at solving superficial problems (Deverell, 2009; Smith & Elliott, 2007). In comparison, double-loop learning exerts more profound changes in an organisation's norms and values underpinning its policies and goals (Argyris, 1977). As a result, single-loop learning outcomes can solve technical and procedural problems while double-loop learning can lead to much deeper cultural changes to solve underlying problems in an organisation (Smith & Elliott, 2007). Studies have found double-loop learning is normally triggered by a major crisis and relies heavily on facilitation from leadership of the affected organisation (Argyris & Schon, 1974; Deverell, 2009). The melamine scandal had a full-scale impact on the Chinese food industry and triggered comprehensive changes in CFSA and dairy food safety regulatory system. Some of the changes solved technical or procedural issues while others can be identified as deep changes and therefore as double-loop learning.

The segmented organisational design of CFSA was identified and criticised as the root cause of overlapping food safety standards and chaotic enforcement due to lack of coordination between agencies. To address the problems, the new food safety law capped the NFSC on the top of the old organisational structure to try and resolve coordinative problems between food safety agencies. MOH was assigned to integrate food safety standards (Xinhua News Agency, 2009, February 28a). This single-loop learning outcome did not uproot overlapping enforcement and poor coordination problems (China Daily, 2008, October 24). The rebranded CFSA enhanced its dairy food safety scrutiny in the wake of the crisis. To ensure food safety, new quality control centers were established to sample and test each batch of food products. A surveillance system and product-tracking system were built to facilitate food product recall. Infant formula products were re-categorised and could only be distributed through pharmacies. To protect consumers' rights, the Sanlu case led to a procedural change in food safety legislation. In the process of Sanlu's bankruptcy liquidation, the local court prioritised the dairy company's shareholders and business partners' interests over victims', leading to parents and lawyers' protests. The 2009 Food Safety Law reversed the priority order to guarantee compensation to victimized consumers first (Xinhua News Agency, 2009, February 25).

At the outbreak of the Sanlu case, the inspection-exemplification policy was recognised as a dereliction of duty by AQSIQ. The Chinese government banned the problematic policy immediately and extended it to the whole food industry. This new regulative rule denied the assumption that food safety could be guaranteed by state-qualified famous brands. CFSA took back its regulating power and began to rely on food safety law enforcement rather than operators' CSR to ensure food safety. This learning outcome gave birth to a new norm in the food industry.

This study also identified several unaddressed problems in the wake of the crisis. Local governments were still the first responders to local food safety crises (China Daily, 2008, October 24). It did not sort out the conflict of interest incorporated in local governments' role as owners of local SOEs and also the first responder to food safety crises. The unlearned lesson gave way to potential cover-ups of food safety problems or lax regulation. Official investigations found adulteration in the industry originated from exploitation of dairy farmers' interests. Chinese government and CFSA encouraged dairy farmers to form cooperatives and sign purchase contracts with dairy firms (State Council of China, 2008, November 19). The government agencies had a vision to establish a third-party testing system to prevent firms' exploitation. However, the cognitive learning did not turn into behavioural changes. Farmers ended up moving into collective dairy farms set up by dairy firms. Their dairy farming expenses increased, and the exploitation devastated. In 2014, dairy farmers across the country began to dump milk and sell or slaughter milk cows. As in the past, dairy firms would not collect milk when the market was down. About 10% of milk production in 2016 was reportedly rejected by dairy firms (Xinhua News Agency, 2015, January 11). Subsidies to dairy farmers were embezzled in the process and farmers could only get half of the amount (CCTV, 2016, September 18). In contrast, Chinese dairy giant Mengniu reported 51.9%, 31.4%, and 33.7% gross profit margins between 2014 and 2016 (China Mengniu Dairy Company, 2021, November 20). Yili and other Chinese dairy giants had similar growth rates. Overexploitation of dairy farmers, a key underlying problem leading to dairy product crises, was therefore not uprooted.

This study found the 2008 melamine scandal indeed triggered comprehensive changes in CFSA and the Chinese food safety regime. It led to the quick enactment of China's first food safety law, the reorganisation and rebranding of CFSA agencies, updated dairy food safety standards, strengthened food safety scrutiny, and a new food product tracing and recall system. Most of the

learning outcomes can be categorised as a single-loop learning process. The Chinese government and CFSA need to achieve more in-depth organisational learning to uproot key underlying socio-political problems, including local protectionism, a double-standard food safety system, and exploitation of dairy farmers.

5.6 Summary

The Sanlu case was a food safety crime caused by industry-wide melamine adulteration. The crisis caused substantial damage to the reputation and financial interest of the Chinese food industry. This study found several underlying socio-political roots leading to the food safety crisis and other such incidents in China. Firstly, under dairy firms' exploitation, Chinese dairy farmers could not afford nutritious feed products for milk cows, leading to low protein content in raw milk and consequent melamine adulteration by milk-collecting stations to boost protein readings of raw milk to the level required by dairy firms' quality and safety standard tests. The unsustainable business model descended the Chinese dairy industry into a vicious cycle leading to repeated dairy food safety crises. Secondly, the food safety agencies were found to have been derelict in their duties. The segmented organisational design led to overlaps and gaps in the dairy food safety regulations and enforcement, conflicts of interest in the role of the local government resulted in its ineffective crisis responses, and the double-standard food safety system exposing powerless and disadvantaged social groups to unsafe foods discouraged reforms and improvements in food safety regulations and enforcement. The whole incident was a specimen of an anomic society transitioning from a planned economy to a market economy under the model of cheap capitalism.

The study found the unprecedented crisis triggered full-scale accountability and comprehensive crisis-induced learning in CFSA and the dairy food regulatory system. A new food safety law was

passed and enacted to address the major loopholes in the system and dereliction of duty in the food safety agencies. For example, the inspection-exemplification policy was revoked from the food industry, a national commission was established to ensure coordination between different agencies, unified dairy food safety standards were released, more food safety monitoring centres were established, the tracing and recall system was strengthened and infant formula products were required to be distributed through pharmacies only. However, these single-loop learning outcomes did not uproot underlying problems. These included the segmented organisational structure where local governments remained as primary food safety regulators and first crisis responders despite local protectionism, the conflict of interest in their roles as shareholders of local SOEs and regulators, and the fact that double food safety standards in regulations and enforcement were not addressed. Double-loop learning was needed to resolve the deep-rooted social problems imposed by the triple helix formed by Chinese political, intellectual, and economic elites who formed a conspiracy with foreign capital to profit from cheap resources and human labour in China.

CHAPTER 6 EVIDENCE OF ORGANISATIONAL LEARNING IN NZFSA

The data corpus for the Fonterra case consists of selected news articles and government inquiry reports. Similar to Chapter Five in the method of qualitative content analysis employed in the Sanlu case, this chapter presents the process of data coding and theme categorising from the NVivo project and reports findings from interpreting the coded data in both visual and textual forms. These findings were to answer two research questions on the Fonterra case: How did NZ food safety authorities, namely MPI and the verifier, manage WPC80 incident? What evidence was there of organisational learning induced by the incident in NZ food safety authorities?

Evidence of organisational learning in a public organisation can be identified through examining changes ranging from its leadership, bureaucratic design, statutory power, and crisis response plans to legislation and bilateral agreements in the sector (Elliott, 2009). It is based on evaluation of its crisis management performance against its responsibilities and the execution of crisis response plans (Barton, 2001). To do so, this study coded the data corpus for WPC80 incident into three stages of government crisis management, in line with the three-phased crisis management theoretical framework developed by Coombs and Holladay (2010). The pre-crisis phase was between February 1, 2012 and August 1, 2013 when an accident developed into a food safety emergency affecting several countries. The crisis stage was from August 2 to August 28 in 2013 when MPI declared and then revoked the recall of dairy products affected by WPC80 products. The post-crisis stage lasted from the product recall revocation to the end of data collection of this study. To identify evidence of organisational learning in NZ food safety authorities induced by the WPC80 incident, this chapter includes the following steps:

- Building a construct of the food safety framework and crisis response plans in NZ

- Examining approaches employed by NZFSA in each stage of the crisis management and evaluating performance of the food safety authorities in the incident
- Identifying loopholes in NZFSA and NZ food safety regime
- Establishing changes in NZFSA and NZ food safety regime as evidence of crisis-induced organisational learning in this case.

6.1 Data exploration and content analysis construct

6.1.1 Data exploration

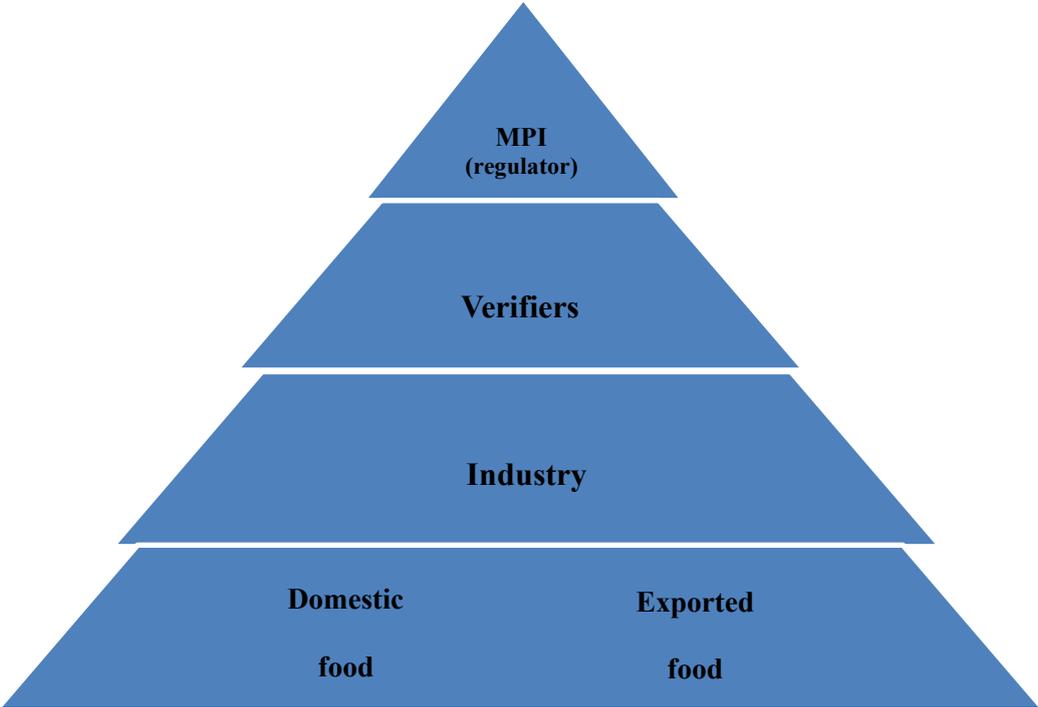
After importing all the data corpus into NVivo, the researcher explored “word frequency” of the government documents and news articles to let the data schemes emerge. Since all the documents are in English, it is not necessary to examine the two genres of documents separately. The minimum length of display words was set as three and a dozen words with insignificant meaning in this study were added into the stop word list. The outcome of the word frequency query was exported and demonstrated as below (See Figure 11). The most frequently occurring words in the documents include “Fonterra”, “New Zealand”, “food”, “safety”, “products”, “China”, “MPI”, “dairy”, “ministry”, “formula”, “botulism”, “scare”, “government”, “testing”, “affected”, “inquiry”, “contamination”, “company”, “report”, “risk”, “wpc80”, “recall”, “consumers”, “crisis”, “management”, “Danone”, “AgResearch”, “reputation”, “quality”, “system”, “Australia”, “amended”, and “regulatory”.

The outcome of the word cloud exploration of the data corpus gives a clue of the food safety issue related to NZ’s dairy giant Fonterra. The NZ Government agency MPI and affected parties such

will be able to examine decisions and actions taken by the three actors to identify shortfalls and related changes in the NZ food safety regulatory system sparked by the incident.

Underpinned by the APA 1999 and the FA 1981, the NZ dairy product regulatory framework is composed of four-layer pyramid structure (see Figure 12). On the top of the structure, MPI is the competent food safety authority

Figure 5 The New Zealand Food Safety Regulatory Framework



Source: Adapted from NZFSA (2008)

responsible for setting regulatory requirements, verifying and providing official assurances, undertaking compliance activities, and monitoring and auditing the system. Food safety verifiers, such as AsureQuality³⁹ in this case, were independent third-party auditors responsible for auditing

³⁹ AsureQuality is a NZ government-owned organisation.

regulatory compliance of food manufacturers. In other words, verifiers were to check and make sure food processors were complying with their RMPs⁴⁰ in their operations. The food industry, specifically dairy industry in this case study, was supposed to take risk-based measures to meet all regulatory requirements and supply safe and suitable food products to consumers in domestic and overseas markets (Dean et al., 2013, December 3, 2014, November 24).

In times of food safety emergency or crisis, MPI responds in accordance with the Food Incident Response Protocol (FIRP) and Trade Response Protocol⁴¹ (TRP). Both protocols function under the framework of *the New Zealand Coordinated Management System (CIMS)*⁴² (Dean et al., 2014, November 24). The CIMS system (see Figure 13) was designed to manage a broad range of incident situations from natural disasters to terrorist attacks in NZ (NZ Government, 2014, April 10). Under the system, the incident controller oversees coordinating and implementing crisis response activities with the assistance of a safety advisor, an information officer, and a liaison officer. The role is assigned to a senior first responder who arrives first at the scene or is transferred to the agency with primary authority for the incident (NZ Government, 1998). In a food safety incident, the incident controller is to report to the key decision maker, the director-general of MPI (Dean et al., 2014, November 24). In a major incident, the incident controller would set up an incident management team made up of an operation manager, a planning/intelligence manager, and a logistics manager, who are respectively responsible for directing and coordinating all operations, implementing the

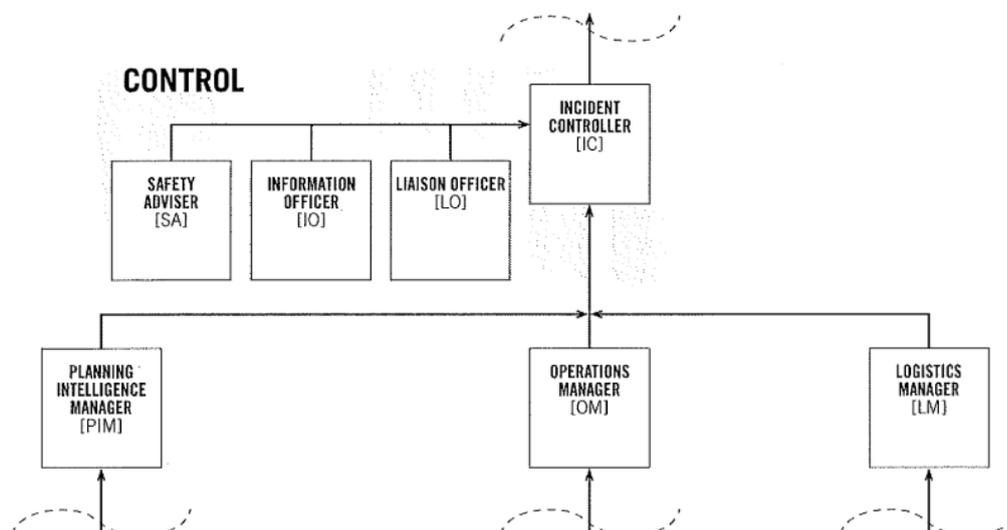
⁴⁰ The Risk Management Program was registered under the Animal Products Act 1999.

⁴¹ Or Trade Response Guide

⁴² The 1st version was developed in 1998, based on a United States model. It was revised by a number of agencies, including MPI, in 2014.

incident action plan gathering, evaluating, and disseminating information and creating an incident action plan, and providing personnel, supplies, and other necessary services (NZ Government, 1998).

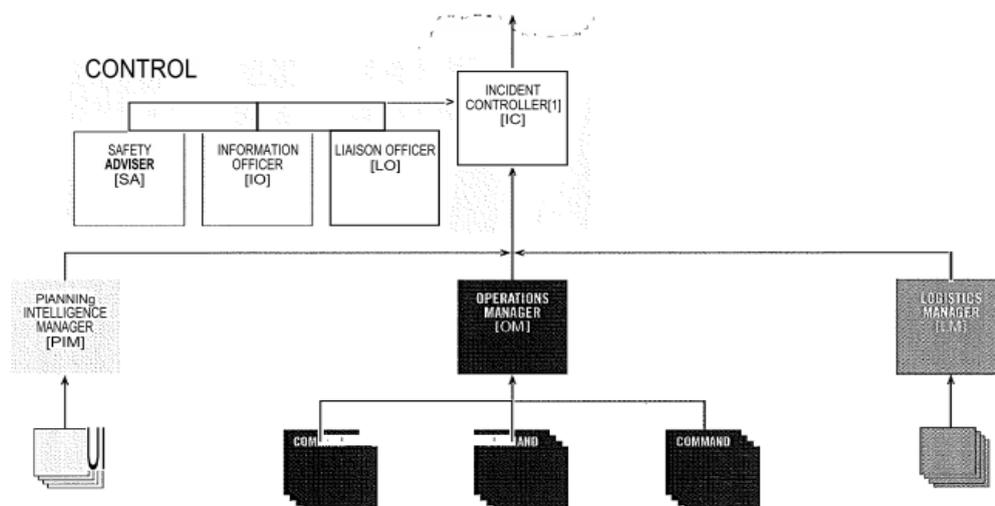
Figure 6 Incident Management diagram under the CIMS



Source: NZ Government (1998)

If an incident involved one government agency or jurisdiction, a single-agency response modular design would apply. There was also a multi-incident multi-agency response modular design (see Figure 14) if more than one government agencies were involved. Under this model, each of the involved government agencies had its own line of command, but the response management system would be under the command of one incident controller. Effective liaison between the agencies would be the key factor for successful handling of the incident. To find out approaches employed by NZFSA in handling the Fonterra case, the researcher examined and coded the data corpus in accordance with the three-phase crisis management theoretical framework. This approach is in line with the analysis of the Sanlu case and it makes the two cases more comparable.

Figure 7 Multiple-agency response module under the 1998 CIMS



Source: NZ Government (1998)

The biggest-ever NZ food scare can be divided into three phases by two milestone events, MPI's news release announcing safety concerns about three batches of WPC80 products released on August 3, 2013 and MPI director general announcement on August 28 that the botulism scare was a false alarm (MPI, 2013, August 28a). The pre-crisis stage started on February 1, 2012 when a torch lens was accidentally broken in machinery and affected 42 tonnes of WPC80 products in a Fonterra plant and ended with MPI's media release announcing a potential botulism concern on August 3 (Dean et al., 2014, November 24). The crisis event lasted from the outbreak of the crisis triggered by MPI's statement of a food safety alert until the director-general revoked all the previous statements on August 28, 2013. The post-crisis stage covers the time range from the end of the botulism scare to the date when data collection for this study finished.

The data set of the Fonterra case was coded according to the above defined timelines of the three stages of crisis management employed by the NZ Government. The pre-crisis stage is about the context of the botulism scare and approaches employed by Fonterra and other involved parties

handling the incident. This category has got 173 references coded from 32 documents (see Figure 15). This category covers the company profile of the

Figure 8 Coded themes of the Fonterra case

2. Fonterra botulism scare			
Name	Files	Referenc	
1. Pre-crisis Context of the crisis and approaches to handling the Hautapu incident	31	173	
1.1 Fonterra and New Zealand dairy industry	15	36	
1.2 Fonterra's past crises	12	16	
1.3 Mishandling of the Hautapu incident	12	74	
2. Crisis-stage Government handling of the crisis	94	563	
2.1 Initiating precautious recall of affected products	11	71	
2.2 Validating testing results provided by Fonterra	11	25	
2.3 Repairing NZ's image of safe food exporter	74	176	
3 Post-crisis stage Government inquiry and learning from the crisis	95	617	
3.1 Government inquiry and accountability	80	281	
3.2 Identified loopholes in the regulatory system	36	187	
3.3 Evidence of OL in the MPI induced by the scare	26	143	
4 Reflections and recommendations	85	273	

Fonterra Cooperative Group, the economic significance of the NZ dairy industry, Fonterra’s position as the biggest company in NZ, Fonterra’s involvement in past food safety crises like the Sanlu case and the 2013 dicyandiamide contamination, WPC80 incident that happened in the Hautapu plant and the responses of related parties including Fonterra, the verifier AsureQuality, AgResearch, and Danone. The crisis stage is mainly about actions taken by the NZ Government in handling the crisis. The 563 references from 94 documents include contents recording the NZ Government and MPI’s efforts focusing on three broad thematic aspects, including communicating to the public and overseas food safety authorities on possible botulinum contamination, tracing down and recalling all potentially affected products from domestic and overseas markets, commissioning further testing in NZ and USA labs to validate results provided by Fonterra, controlling damage and restoring

reputation in key markets. The post-crisis stage government inquiry and learning coding yielded 617 references from 95 documents, covering the NZ Government's inquiry into the Fonterra WPC80 incident and organisational learning in the food safety regime. It started with investigation on the rigor of NZ regulatory system for dairy products, holding those responsible accountable, identifying loopholes in the system, and making changes as result of the crisis-induced organisational learning. A total of 273 references from 85 documents were coded to reflections and recommendation. It is mainly about perceptions and reflections of investigators, interviewees in the government inquiries, remarks in news reports from NZ and abroad. In most cases, a reference contains information fitting for multiple themes and was coded into different themes accordingly. Interpretation of the codes against the contexts of the themes resulted in the following findings.

6.2 NZFSA's approaches to handling the Fonterra case

6.2.1 The "laissez faire" approach at the pre-crisis phase

The Fonterra case was an avoidable incident. Government and Fonterra commissioned-inquiries found there were chances for the verifier, or MPI to step in early before it had developed into a full-blown food safety crisis. NZFSA's failure at this stage was criticised for its long abstention from interference. According to news reports cited below and Fonterra commissioned inquiries, the contamination happened during reworking of its WPC80 products.

Fonterra says it has completed its operational review, which found reprocessing after plastic was found in whey protein at its Hautapu plant in the Waikato led to the contamination event. "An item of non-standard equipment (used during the reprocessing) caused the contamination". (NZ Herald, 2013, September 4)

This news report confirmed the origin of the botulism scare, an accident that happened in Fonterra's Hautapu plant. The government inquiry report indicates that the accident could be traced back to February 1, 2012 when a torch lens was broken in WPC80 processing machinery (Dean et al., 2014, November 24). Fonterra's Hautapu plant staff followed quality control procedures and filed a category B event report to the verifier AsureQuality on February 8. But the report was not submitted within the time frame required by the RMP⁴³ (MPI, 2013, August 25).

The Hautapu staff followed up the report with two product disposal requests to AsureQuality (Dean et al., 2014, November 24). The first one was submitted on February 20 to seek reclassification of the impacted products so that they could not be exported to the Japanese market with higher standards for medical purpose. AsureQuality's auditor had not visited the Hautapu plant until early March. He approved Fonterra's request, but his approval, as shown in the government inquiry report below, was rejected by two senior auditors.

A request to supply to "restricted markets" was beyond AsureQuality's scope to approve... peer reviewers could not see how simply preventing the sale in a particular market would deal with the risk of contamination, which, if permitted, would merely, and inappropriately, shift any risk to other markets. (Dean et al., 2014, November 24)

After being rejected, a second request was submitted on March 30 seeking approval to reprocess the impacted WPC80 products without detailing the reworking plan. However, the request did not state

⁴³ The event was supposed to be reported to verifier within 24 hours. The Hautapo plant did not report until February 8.

two plants outside Hautapu's RMP would be used for the reworking, which misguided the verifier (Dean et al., 2014, November 24).

AsureQuality approved the second request without seeking clarification of reworking details. Nor did the verifier follow the RMP and visit the plant during the reworking process. The Hautapu plant finally finished reworking the affected products with a non-standard pipe and hoses (Dean et al., 2014, November 24). Fonterra did not test the reprocessed products for SRC though it was required by customers (NZ Herald, 2013, October 30b). The products were tested and qualified for customer specifications and NZ regulation standards⁴⁴. When the Hautapu plant reported to AsureQuality of its closure of product disposal request, the latter did not audit its regulatory compliance. In fact, AsureQuality did not even know that Fonterra had adopted a new procedure affecting product quality since July 2011 without notifying MPI or AsureQuality (Dean et al., 2014, November 24).

AsureQuality missed several opportunities at this stage to avert the crisis through its regular auditing processes before the impacted products were distributed. As a result, the affected WPC80 products with high SRC readings were supplied to its downstream users, including 3.6 tonnes to Fonterra's Waitoa plant and 13.5 tonnes⁴⁵ to its Darnum plant in Australia (MPI, 2013, August 25). The Darnum plant manufactured 1,266 tonnes of nutritional powder for the French food giant Danone with the reworked WPC80 products. When Fonterra's Darnum plant found excessively high SRC readings from the end products for Danone, its investigation later established the source of the

⁴⁴ One of Fonterra's customers did require SRC test.

⁴⁵ 100 kilograms of the 13.5 tonnes of WPC80 products to Darnum was degraded due to shipment damage.

contamination was the reworked WPC80 products from the Hautapu plant (Dean et al., 2014, November 24).

The Darnum plant did not report to MPI or AsureQuality but decided to rule out clostridium botulinum through testing. The Darnum plant made a complaint within the Fonterra system for financial loss caused by the contaminated WPC80 products. An AsureQuality auditor noted the complaint, but she did not pick up the matter as a food safety issue, as being noted in the government inquiry report:

In late May, during a regular audit at Hautapu, an AsureQuality auditor noted a complaint in Fonterra's system about high SRC levels in WPC80 powder manufactured there. She told the Inquiry that no details were provided, which was unusual but did not investigate further because she considered high SRC levels to be a question of food spoilage, not food safety. (Dean et al., 2014, November 24)

The auditor obviously missed a chance to change the course of the incident. According to the government inquiry, the Hautapu plant manipulated the category of the incident to a level that could prevent its escalation during communication with the Darnum plant. The Fonterra senior management was unaware of the issue until its Australian subsidiary, the Darnum plant, made a formal compensation complaint and negotiated a financial settlement with New Zealand Milk Products (NZMP)⁴⁶. The government inquiry stated that the managing director was still kept in the dark about the SRC issue (The Dominion Post, 2013, August 30). Fonterra's quality control team and nutritional technical team decided to investigate the SRC problem without informing senior management, nor

⁴⁶ A subsidiary of Fonterra, dealing with ingredient and solution products.

did they notify the food safety regulators or verifiers. Among the mistakes committed by Fonterra, there unfolded a dramatic scenario when approving the botulinum test. A team manager unwittingly approved the toxin testing without being aware it was about clostridium botulinum testing. Though Fonterra senior executives denied any knowledge or involvement of the clostridium botulinum testing contract to AgResearch, the government inquiry found it would not have happened without encouragement from the Fonterra Research and Development Centre (FRDC) who contracted the testing to AgResearch in mid-July (Dean et al., 2014, November 24). Fonterra formed a critical event team in late July without warning of a potential food safety issue to MPI, AsureQuality, or its customers. The regulator had no time to prepare for the food safety incident (MPI, 2013, August 29).

In brief, at the pre-crisis stage of the Fonterra case, both MPI and AsureQuality failed to pick up any of the signs of an upcoming food safety crisis. There were undoubtedly chances for the food safety authority to prevent the risks from developing into an unprecedented crisis. What if AsureQuality's auditor had visited the Hautapu plant as he was supposed to when a category B event was reported? What if AsureQuality had reported the issue to MPI? What if there had been a mechanism that could trigger intervention of MPI if both manufacturers and auditors failed to report such a food safety issue? What if AsureQuality auditor had required a detailed rework plan and supervised the reworking on site, as required by the RMP? Investigators concluded "numerous people made decisions that, one by one, added their small contribution to the building momentum of events" (Dean et al., 2014, November 24, p. 5).

The food safety crisis in question might have been prevented had one of the above questions been addressed in accordance with the RMP or dairy food safety laws. There were too many unanswered questions for Fonterra (The Dominion Post, 2013, August 30). There were questions to MPI and

AsureQuality as well regarding their approaches to handling the signs of an upcoming food safety crisis. The botulism scare, though proved to be a false alarm, happened not long after Fonterra's involvement in the Sanlu case and the dicyandiamide contamination incident. MPI was criticised by news media for adopting a "laissez faire" style approach to food safety regulation in the last two incidents that Fonterra was involved in (NZ Herald, 2013, August 6a; The Dominion Post, 2013, August 8).

6.2.2 Precautionary recall and test results validation at the crisis stage

On August 2, Fonterra briefed MPI, AsureQuality, and the Department of Agriculture, Fisheries and Forestry in Australia⁴⁷, informing them that three batches of its WPC80 products were "confirmed" as being contaminated by clostridium botulinum (Fonterra Independent Inquiry Team, 2013, October 23). In the report, Fonterra stated the impacted products had been used by its domestic and overseas buyers in five countries⁴⁸ as ingredients for products including infant formula, follow-on formula, sports drink, and other products (MPI, 2013, August 25). Fonterra also implied that it had communicated the contamination concern to its overseas customers before notifying MPI. MPI urged Fonterra to provide further information, including botulinum testing details (Dean et al., 2014, November 24). On the same day, the director-general of MPI triggered the CIMS incident response mechanism and set up a seven-member response management team at the control level, and a technical team, an operation team, a liaison team, and a communication and logistics team at the response level. A separate reporting committee was set up to provide policy and legal advice to the response team. More than 100 MPI staff and some staff from the Ministry of Foreign Affairs and

⁴⁷ Or DAFF in abbreviation, was the food safety competent authority of Australia between 1998 and 2013. It is the Department of Agriculture.

⁴⁸ Later investigation traced the impacted products down to 2 other countries.

Trade, Ministry of Health, NZ Trade and Enterprise, and the Department of the Prime Minister and Cabinet were involved in the food safety incident. The NZ Government finally established a damage control team made up of at least nine ministers to protect the integrity the food safety system (Fox, 2013, August 15). The objectives of the response, as reported in the government inquiry below, were:

To ‘protect consumer health’... to ‘protect NZ’s reputation for safe product and maintain market access in dairy products’ ...to ‘keep ministers, the ministry senior leadership team and Response Strategic Leadership (RSL) fully informed for effective stakeholder liaison. (Dean et al., 2014, November 24)

The extensive crisis response team indicated the NZ Government took the incident so seriously that the reaction was comparable to responding to a terrorism alert (Fox, 2013, August 15). MPI announced in a media release the Fonterra botulism concern on August 3 and declared a precautionary recall of impacted batches of WPC80 products. The Ministry sent response teams to track down impacted products and notify foreign food safety authorities. The acting Director-General of MPI issued several statements, including the two cited below from MPI news releases, between August 3 and 25 to clarify the batches of impacted products to be recalled.

‘At present, we are continuing to verify information provided to us, and we will update further if any products are identified. Products on the market will be recalled if they are found to contain the contaminated protein’. (MPI, 2013, August 3)

MPI took a cautionary approach by tracing and verifying both the products that may have contained the suspect WPC80 as an ingredient. (MPI, 2013, August 25)

However, the first three statements were found to contain confusing and disputed information, which

frustrated and enraged the public. MPI sent staff to Fonterra's Hautapu plant and major manufacturers to confirm the scope of the problem by verifying records of manufacturing, inventories, and product movement (MPI, 2013, August 25). On August 25, MPI announced all potentially affected products had been adequately traced and managed through voluntary product recalls or notification to relevant foreign food safety authorities (MPI, 2013, August 25).

On top of the product-tracing efforts, MPI's response management team made a monumental decision to validate the botulism positive testing results from AgResearch (MPI, 2013, August 25). To validate the original testing results provided by Fonterra, MPI commissioned a total of 195 independent tests from labs in NZ and the USA (NZ Herald, 2013, August 28). The test samples were shipped to two labs in the USA on August 8 and the results came back to MPI on August 27, reporting no evidence of clostridium botulinum (MPI, 2013, August 28a). According to the test reports from the labs of MPI at Massey University in NZ and CDC and NVSL in the USA, the contamination was caused by clostridium sporogenes, a strain related to food spoilage rather than lethal toxins (MPI, 2013, August 31).

On August 28, MPI director-general released the fifth statement, as shown in its news release below, announcing all tests returned negative results for clostridium botulinum and the botulism scare was a false alarm (MPI, 2013, August 29; NZ Herald, 2013, August 28).

I, Scott Gallacher, Acting Director-General, confirm that further testing and information has revealed that the identified batches of WPC80...are not contaminated with clostridium botulinum and pose no risk to consumers of contracting botulism. Therefore...I revoke the Director-General statement issued ... and all other previous statements related to this matter. (MPI, 2013, August 28b)

This announcement brought the product recall to an end. The dramatic U-turn of the incident gave all involved parties much relief. However, this incident revealed plenty of problems in the dairy food safety regulatory system and crisis response mechanism. NZ media ironically labelled the whole incident that shook NZ's food safety image as a "botch-ulism scare" (NZ Herald, 2013, August 31). To restore the country's reputation as a safe food supplier to its customers at home and abroad and hold those responsible to account, the NZ Government commissioned two public inquiries to review the dairy food safety regulatory system and investigate the causes of the incident.

6.2.3 Image repair and accountability process at the post-crisis stage

Even though the Fonterra case was a false alarm, and the consequent precautionary product recall was induced by problematic interpretation of the test reports from AgResearch, NZ's reputation as premium dairy product supplier was severely damaged. China, Australia, and Vietnam took a "measured response" by suspending dairy product imports from NZ (NZ Herald, 2013, August 6c). NZ news media reported import bans from Russia, Belarus, and Kazakhstan, which had not imported the impacted dairy products (NZ Herald, 2013, August 13b). The Fonterra case brought down NZ product sales in the Chinese infant formula market (NZ Herald, 2013, September 12). Some NZ small and medium dairy companies were struggling for survival. The crisis quickly expanded from the dairy industry to the whole food industry and further spread to other industries such as tourism. NZ Government and food safety regulators were faced with the immediate task of holding those responsible accountable and restoring its image as a safe dairy product supplier to the world.

China was already NZ's biggest trade partner and Fonterra's most important market at the time. The Chinese Xinhua News Agency published an editorial article criticising NZ's food safety regulatory system as a total failure. The article scorned NZ's 100% pure image as a "festering sore"

(NZ Herald, 2013, August 6a). The Fonterra case was perceived by NZ media as a political gift to the Chinese government. The severe criticism from the Chinese Xinhua News Agency was interpreted as the Chinese government taking advantage of a rare opportunity to belittle food safety of foreign brands and rebuild Chinese consumer confidence in domestic dairy brands destroyed by the Sanlu case (Laura, 2013, October 17; National Business Review, 2013, August 9). The UK's Food Standards Agency enhanced scrutiny of food products from NZ and issued a warning on misleading Manuka honey (NZ Herald, 2013, August 25). A UK newspaper went even further and extended the topic to the environmental issue. The article criticised NZ as the only OECD country without an annual report on its environment and said its rivers were too polluted to swim in (NZ Herald, 2013, August 9c). NZ's pure and green image was at stake (Fox, 2013, August 10). At the same time, NZ dairy manufacturers were faced with increasing pressure from their competitors in the USA and the EU who took advantage of the opportunity to expand supply lines in the Chinese market (Fox, 2013, September 7).

Fonterra reacted very quickly and started damage control and reputation restoration in China by sending its CEO Theo Spiering to Beijing on August 5 (NZ Herald, 2013, August 8). Mr. Spiering apologised to Chinese consumers for the distress and uncertainty and reassured Chinese customers of the safety and quality of its dairy products (Fox, 2013, September 7). But Fonterra was far from escaping its public relations nightmare. News articles related the botulism scare with Fonterra's past involvement in the dicyandiamide contamination and the Sanlu case (Fox, 2013, August 6; NZ Herald, 2013, October 30a; The Dominion Post, 2015, March 11). Fonterra was criticised for sitting on the Sanlu melamine contamination issue for too long and leaving the NZ Government to do the whistle-blower job (Fox, 2013, August 6). Three safety strikes were too many for a food

manufacturer (NZ Herald, 2013, August 6d). The NZ Government was pressed by the media to think about the risk of putting all its eggs in one basket.

The National government was dragged into the PR crisis. The then-Prime Minister John Key made diplomatic efforts to talk about the issue and assure overseas customers and regulators of NZ's food quality. It started in his visit to Paris where he reportedly talked with Danone, the parent company of Nutricia, on its financial loss caused by the product recall in late September in 2013 (NZ Herald, 2013, September 26). The effort obviously could not resolve the issue between Fonterra and Danone. The NZ Government's damage control team apparently gave much attention to China, the top trade partner and the biggest dairy market of NZ. John Key led a so-called "milk run" team consisting of senior government officials, top Fonterra executives, and 30 CEOs of NZ dairy businesses to Beijing in March 2014, as reported by news media:

Key's campaign to assure China's leadership and its consumers that NZ's strengthened food safety system will ensure there is no repeat of the Fonterra case. (NZ Herald, 2014, March 19)

Mr Key left Beijing knowing China's leadership had accepted the assurances over food safety... the bilateral relations 'has never been stronger'. (NZ Herald, 2014, March 20)

John Key's "milk run" in China was a dramatic turn of the whole botulism scare. The NZ Prime Minister received unexpected hospitality from the Chinese leadership. The NZ Government effectively contained the damage of WPC80 crisis and turned it into an opportunity of a better business outlook in the Chinese dairy market. Some scholars gave credit to the long and unique bilateral relations between the two countries (Fox, 2013, August 10). The botulism apology tour concluded with an agreement that secured growth in NZ exports to the Chinese market and enhanced

bilateral trust (NZ Herald, 2014, March 22). However, it was not a happy ending for all parties. NZ small and medium dairy companies were faced with more difficult business environments. The Chinese dairy regulators were in the process of raising the industry threshold through consolidating the number of domestic and overseas dairy manufacturers (NZ Herald, 2014, March 22). The NZ Government approved a \$2 million support package to help those affected businesses regain market confidence (NZ Herald, 2013, September 12).

The NZ Government and MPI promised to hold all responsible parties to account to restore its reputation as a world leader in food safety regulation (MPI, 2013, August 25). During the unprecedented food safety crisis, Fonterra was criticised for making too many mistakes. Prime Minister John Key wanted answers from Fonterra on many questions, including its delay in informing its customers, MPI, and its verifier AsureQuality (NZ Herald, 2013, August 6c). The NZ public, dairy farmers, consumers, and other stakeholders also wanted to call Fonterra to account (Alex, 2013, August 7; NZ Herald, 2013, August 9b).

Consequently, a total of four inquiries were initiated throughout the Fonterra case, including two commissioned by the government with the following purposes:

To establish whether the scare was an isolated incident or indicative of a broader systemic issue...Ministry of Primary Industries 'compliance investigation' to determine whether regulatory requirements under the FA and the APA were met by all parties, or whether any parties have committed breaches or offences. (NZ Herald, 2013, August 13b)

In order to empower the government with more statutory power for a thorough and efficient inquiry process, the NZ Parliament passed a bill and updated the Inquiry Act (Vernon, 2013, August 13). The

two government inquiries involved key participants including Fonterra, MPI, AsureQuality, AgResearch, and Danone. To ensure Chinese regulators' confidence in the NZ Government inquiry, Prime Minister John Key even invited Chinese scientists to sit on the inquiry into the Fonterra case (National Business Review, 2013, August 12).

Government inquiries finally established significant mistakes committed by Fonterra, including, as summarised below in the inquiry report:

- Hautapu staff did not follow AsureQuality verifier's suggestion to degrade the affected WPC80 to stockfeed
- the RMP was ignored during the rework process
- a senior manager unwittingly approved a botulism test without seeking advice from scientist or top executive
- it contracted the toxin test to AgResearch, an unaccredited lab for botulism testing
- it did not inform the ministry and the public in a timely manner of the potential product contamination
- it dropped the botulism bombshell without a sound crisis response plan
- its product traceability proved to be inefficient
- its lack of collaboration with the ministry and other regulators (Dean et al., 2014, November 24).

The government inquiries identified the root causes of these problems as silo mentality in Fonterra's organisational culture, failed escalation procedures, and insufficient CSR within Fonterra (Dean et al., 2014, November 24). As a result, MPI filed four charges against Fonterra under the APA 1999 (Dean et al., 2014, November 24). The dairy giant pleaded guilty on all charges and was

fined 300,000 NZ dollars. Although MPI was satisfied with the result, other affected dairy companies were not happy (Hamish, 2014, April 5). The fine was allegedly too small to remedy NZ's loss in reputation and credibility.

Nutricia, a subsidiary of Danone, recalled its Karicare infant formula products from markets in eight countries (NZ Herald, 2013, October 18). Danone accused Fonterra of providing false information that misled Nutricia into continuing manufacturing and distributing the contaminated products (NZ Herald, 2014, June 26). The two parties could not reach an agreement on compensation for Danone's financial loss. The French company finally sued Fonterra Cooperative for 545 million NZ dollars and ended its contracts with the NZ dairy partner (The Dominion Post, 2014, July 19). Under increasing accountability pressure from home and abroad, Gary Romano, the managing director of the NZMP, resigned from his position (National Business Review, 2013, July 11). The incident in the end claimed another two managers' jobs, and a third was redeployed within the company. Fonterra also ceased outsourcing its public relations sector and started to build up its own capacity in the area (NZ Herald, 2013, October 30a).

All affected stakeholders of WPC80 incident, especially the NZ public and food product importers, were not contented with Fonterra and NZFSA. The Chinese food safety authorities blamed MPI for its lax regulation of the infant formula products, a sensitive issue for the Chinese government and public (NZ Herald, 2013, October 14). The chairman of the NZ Infant Formula Exporters Association criticised MPI as well as Fonterra for casting a shadow over the whole dairy industry of NZ (NZ Herald, 2013, August 6b). A crown prosecutor commented:

NZ's reputation and image for quality and safe dairy products in key foreign markets was damaged by the Fonterra case...The confidence of those markets in the effectiveness of NZ's

overall food safety regulatory system was shaken. (Hamish, 2014, April 5)

Fonterra was fined 300,000 NZ dollars only for the damage. The Labour Party called MPI's management of the crisis "a complete system failure" (NZ Herald, 2013, August 29) and questioned its compliance in handling the incident (NZ Herald, 2013, August 9a). MPI was pursued by tough questions such as whether the revealed shortfalls, including food safety monitoring and testing process, were a result of the merger of NZFSA and the Ministry of Agriculture and Forestry (MAF) (NZ Herald, 2013, August 6b). News media even claimed MPI's response was suspected to help cover up the incident (NZ Herald, 2013, August 31)

Then Prime Minister John Key wanted all issues to be addressed through the government inquiries so that he could give an assurance to foreign regulators and markets of NZ dairy products regulatory system and product quality (Vernon, 2013, August 13). The NZ Government commissioned a two-stage inquiry to review the dairy food safety regulatory system and responses of NZFSA (Dean et al., 2013, December 3). The government inquiries employed an investigative approach and involved a broad range of stakeholders, being noted in the inquiry report:

Inquiry members have adopted an investigative approach to the task, undertaking many interviews with dairy companies, regulators, accreditors, verifiers, infant formula manufacturers, customers, ministries, laboratories and industry or expert organisations in NZ. In addition, the Inquiry has consulted regulatory and expert organisations around the world. (Dean et al., 2013, December 3)

The two government inquiries established that the NZ food safety regulatory system was still fundamentally robust and consistent with international risk management principles (Dean et al., 2013, December 3). Given the complexity and urgency of the issue involving "public health, trade, market

access, tracing, infant formula supply and media problems” (Dean et al., 2014, November 24), the government inquiry commented positively on MPI’s precautionary approach. It was regarded as a demonstration of the responsibility and transparency of the NZ Government and its food safety regulators in handling food safety issues.

The inquiry also found the ministry lacked a single, coherent food incident management plan that could be implemented very easily (Dean et al., 2014, November 24). NZFSA needed more compliance and enforcement tools to handle future food safety crises. The government inquiry identified 29 shortfalls in the food safety regime and recommended MPI make relevant changes.

6.3 Loopholes identified in the Fonterra case

According to Boin et al. (2008), crisis events caused by regulatory failures normally lead to democratic processes of inquiry and accountability in the wake of the crisis. Such a process aims at drawing mature lessons and making substantive policy change to fill in the identified regulatory gaps. The authors suggest the crisis-induced processes of accountability and learning involves public debate and acceptance of inquiry findings and recommendations, sanction on the responsible parties, proposals of new policies, and strikes at opponents for political gains. All these scenarios played out in the Fonterra case. Though review of the NZ dairy food regulatory system proved it was still one of the best in the world, the opposition Labour Party questioned MPI for its complete systems failure (NZ Herald, 2013, August 29). An in-depth analysis of the data corpus in this study established some profound problems existing in the NZ dairy food safety regulatory system.

6.3.1 Confusing crisis response mechanism and undertrained staff

The botulism scare revealed multiple loopholes existing in NZ's food crisis response mechanism. MPI is the competent food safety authority responsible for handling major food safety issues in NZ and overseas. At the time of the botulism scare, neither FIRP nor TRP, the underpinning protocols of the food safety response system in NZ, had ever been officially approved or annually reviewed by MPI or its predecessor MAF. Making the situation even worse, the government inquiry found the two protocols were ill-defined and overlapping:

The ministry described the trade protocol as a “module” that can be linked to the food protocol, but the relationship between the two is ill-defined and lacks explicit guidance for staff about when to follow one rather than the other. The choice is made all the more difficult because of the amount of overlap between the two documents. (Dean et al., 2014, November 24)

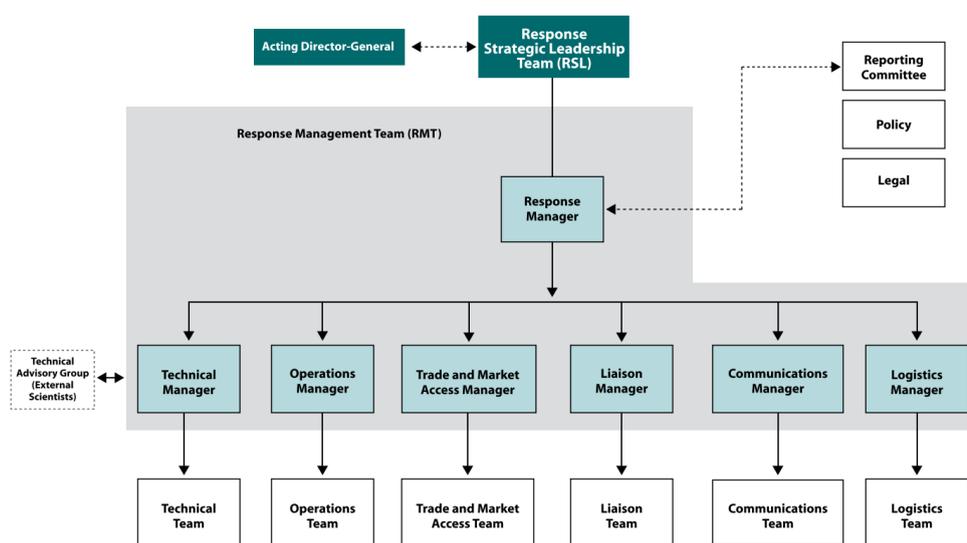
Under such circumstances, the crisis responders were bewildered as to when to follow which guidance. The dual protocol framework could not even produce an agreed crisis response leadership. The TRP required an RSL team to make strategic response decisions while the FIRP had no equivalent arrangement but an incident controller whose role was to report to the commander, the Director General, and coordinate and implement responses (Dean et al., 2014, November 24). When multiple government ministries were involved, the Department of the Prime Minister and Cabinet would set up the Officials Committee for Domestic and External Security Coordination as a leadership team. In response to the Fonterra case, the response management team was made up of RSL and general director (see Figure 16). The government inquiries found the two roles were overlapping in making strategic decisions (Dean et al., 2014, November 24).

The government inquiry identified another loophole regarding the approaches of product recall MPI should employ:

Neither food nor trade protocol contains guidance about how the ministry should approach the use of any of its statutory powers. (Dean et al., 2014, November 24)

A single, coherent food incident management protocol should have been implemented immediately. (MPI, 2014, December 9)

Figure 9 MPI's WPC80 incident response structure



Source: (Dean et al., 2014, November 24)

On top of the problems with the crisis response protocols, the government investigation also found related government agencies had no simulation or systematic staff training. Some government agencies and industry groups did not even know the existence of the two protocols:

there had been no systematic staff training in the protocol, although some staff were aware of the protocol or its predecessors from previous positions ... Nor had there been any effort to ensure

other government agencies and industry groups were aware of MPI's protocols. (Dean et al., 2014, November 24)

The ministry's response ... did not follow either of its protocols exclusively. Instead, the ministry adopted elements of both and added its own improvisations. (Dean et al., 2014, November 24)

As a result, MPI director general issued response decisions in the first three statements without any documented basis (Dean et al., 2014, November 24). All in all, MPI lacked commitment to ensuring readiness to handle a food incident demanding a coherent and automatic response from well-trained staff. After repeated mergers of the primary ministries, MPI was still absorbing the post-reorganisation change that had taken place over the past three years, as suggested by interviewees in the government inquiries:

Overall, there was a general lack of commitment to ensuring readiness to deal with a food safety incident. As more than one senior official candidly acknowledged, no one had 'taken ownership' of food safety. That appeared to be due, in part, to pressures and other priorities stemming from the merger. (Dean et al., 2014, November 24)

If it was true, to everyone's astonishment, the food safety authority did not even sort out who and which of its departments were responsible for food safety. The inquiry established MPI responded to what Fonterra perceived and described rather than outcomes of a risk assessment, nor did it seek input from other key stakeholders like Nutricia. Otherwise, MPI was very likely to pick up the fact AgResearch's testing report was a preliminary one stating "likely" clostridium botulinum, not "confirmed" as Fonterra reported to MPI. The government investigation suggested an appropriate

budget for MPI to fund its daily operation, regular simulation of RMP, and reform in dairy regulation (MPI, 2014, December 9).

6.3.2 Defective verification system and underperforming auditors

The RMPs of dairy operators constituted a central part of the dairy regulatory system in managing food safety hazards and risks. The independent verifiers were responsible for auditing the implementation of the RMP by the operators. Verifiers were empowered to get access to manufacturing sites, to examine related information, and to test samples. Even high-performing dairy manufacturers were subject to quarterly auditing and intense scrutiny. In the case of the Fonterra case, the verifier was AsureQuality, a government owned organisation. The 2013 government inquiry found Fonterra underwent more than 850 audits⁴⁹, including 212 regulatory audits by AsureQuality (Dean et al., 2013, December 3). Despite this, AsureQuality did not find high readings of SRC in the impacted WPC80 products from the Hautapu plant. The verifier did not show up when receiving a category B event from Fonterra plant, nor did it come to supervise the reworking of the impacted products. The reworked WPC80 products were finally verified as qualified products for its purpose. Both industry and verifiers were obliged to report certain food safety concerns/events. However, government inquiries found the notification requirements were complex, overlapping, and at times confusing (Dean et al., 2014, November 24). When the verifier noticed the complaint of Darnum in Fonterra's system, she recognised it as a food spoilage and did not report the issue to MPI. The NZ Government inquiry found AsureQuality was unaware of changes in Fonterra's RMP that had been under the verifier's watch.

⁴⁹ In addition to regulatory audits, there were internal and customer audits.

This study found the independence of the third-party verification system could be compromised, as indicated in the government inquiry:

Like all dairy processors, Fonterra had then, and now, RMP, the centrepiece of the dairy regulatory system to manage hazards and risks, including those related to food safety. These are regularly audited by third-party verifiers paid by the dairy company. (Dean et al., 2014, November 24)

The routine practice demonstrates an awkward situation faced by verifiers in its relationship with dairy operators and MPI. They obviously could not maintain independence when they would be qualified by MPI and paid by the industry. Given the key role verifiers play in ensuring food safety, it was a big loophole in the food safety regulatory system. The government inquiry hence raised the question of potential conflicts of interest in the role of the verifier. Other related stakeholders, especially foreign regulators, were not confident in the independence of the verification system as well. According to the government inquiry,

Some participants, including overseas regulatory authorities, have voiced concerns about the potential for conflicts of interest, perceived or otherwise, in the NZ model, pointing to the vulnerability of recognised agencies to commercial pressures from operators. (Dean et al., 2013, December 3)

Reviewers of the dairy food safety regulatory system recommended MPI clarify the verifier's role as a client of the regulator rather than the industry (Dean et al., 2013, December 3).

In addition to the controversial role of verifiers, lack of competition in the verification market was recognised by investigators as a concern. The verification service had been dominated by crown-

owned verifiers (see Appendix 4) since the APA 1999 was enacted, as noted in the government inquiries:

In the 14 years since the Act was enacted, very little competition has emerged. In the dairy sector there are only three verifiers with AsureQuality verifying over 75% of the dairy industry, and MPI Verification Services the majority of the remainder. In other sectors, MPI Verification Service and AsureQuality are the dominant or only providers, with the exception of the wine and food sector. (MPI, 2014, December 9)

Private verifiers accounted for only a negligible share of the market. The investigation team recommended MPI reform the verification system to ensure independence of the verifiers and competition in the verification service market (Dean et al., 2013, December 3; Fox, 2013).

6.3.3 Imperfect food safety standards and suspect testing capacity:

In the Fonterra case, the high readings of SRC in Dornum's nutritional powder for Danone in March 2013 was a key factor leading to testing for clostridium botulinum in the reworked WPC80 products. However, testing and reporting SRC levels was not a compulsory food safety standard stipulated by the APA 1999 at the time, as suggested in the inquiry:

Fonterra's ingredient specifications for SRC limits differed from one major customer's end-product specifications: indeed, no SRC specification for WPC80 applied at that time. (Dean et al., 2014, November 24)

Samples were tested – although not for SRC – and the reworked powder was deemed to have met all regulatory requirements as well as customer specifications. (Dean et al., 2014, November 24)

The impacted WPC80 products were therefore distributed because they were tested as approved in accordance with NZ food safety standards for WPC80 products. However, as part of best practice, the product specifications were required to satisfy the most rigorous safety and quality standards set by customers. Danone set a maximum SRC level of 50cfu/g for its nutritional products. In March 2013, a total of 1688 tonnes⁵⁰ of Dornum's final products, using the reworked WPC80 products as an ingredient, were initially rejected after being tested as "unfit for purpose" (Dean et al., 2014, November 24, p. 42). The government inquiry stated Fonterra did not test WPC80 products for SRC levels, stating "Fonterra did not test WPC80 for the type of contamination (SRC) caused by using the inadequately cleaned hoses and pipe" (Dean et al., 2014, November 24, p. 7). However, one of MPI's reports on traceability and verification of WPC80 products in 2013 shows Fonterra did test for SRC, comparing the readings from original manufacture and rework output (MPI, 2013, August 25). The report demonstrates the drastic rise of SRC levels in the reworked products manufactured with the contaminated equipment (see Appendix 5). The government inquiry established:

(MPI) did not put infant formula and other high-risk products under close watch in terms of revision of food safety related requirements, testing standards, and traceability. (Dean et al., 2014, November 24)

Testing of clostridium botulinum was not conducted in NZ dairy product regulatory system. Given its rarity in occurrence, it is not a routine testing standard of the Codex Alimentarius as well (Dean et al., 2013, December 3). Danone refused to accept Fonterra's contaminated nutritional products because one of its microbiologists advised it was a key indicator guarding against infant

⁵⁰ 12 batches of Dornum's products exceeded the permitted limit, with one batch of them having a reading of 360cfu/g.

botulism. FRDC decided to carry out clostridium botulinum testing after its internal testing analysis found close relations between *C. sporogenes* and clostridium botulinum (Dean et al., 2014, November 24). Further testing was needed to distinguish the two strains of bacteria. The government inquiry found the testing of clostridium botulinum was an unwittingly decision made by a manager of Fonterra without reporting to its senior executives. Nor did FRDC notify MPI or AsureQuality of the food safety concern and testing of clostridium botulinum.

AgResearch was reportedly one of two research facilities in NZ capable of testing botulism bacteria (NZ Herald, 2013, August 28). However, the crown-owned lab was unaccredited for botulinum testing and Fonterra FRDC commissioned the testing contract despite its knowledge of the fact (Dean et al., 2014, November 24). AgResearch toxicologist conducted two mouse bioassays without being clearly informed of the nature and purpose of the work. Upon Fonterra's request for a preliminary report, AgResearch emailed a draft on August 2 outlining its results of initial investigation. Classic symptoms of botulinum toxin were exhibited, likely clostridium botulinum had been identified and further testing to determine the toxin type was implied (Dean et al., 2014, November 24). AgResearch stated clearly in the draft report it was not a registered diagnostic facility and the results were for research rather than diagnostic purposes.

Fonterra reported to MPI of the botulism concern based on 'confirmed' testing reports from AgResearch. According to the government inquiry, AgResearch was astonished when it learned from news media that Fonterra had reported to MPI a confirmed clostridium botulinum contamination (Dean et al., 2014, November 24). AgResearch did not engage with MPI to clarify the misinterpretation of its report, possibly due to its confidentiality obligation to clients. Neither did

MPI urge Fonterra to provide the report though the ministry had general power to force RMP operators to release related documents.

In spite of the flurry of emails and phone calls with Fonterra, MPI did not, in the Inquiry's view, show sufficient urgency in gaining access to AgResearch's preliminary report... But the result was that the ministry did not have access to the report until 7pm on 4 August, more than 48 hours after notification. (Dean et al., 2014, November 24)

The government inquiry identified it as a shortfall in MPI's statutory power and recommended empowerment of MPI to override any confidentiality obligations and demand related documents for risk assessment. MPI decided to verify testing results from AgResearch by using accredited labs. It turned out to be a turning point in the whole incident. It is unfair to blame AgResearch given Fonterra concealed key information, including the purpose of the tests, from it. However, NZ scientists slammed both Fonterra and AgResearch for the way of the tests were conducted, which consequently led to a catastrophic food safety scare. A microbiologist commented:

How it was done should be determined by how much Fonterra was willing to pay... it sounds like a quick and dirty way to do it... the sample size and the data produced were not enough to make a huge decision like that. The question is whether they were given the time and funds to do the work that needed to be done. (NZ Herald, 2013, September 7)

Despite disputes about AgResearch's testing capability, botulinum toxin was not listed as a routine food testing criterion in both NZ and international food safety standards. However, a couple of other food safety incidents were cited to question NZ's food safety testing capacity. In February 2013, Fonterra dairy products exported to Sri Lanka were tested and found to be dicyandiamide-

contaminated by local regulators. It caused concern in the Chinese market when Chinese dairy experts said dicyandiamide was very similar to melamine in composition and it was harmful to human kidneys (China Daily, 2013, August 13). When the then Prime Minister John Key was visiting China handling the botulism scare, imported products from Westland Milk Products, the second largest dairy company in NZ, were quarantined by Chinese regulators for high levels of nitrate from a cleaning fluid (Hamish, 2013, August 20). Chinese food safety regulators were reportedly not happy with the situation:

In the recent case of botulism, the Chinese authorities have accused the NZ regulators of lax standards. This should be seen in the broader context of a growing willingness by the Chinese regulatory authorities to take a tougher attitude towards the practices of foreign firms, and, it should be noted, Chinese firms as well. (NZ Herald, 2013, October 14)

It indicated that the Chinese food safety authority was not concerned about NZ's dairy food safety regulations, but their enforcement. In response, MPI immediately revoked the company's export certificate.

6.3.4 Deficient traceability and communication problems in product recall:

As the largest dairy products exporter, Fonterra had been supplying WPC80 products to customers all over the world. The three batches of impacted products, 37.8 tonnes in total, ended up being processed in two Fonterra plants and three Nutricia manufacturing facilities in NZ⁵¹, with the rest being exported to eight customers in seven foreign countries⁵² (see Figure 17) between July 2012

⁵¹ More than 53kgs were used by NZAgbiz, and 25kg to FRDC for research and trials.

⁵² The seven impacted countries included Australia, China, Vietnam, Saudi Arabia, Philippines, Thailand, Malaysia.

and June 2013 (Dean et al., 2014, November 24; MPI, 2013, August 25, 2014, December 9). Government inquiries found both the industry and MPI had difficulty in tracking down and recalling

Figure 10 Affected foreign customers of WPC80 incident



Source:(MPI, 2014, December 9)

the impacted products soon enough. The contaminated WPC80 products, being used as ingredients, were made into 6,000 tonnes of infant formula and thousands of tonnes of other products like milk base powder⁵³, dairy beverages, yoghurt, sports drinks, and stock food. Given the length of the time, some of the final products had already been consumed. Verifying and tracking down all impacted products in storage or on market shelves was an enormous task for Fonterra, MPI, and other involved

⁵³ Milk base powder is used as ingredients of other products.

parties. Many other factors, such as the different tracing systems used by dairy companies, weighed in on the already complex issue (MPI, 2013, August 25).

On top of the already complex situation, the dairy giant kept changing its information to MPI and Nutricia, which frustrated them in deciding which batches of products should be recalled (MPI, 2013, August 25).

Fonterra advised Danone and the ministry on 2 August that it had supplied Danone with 590.5 tonnes of contaminated production. Three days later, that figure had jumped to 1,631.1 tonnes, an increase of 176 per cent. By 18 August, contaminated production had climbed to its final peak of 1,759 tonnes. But even those numbers fail to give a true sense of the fluidity of the situation. Altogether, Danone received 17 variations to product totals during the 16-day period. Information given to MPI changed eight times between 2 and 27 August. (Dean et al., 2014, November 24)

MPI consequently issued three Director-General statements in three days to clarify inaccurate information previously provided to the public. MPI's information and the Director-General's statements were criticised by the media and public for lack of accuracy regarding the impacted products, especially infant formula (Dean et al., 2014, November 24). Fonterra's product tracing system proved to be deficient to cope with such a bewilderingly complex challenge. The company could not track down the 1,759 tonnes of nutritional powder supplied to Danone (Dean et al., 2014, November 24). MPI sent auditors to all affected premises to verify information provided by Fonterra. It took MPI more than three days to figure out what to recall from the market. Nutricia alone recalled 7.5 million cans and pouches of infant formula from the market. It took MPI and related parties over three weeks to eventually track down and verify all affected products by August 25 (Dean et al., 2013,

December 3). It was not until August 9 that the ministry could notify the food safety authorities of the seven affected countries and the WHO of related information (MPI, 2014, December 9).

Crisis communication was a major problem during the products recall. Due to lack of coordination and mutual trust between Fonterra and MPI, sometimes disputing information released by the two parties confused and enraged mothers of young babies. When the first two Director-General statements were released at press conferences, MPI was criticised for lack of coordination with related parties to produce reliable information. An association member in the industry commented:

There wasn't full and frank disclosure of the facts at the earliest possible time so that parents could make a decision what to do regarding the safety of their infant. Mr Claridge said the association had warned the Government three months ago that the response to such an issue needed to be properly coordinated. "Our members have always been concerned that anything that affects our reputation should be coordinated across the relevant government departments involved." (NZ Herald, 2013, August 5)

MPI was also blamed for failing to coordinate effectively with MOH to update and publish consistent information about impacted infant formula products. Parents at home and abroad were concerned but had no idea what to do and which products were safe to buy.

It did not say what specific products consumers should avoid; what the risks of contracting botulism were; what medical advice should be followed; or how widely the problem might have spread. Risk communication framework and resources were not in place. The ministry also lacked a single, coherent food incident plan to implement straight away. (Dean et al., 2014, November

24)

Many Chinese parents were reportedly devastated by the incident and did not know where to buy safe infant formula (NZ Herald, 2013, August 1). In the wake of the crisis, the government inquiry identified the lack of a coordinated crisis response plan was another major factor contributing to the chaotic situation. MPI was recommended to improve readiness for food safety incidents through coordinating effectively with other government agencies and involved parties.

The government inquiry established several loopholes in food safety legislation. There was no legislation concerning requirements for certain kinds of testing being conducted by accredited labs. If no accredited labs were available, such as what had happened in the Fonterra case, there was no legal obligation on the industry to seek MPI's approval to test in unaccredited labs (MPI, 2014, December 9). The government inquiries indicated MPI lacked sufficient statutory power to get access to key information in times of food safety incident:

The law should be amended to give the ministry a specific statutory power to compel disclosure of relevant information (including test results) needed to respond effectively to a food safety incident. The power should include the ability to disclose such information to any affected party. (MPI, 2014, December 9)

On top of compulsion of test results and other necessary information access, MPI was recommended to have the power to disclose such information to other affected parties. In the end, the government inquiry established 29 shortfalls in the dairy product regulation and food safety crisis response systems and recommend the ministry make relevant changes to address the problems. (NZ Herald, 2013, December 12)

Though MPI accepted all the recommendations of the inquiry team, it defended its initiation of the precautionary recall. Acting director general Scott Gallacher said in a statement:

When MPI received information from Fonterra on August 2 ..., I immediately adopted a precautionary approach to protect consumers both here and overseas... We needed to act on what we knew at that time. The information we had then said there was a food safety risk to consumers, and we moved quickly to address it. (NZ Herald, 2013, August 28)

MPI suggested it would adopt the same precautionary approach again given the circumstances that a potentially lethal toxin put young children and other consumers' life and health at risk (Dean et al., 2014, November 24).

6.4 Evidence of crisis-induced organisational learning in NZFSA

After investigation and identification of loopholes in the NZ food safety regulator and regime for dairy products, this section answers the research question: what evidence that crisis-induced organisational learning is there occurred in the food safety authority and the dairy food safety regimes. To learn from WPC80 incident and prevent repetition of such avoidable crises was a major objective of the crisis response proposal, in addition to other objectives including protection of consumer health and protection of the reputation of NZ food products (MPI, 2014, December 9). The NZ Government allocated 12 million NZ dollars more budget every year to MPI to implement the recommendations and make changes in the government organisation and food safety system (NZ Herald, 2013, December 12). These changes ranged from operational adjustments to a strategic move to establish a global dairy safety and quality benchmark under a four-year project (Hamish, 2013, August 7).

This evidence of crisis-induced organisational learning evidence can be summarised into several areas, including new food safety-related legislation, organisational structural change in the food safety regulator and verifiers, new food safety standards and testing capacity, updated product traceability and recall system, and the crisis response mechanism (see Appendix 6). To facilitate the new changes in the food safety system, the NZ Government appropriated millions of dollars in extra budget to fund food regulatory reform, expand the presence of MPI in overseas markets, and establish new government branches including the Food Safety Assurance Advisory Council and the Daily Traceability Working Group (Dean et al., 2014, November 24).

6.4.1 Changes in New Zealand food safety-related legislation

The first crisis-induced change in legislation took place at the peak of the botulism crisis. To speed up the government inquiry, Parliament rushed to pass a long-delayed government inquiry bill that was first introduced in 2008 (NZ Herald, 2013, August 13a). The Inquiries Bill empowered the Government to compel all necessary evidence from the industry, ensuring a thorough and quick investigation into WPC80 incident (Vernon, 2013, August 13).

Another important change in NZ food safety legislation was the passage of the FA in June 2014 to replace the FA 1981. The FA 2014 took effect in March 2016, giving the Director-General of MPI more power to force a mandatory recall (MPI, 2020, November 16b). MPI was obligated to monitor the performance of verifiers under the FA 2014:

A principle of the Food Act is consistent and fair application of the Act including the assessment of food safety and suitability. MPI has assessed the monthly reporting requirements as the minimum data requirements needed to effectively assess verification performance. (MPI, 2016,

March 22)

This new obligation on verifiers was a significant learning result from WPC80 incident. AsureQuality made crucial mistakes at several decision points in the development of the crisis. It failed to hold Fonterra to its RMP in the reworking and product verification processes. The verifier did not report to MPI when its auditor noticed the dispute within Fonterra branches on WPC80 contamination. The reporting requirements under the FA 2014 would empower MPI not only to assess verifiers, implementation of their duties and hold them to account but also to be informed of food safety issues and intervene at an early stage of a crisis.

The new food safety law changed the Director-General's power in food safety regulation exemptions. According to the FA 1981, the Director-General had power, with limitations, to grant or revoke requirements related to RMP, animal product standards, and fees. While, in the FA 2014, exemption power in fee waiver was maintained but was mostly limited to fund-raising as stipulated in Article 31: "Exemption from food control plan and national programme if trading in food for certain fund-raising" (NZ Parliament, 2021, February 23, p. 46). The new change could prevent MPI from making similar mistakes to those of ACSIQ in the Chinese case. Exemption from food safety regulations proved to be risky when other quality control procedures were compromised. The WPC80 incident showed that MPI could not rely on the verification system to ensure food safety if it had exempted Fonterra from food safety regulations. The FA 2014 obviously closed a major loophole in the FA 1981 and limited the exemption to fund raising or charity activities.

Other related changes in the new law covered food recall, food imports, and food regulation enforcement and penalties (MPI, 2014, December 9). The Fonterra case exposed the complexity of food product recall and shortfalls in NZ's food product recall system. Both Fonterra and MPI were

criticised for their deficiency in tracing and recalling the impacted products. The FA 2014 enhanced MPI's statutory power to initiate a compulsory product recall and specified the notification obligations of manufacturers. To prevent food operators from making changes to their RMPs without notifying food safety authorities, as Fonterra had before WPC80 incident, the new law made related changes as well:

The FA 2014 gives the chief executive of MPI the power to direct a food recall if needed. (MPI, 2020, November 16a)

The operator of a registered food control plan must give written notice to the registration authority of any significant change in circumstances. (NZ Parliament, 2021, February 23)

Previously a recall under the FA 1981 could only be directed by the Minister for Food Safety. The new law allocated the power to the CEO of MPI. The new empowerment meant less time and efforts for communication between offices and quicker decisions on product recall. The new law obligated food operators to seek approval from MPI for important changes in their RMPs. As a result, the verifiers and MPI would not be kept in the dark about the changes and could impose quality control accordingly.

However, the FA 2014 did not make significant enough changes to address problems in traceability and verification systems. A working group on dairy traceability submitted a report to MPI, recommending further regulatory changes in those two aspects. An information sharing requirement was crucial part of the recommendations. The working group suggested food operators should share their data records with MPI and verifiers, including information on raw material supply sources, production processes, stocks, and sales and transportation details (MPI, 2015, January 1).

Consequently, a reform bill was introduced to the parliament in June 2016, three months after the FA 2014 was enforced, as introduced by the NZ Government:

The Bill amends the Animal Products Act 1999, Food Act 2014, and Wine Act 2003 so improvements, recommended by the dairy-focused WPC Inquiry, apply across the system. The Bill provides for regulations to set the traceability and recall requirements that are essential to food safety and maintenance of NZ's reputation. (NZ Government, 2018)

The regulations included empowering MPI to get necessary information from food manufacturers and release such information to the public in food safety response scenarios.

The reform bill included comprehensive changes in the food safety regulations. The new changes were aimed at addressing legal changes recommended by the government inquiries on WPC80 incident (Office of the Minister of Food Safety, 2015, July 15). Though the focus of WPC80 inquiries and recommendations were on the dairy industry, the reform bill sought to amend and enhance three food safety acts, the APA 1999, the FA 2014, and the Wine Act 2003. According to the NZ Parliament (2016, September 9), the reform bill was also aimed at minimising overlaps or inconsistency in food legislation and improving its interface with other food acts.

To address a perceived conflict of interest in the process of verification identified in the government inquiry into the botulism scare, the reform bill requires a verifier provide accreditation reports to the ministry rather than the industry:

For the avoidance of doubt, clarify that the first duty of Recognized Agencies and Persons is to the relevant regulator...to amend the regulation-making power in the three food safety Acts to permit a requirement to be set that an agency applying to the Ministry for Primary Industries for

recognition, or to maintain such recognition, must either provide, or authorise the accreditation body that assesses the agency against international standards to provide, all the agency's accreditation reports directly to the Ministry (Office of the Minister of Food Safety, 2015, July 15)

To further address the conflict of interest in the verifiers' role, verification fees were to be paid by MPI rather than by the industry. This study has found that the 2013 botulism scare induced comprehensive and long-term organisational learning in NZ's food safety regulators and regime. Parliament passed the 2018 FSLRA as an amendment to the FA 2014 to further address problems identified in WPC80 incident inquiries. According to the food safety legislation plan scheduled between 2020 and 2021, MPI will follow the recommendations of WPC80 incident inquiry and make further regulatory amendments to current food safety acts, including changes related to food recalls, risk plans, and regulation design under the Animal Products and Wine Acts, (MPI, 2020, July 31).

6.4.2 Improvements in food safety standard and testing capability

The WPC80 incident identified problems in both the testing standard and testing capacity. It was the high reading of SRC that triggered the internal investigation into the WPC80 contamination within Fonterra and the problematic test reports from AgResearch that detonated the biggest food safety crisis in NZ. There was no mandatory SRC specification for WPC80 products in NZ's food safety standard. This study found the crisis did not lead to straightforward change in this regard.

SRC testing should not be mandatory for all dairy products. (Dean et al., 2013, December 3)

Fonterra has now introduced WPC80 specifications that meet end-customer requirements (particularly for infant formula) by including SRC testing. MPI is also reviewing specifications for infant formula. (Dean et al., 2014, November 24)

Although this testing is not required, MPI has added SRC testing to a dairy testing programme for high-risk nutritional powders. (NZ Government, 2014, December 9)

MPI scientists initially did not think the testing for SRCs was significant. Botulism is a disease affecting infants less than one-year old. There had been no cases of botulism illness caused by contamination of infant formula in NZ⁵⁴ (MPI, 2014, December 9). The presence of SRCs in dairy products is not an indicator of the existence of clostridium botulinum. However, a high reading of SRCs indicates defects or problems in food processing (MPI, 2014, October 1). When Fonterra included SRC testing in its RMP to meet its customers' requirements, MPI finally decided to mandate it for certain dairy products. According to the consolidated list of tests for animal products imposed by MPI in 2021 (Appendix 7), both clostridium botulinum and SRC were listed later in the microbiology testing requirements for all dairy products (MPI, 2021, September 1). The limit for infant specification for WPC80 products was set as 100cfu/g, taking effect from August 2013.

To enhance its testing capability for food safety, the NZ Government was in the process of building a Food Safety Science and Research Centre (FSSRC) hosted by Massey University (NZ Government, 2014, December 9). Both the government and the food industry were committed to funding the project (Dean et al., 2014, November 24). Under the FA 2014, food tests were required

⁵⁴ There have been a couple of cases in NZ in the last 35 years, according to a news article of NZ Herald, but not caused by infant formula.

to be conducted in accredited labs. MPI, the FSSRC, and labs were committed to collaborate and provide a globally accredited microbiological testing service in NZ (Dean et al., 2014, November 24). At the same time, dairy verifiers started to conduct unannounced audits in some dairy plants as recommended by the government inquiry,

(MPI) has compiled a list of all laboratories and the tests for which they have been accredited. MPI is currently consulting industry and laboratories on their non-routine testing capabilities.

Unannounced audits of specific premises have also commenced. MPI is maintaining contact with verifiers through Verifier Summits and regular teleconferences. (NZ Government, 2014, December 9)

The FA 2014 obligated the industry with new food safety standards and practices. If no accredited lab was available for a new test, manufacturers were compelled to seek approval from MPI to be tested in an unaccredited lab (MPI, 2020, November 16a, 2020, November 16b). According to MPI's report on its progress in implementing WPC80 inquiry recommendations, the ministry, in collaboration with verifiers and labs, was making efforts to update food safety guidelines under the supervision of the Parliamentary Counsel Office.

6.4.3 Updates in crisis response and coordination

MPI was criticised for lack of readiness in crisis response planning and simulation. The poorly-coordinated responses between different government agencies and other parties involved in the incident indicated a systemic failure, especially with regard to crisis communication to the public. One of the many lessons to learn from the crisis was the need for the ministry and the industry to plan and test their crisis response protocols so that they could have coordinated effective and swift

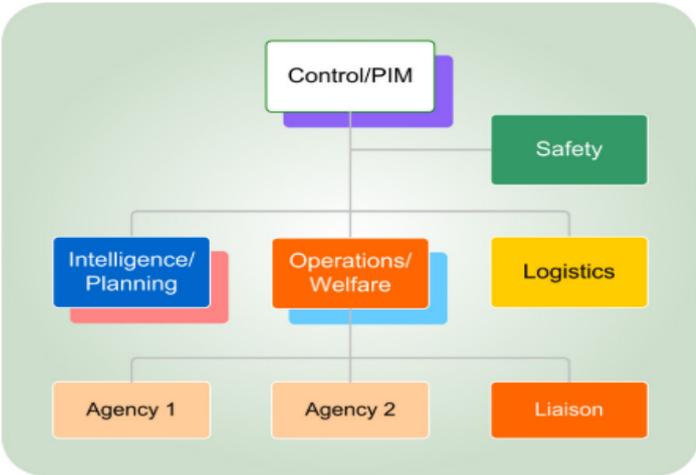
responses in future crisis scenarios (Dean et al., 2014, November 24). MPI has made significant progress, including working with other government agencies to build an integrated crisis response module.

The ministry is now developing a single scalable response model to standardise its management of all incidents, but with customised modules to reflect the diverse range of incidents that it may have to deal with.

MPI is working closely with other government agencies, including Department of the Prime Minister and Cabinet, on the new response model. (Dean et al., 2014, November 24)

This new model laid the foundation for future crisis scenarios when multiple government agencies were involved. To facilitate changes in the crisis response system, the NZ Government updated the 1998 CIMS in April 2014 to establish an integrated emergency management system with multiple agencies involved (NZ Government, 2014, April 10) (see Figure 18). Under the new framework, the

Figure 18 Multiple-agency response module under the 2014 CIMS

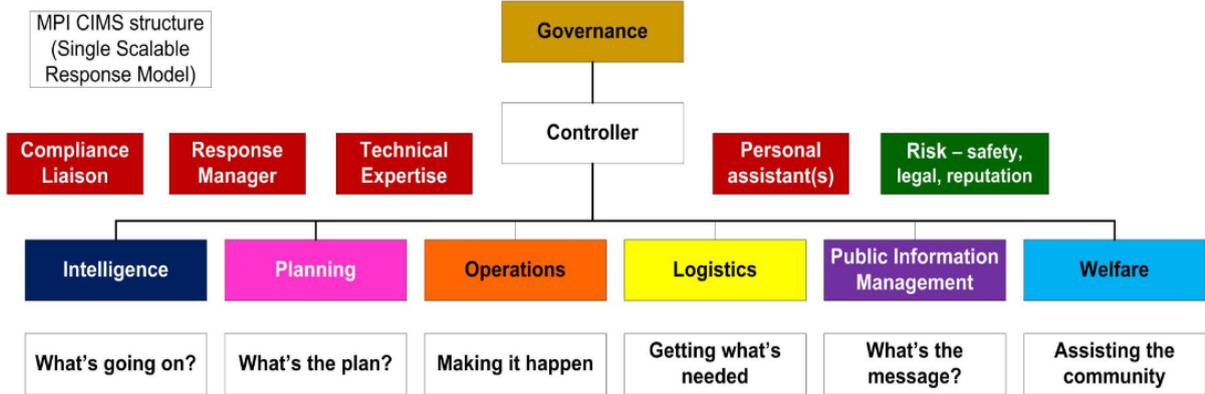


Source: NZ Government (2014, April 10)

incident controller, normally from the lead Agency was responsible for commanding all response activities. The controller was empowered to appoint function managers and coordinate other support agencies.

In alignment with the underpinning CIMS, MPI made related changes in its food safety response framework. The WPC80 incident government inquiry confirmed MPI had made good progress in identifying core competencies for food safety crisis response and was committed to finish the development of an integrated crisis response model by the end of 2014 (Dean et al., 2014, November 24). The ministry started implementation of the new model (see Figure 19) in 2015 after testing with other government agencies and the dairy industry (NZ Government, 2014, December 9). Food safety incidents would still use the RSL structure based on the FIRP and the TRP. Drawing lessons from

Figure 19 MPI’s coordinated incident management model



Source: (MPI, 2017, December 14)

WPC80 incident, MPI and other food safety crisis response agencies started to collaborate in staff training to strengthen coordination and readiness for future responses, as indicated in the government inquiry:

Undertaking regular exercises/simulations of its food incident protocol ranging from smaller desktop exercises through to largescale, multi-agency rehearsals.

Only staff with training in the CIMS approach will be part of any food safety response. (Dean et al., 2014, November 24)

MPI made the response capabilities a necessary competence for the role of food safety officials. A Dairy Capability Working Group was established under the ministry to identify such core competencies and develop them into crisis response programs. MPI got an extra annual eight million NZ dollars budget annually for four years to fund regular simulations and dairy regulation reform (MPI, 2014, December 9; NZ Government, 2014, December 9). To improve crisis communication with related food safety agencies and other key stakeholders such as the public, MPI developed a Risk Communication Framework that can be applied alongside other risk management practices (NZ Government, 2014, December 9). Rebuilding of the crisis communication framework included overhaul of its web presence by integrating the contents of seven inherited websites, establishment of a contact centre helpline, assignment of new communication teams connecting clients and foreign regulators, and providing additional support to the Food Safety Consumer helpline (MPI, 2014, December 9).

6.4.4 Reinforcement of verification and traceability

MPI and the NZ Government were faced with the immediate task of strengthening verification and traceability systems. To uphold the value of being a robust regulatory system ensuring premium dairy product quality, MPI was supposed to improve the genuine independence of verifiers and verifying agents in its auditing and verification system. The government inquiry recommended the

ministry clarify the verifier's role as an agent of MPI, not the industry. As a result, MPI was asked to remove a perceived conflict of interest between the dairy industry and their verifiers for several reasons.

It may create perception issues for our overseas trading partners whose regimes have a higher level of direct government intervention. (MPI, 2014, December 9)

MPI to assume responsibility for the contractual relationship with third party verifiers to remove perceptions of a conflict of interest between verifiers and the businesses they verify. (MPI, 2013, October 8)

when recognised agencies and persons are providing verification and evaluation services, their primary accountability is to the regulator. (NZ Government, 2018)

The clarification did not happen until the passage of the Food Safety Reform Law in 2018. To avoid a conflict of interest, the industry was required to pay verification service fees to the ministry rather than directly to verifiers. Developing a competitive verification market was regarded as a solution to strengthen third-party status and the genuine independence of verifiers. To achieve this goal, the investigation team recommended withdrawing government verifiers such as AsureQuality from the market and contracting out verification services to competing verifiers.

To address the lack of competition in the verification market, a contestable model was under development, according to a report from MPI:

The Animal Products Act specifically provides for third parties to undertake verification services in contest with the government verifier. It was expected when this contestable model was

established that Government would step back and a competitive market, with multiple third-party suppliers, would develop over time. (MPI, 2014, December 9)

However, there was no timeline for the completion and implementation of the model and full withdrawal of government verifiers. MPI supported the industry in having freedom to choose verifiers, regarding it as good progress towards contestability of the verification service (MPI, 2014, December 9).

In July 2014, a Food Safety and Assurance Advisory Council was founded to provide strategic advice at quarterly meetings to the Director-General on the entire food safety and assurance regime. The Advisory Council was to support leadership and planning of the systems by:

measuring the performance of the food safety system, identifying risks and opportunities, and ensuring NZ is prepared to deal with food safety events and incidents. (NZ Government, 2014, December 9)

Verification Services has now been shifted to the Regulation and Assurance Branch. (MPI, 2014, December 9)

The shift was for structural improvements to facilitate an integrated food safety system, following the WPC Inquiry recommendations. This change could produce stronger system accountability, as recommended by the government inquiry (MPI, 2014, December 9).

At the same time, relying on the dairy industry for self-regulation and a third-party in to monitor, assess, and report performance of the dairy sector against their RMPs proved to be problematic (Fox, 2013; MPI, 2014, December 9). The regulator was advised to improve its visibility to guarantee a

high level of scrutiny in the process of verification (Dean et al., 2013, December 3). To increase MPI's monitoring and auditing processes, an Audit, Assurance and Monitoring Directorate was set up to lead the branch. Under the directorate, a Manager Systems Audit played a key role in tracking auditing information and overseeing the dairy industry and verification services. A new Regulation and Assurance Branch⁵⁵ and a new Food Policy Directorate were later established to strengthen MPI's visibility in its food safety role (NZ Government, 2014, December 9).

To ensure effective management of the product tracing and recall system, timely updating of food safety legislation was recognised as critical by the government inquiry (MPI, 2014, December 9). In response, a Dairy Traceability Working Group, consisting of MPI, the dairy industry, the Food and Grocery Council, and the international customer's perspective was established in 2014 (Dean et al., 2013, December 3, 2014, November 24). It aimed to quickly locate food products in the supply chain and ensure effective recall of any unsuitable or unsafe food products (Dean et al., 2013, December 3). Some new measures were put in place in the process of verification. On top of auditing clean-in-place processes, sampling, and testing, verifiers were required to report information related to traceability and recall processes information to the regulator (Dean et al., 2014, November 24), especially for infant formula regulation products. The 2018 Reform Bill went further by involving food operators' upstream suppliers.

Draft regulatory standards covering infant formula export labelling, traceability, and manufacturing were released for public consultation in 2014. MPI intends to issue the standards

⁵⁵ A result of merger of three former MPI branches, namely the former Standards, Resource Management and Programmes, and Verification and Systems Branches.

progressively in the first half of 2015 as technical details and drafting are finalised. (NZ Government, 2014, December 9)

The Reform Bill allows the government to require businesses and individuals that deliver services to food operators ...to provide information relevant to managing serious food safety incidents. (NZ Government, 2018)

The FA 2014 stipulated new traceability regulations, including compelling the ministry to share material records and related information in the process of production (MPI, 2020, November 16a, 2020, November 16b). The 2018 Food Safety Law Reform Bill gave more importance to product traceability and recall systems. It increased the obligation to provide more detailed traceability information. The reform bill increased MPI's power to get access to necessary information from suppliers and other business partners of the food industry, with articles in place protecting confidential information at the same time (NZ Government, 2018). In addition, MPI was running an Exercise Program with the involvement of the industry to strengthen food incident response capacity and product traceability (MPI, 2014, December 9).

To clarify MPI's responsibility and accountability in food safety, the ministry assigned a new leadership team, the Deputy Director-General Regulation and Assurance, to lead the food safety system (MPI, 2014, December 9). The Food Safety Reform Bill added enforcement tools to ensure tougher and a broader range of penalties on food safety offences (NZ Government, 2018). To increase MPI's overseas presence, as the government was committed to WPC80 inquiry, the ministry got more than 8 million NZ dollars budget to deploy employees to China and other countries in Middle East, North Africa, and Latin America (NZ Government, 2014, December 9).

6.5 Discussion: the 2013 botulism scare and crisis-induced learning in NZFSA

The Fonterra WPC80 incident was a major food safety crisis triggered by a false alarm. The consequent global product recall caused unprecedented damage to NZ's reputation as a premium dairy food supplier to the world. As in most scenarios of an avoidable crisis, there were chances for Fonterra and NZFSA to prevent the production accident from developing into a disaster. Though co-existence of a solo mentality culture and opportunistic behaviour in Fonterra was the main cause of the incident, lax regulation by AsureQuality in this case paved the way for the upcoming catastrophe and caught the unprepared regulator off guard.

Multiple loopholes were identified in the food safety regulation system by the government inquiry, including a perceived conflict of interest in the role of verifiers, unclear food safety responsibility within NZFSA, problematic testing regime and capability, defective coordination across ministries, insufficient statutory power for the ministry, and a deficient traceability and recall system. Through content analysis of the data corpus, this study found two levels of problems leading to the dysfunction of the dairy food safety system in WPC80 incident; defects in the structural design of NZFSA for the dairy sector, and failure in the implementation of food safety regulations and crisis response protocols. These problems were attributed to the following underlying socio-political factors in the NZ context; lack of trust between the ministry and the industry, conflict of interest in NZFSA structural design and weak accountability in the public sector.

6.5.1 A country of small government and big market

NZ is a developed market economy described as a “settler capitalist” (p.288) country due to its political and historical ties with Great Britain (Hopkins, 2003). It is a constitutional monarchy with

an elected government under a parliamentary system. In such a system, economic activities are mainly under the influence of the invisible hand of the market without much government interference. It means business organisations in NZ have more autonomy and power in face of government agencies. This can be demonstrated in the Fonterra case.

The Fonterra WPC80 case was caused by a production accident in a plant and a series of mishandlings by the dairy giant. A government investigation found a toxic organisational culture, such as silo mentality and prioritizing profit over consumers' interests, to be the underlying factor leading to the crisis. Government inquiries also brought to the surface the fact that the dairy giant and MPI did not trust each other (Dean et al., 2014, November 24). According to the inquiry, the DCD incident was perceived by Fonterra as being mishandled by MPI and the company therefore did not trust that the ministry could respond to a bigger crisis in a predictable and consistent manner. This lack of trust was worsened when Fonterra tried to arrange a conference call with the ministry to report the upcoming crisis on August 1, one day before the outbreak. The relevant staff in the ministry were not available and the call had to be postponed to the next day.

Fonterra's mistrust played out as a major barrier for the two parties in making a coordinated crisis response. The company reported WPC80 contamination to its clients at home and abroad before it reported to MPI. It did not release the information to the regulator it needed to make informed decisions, which left the ministry in the embarrassing position of repeatedly correcting itself when revealing impacted product information. Finally, the food safety regulator had to turn to Danone for related information. The dairy giant got testing results directly from US labs instead of from MPI and urged the ministry to release the test results to the public immediately otherwise it would announce it first.

Fonterra's mistrust and disrespect of a government regulator would be suicidal business behaviour in many other socio-political contexts. But the dairy giant only got a fine of 300,000 NZ dollars, a slap on the wrist from the ministry. How could Fonterra get away with noncompliance with food safety protocols, being the culprit in such an unprecedented food safety crisis and showing disrespect to the regulator throughout the incident? Firstly, it was a false alarm causing no casualties to its consumers. Secondly, the dairy giant, the largest company in NZ, is too big to fail in this country. Above all, Fonterra is the business card of NZ in the global market and such an accountability outcome can also be perceived as a measure of reputational damage control.

6.5.2 Conflict of interest in the verification system

An interesting finding of this study was the identification of a conflict of interest in NZFSA structural design. According to the dairy food safety regulatory system in NZ, the verification system was designed to be third-party independent from the industry and the ministry. Auditors from verification organisations were supposed to be hired by the ministry to carry out independent regulatory duties including testing and verifying food products against the RMPs of food operators. However, there was an apparent conflict of interest in the relationship between verifiers and the industry they were verifying.

According to the NZFSA (2008) report on its review of the regulatory model in 2007, industry operators could not find a wider choice of verifiers due to inherent flaws in the design of the model, including a conflict of interest between verifiers and the industry. For many years, there was only AsureQuality and NZFSA's Verifier Agency, both government verifiers, and a limited number of auditors available for food operators in the verification service market. According to McKinlay (1998), NZ Governments were historically known for heavy intervention in the economy and the

provision of a wide range of services using its strategic assets, the SOEs. AsureQuality, the verifier for Fonterra during the crisis in question, carried out regulatory verification services paid by the dairy company. The government inquiries suggested it was a usual practice in the food industry. Such practice was against the SOE Act⁵⁶ which stipulated that Crown-owned enterprises, for its non-commercial principle, were paid by the Crown rather than by service receivers (McKinlay, 1998). Foreign food safety authorities expressed concern about the apparent conflict of interest in the direct financial relationship between the verifiers and the industry.

In the wake of WPC80 products incident, MPI accepted recommendations from the government inquiry team, including addressing perceived the conflict of interest between verifiers and the industry. Part of the plan was to withdraw SOE verifiers from the verification market they were dominating and qualify more private verifier organisations into the pool. MPI suggested it did not have a timeline to do that.

6.5.3 Problematic accountability in the public sector

The public, politicians, and media usually urge responsible parties be held accountable for a public crisis (Broekema, 2018). According to Coombs and Holladay (2010), stakeholders tend to make sense of a crisis event and attribute responsibilities to involved individuals and organisations. Accountability is about acceptance of one's ownership of an obligation or a task and the willingness to face consequences for his/her performance (Browning, 2012). Thus, public accountability on governance of a food safety crisis is about examining the causes of the crisis and making judgements

⁵⁶ Or State-Owned Enterprises Act 1986. It came into force on April 1, 1987.

on the responses of the food safety authority against their roles and duties in upholding food safety (Boin et al., 2008).

An interesting finding of this study is that there is no evidence anyone from NZFSA was held accountable and sanctioned for any mistakes. This study cannot identify any accountability process on the NZ SOE AsureQuality, and its auditors even though the verifier failed to fulfil its duty on several occasions during the crisis. Fonterra was the only party punished for its mistakes in handling the crisis, including the resignation of its two senior executives and a resulting fine by MPI.

Before, during, and after the Fonterra case, the verification system played a crucial role in ensuring food safety in NZ. While in WPC80 incident, AsureQuality had several decision points at which it could have taken to take action in accordance with Fonterra's RMP or reported the issue to MPI as required by the FA 1981. The verifier did neither. Two rounds of government inquiries attributed several key mistakes to individual neglect or misjudgement in the verifier organisation. An auditor approved WPC80 products' reworking but did not press the Fonterra plant for process details, as required by food safety protocols. No one from AsureQuality showed up to supervise the reworking. The impacted products were tested and verified as qualified products despite of high SCR readings. An auditor noticed the discrepancy between Fonterra's different plants over WPC80 contamination within the dairy company's system but thought it was spoilage rather than a food safety issue.

However, the study did not find evidence showing any of the auditors was held accountable in the wake of the incident. This echoes the findings of Jacobs (2000) study, in which the author suggested the accountability system of the public sector, whether in policy departments or service departments, was "shifting" and "contradictory" (p. 361) in the NZ context. McKinlay (1998)

attributed the lack of accountability in the NZ public sector to a perceived corruption in the model of public sector reform in 1980s.

6.5.4 A critical discussion of the learning in NZFSA

Antonacopoulou and Sheaffer (2014) suggest the tension created by a crisis calls into question the accountability and responsibility of the decision makers in managing a crisis which could lead to organisational learning to improve future responses. The crisis-induced accountability started with investigations into what had happened, who and what caused it, and who should be responsible and punished (Boin et al., 2008). Boin et al. (2008) indicates the public will regard politicians and officials more negatively if a crisis is perceived as avoidable and if the performance of the crisis responders was evaluated as substandard.

The NZ Government, food safety lawmakers, and MPI responded positively to the recommendations from the investigators. This study has found systematic changes occurred in NZFSA and food safety legislation. A couple of food safety bills have been passed and enacted to address the identified problems in the Fonterra case. The NZ Government set up new agencies and appropriated special budgets to strengthen enforcement of the new dairy food safety regulations and laws. The government inquiry established evidence showing crisis-induced organisational learning occurred in Fonterra after the watershed moment:

Food safety is now...one of the “top two agenda items” as the board strives to achieve a food safety culture, ... The Fonterra board has now established a risk committee with governance oversight of risk management, ... A senior position has been created to focus solely on food safety

and quality policies, processes and metrics... The food safety and quality council now has more commitment from senior management. (Dean et al., 2014, November 24, p. 29)

It is fair to say that “Fortress Fonterra” (Fonterra Independent Inquiry Team, 2013, October 23, p. 6) learned a costly lesson from in the incident.

Since the government inquiries established the dairy food safety system in NZ was rigorous and robust and still one of the best in the world, changes in NZFSA and the food safety regime could mostly be identified as error correction, or single-loop learning outcomes. An inquiry bill was passed during the incident. It strengthened the NZ Government’s statutory power to get access to necessary documents from the industry for a quick and thorough investigation in times of crises in the kind. The NZ Parliament passed the FA 2014 months after outbreak of the botulism scare. Following the investigators’ recommendations, NZ lawmakers made comprehensive changes in the new food safety act to address shortfalls established by the government inquiries. It updated food safety standards for dairy products, clarified verifiers’ role as clients of the ministry rather than the industry, removed the extensive exemption power from Director-General of MPI and strengthened the CEO’s power in product tracing and recall. Three months after the enforcement of the FA 2014, a reform bill was passed to amend the FA 2014 and continue to address recommendations from WPC80 incident government inquiries. The reform bill required the industry to share necessary information with NZFSA for efficient product tracing and recall. It also aimed to clean up overlaps and improve interface between different food acts. MPI continued to schedule new regulatory amendments to implement recommendations of the government inquiries.

The biggest food safety crisis in NZ’s history was triggered by a problematic testing report from a lab unaccredited for botulinum testing. In the wake of WPC80 incident, MPI mandated SCR testing

for all dairy products. To strengthen food safety testing capabilities, the NZ Government built a food safety research centre in Massey University. As a learning outcome from the crisis, the FA 2014 obliged the dairy industry to conduct food testing in accredited labs only. Otherwise, food operators were required to seek approval from MPI when accredited labs were not available for testing specific food safety concerns.

According to the two government inquiries on the 2013 WPC80 incident, NZFSA's response to the crisis was chaotic and frustrating. MPI had to make announcements to correct previous inaccurate announcements. Different government responders released disputing information to the public. Domestic and overseas parents were confused and irritated by the inconsistent and contradictory information though understandably it would be the case for any other crisis responders given the complexity and contingency of a food safety crisis posing a threat to infants. The government inquiries identified the chaos in public crisis communication was caused by lack of communication and collaborations between NZFSA and other crisis response government agencies as well as the industry. To strengthen coordination and prevent contradiction between crisis responders, the NZ Government in 2014 reformed the CIMS, the underlying structure of the crisis response system in NZ. The new system integrated leadership for crisis scenarios that involves multiple government agencies. The update aimed to prevent contradictory information from being released to the public and to maximise efficiency in resource allocation and task assignments. MPI later developed a risk communication framework to further strengthen communication between NZFSA and the industry and within government agencies.

One of the findings of the government inquiries into the incident was MPI inconceivably could not specify who should be responsible for food safety after three years of its merger. In 2018, MPI

restructured itself and clarified this responsibility through establishment of a specific business unit, NZ Food Safety (MPI, 2020, September 22). Another embarrassment for MPI was its lack of readiness to handle food safety crises on such a scale. MPI was accused of a lack of staff training and simulation with other agencies. To achieve a coordinated food safety crisis response, the NZ Government allocated a four-year special budget plan to finance MPI for its staff training and cross-agency food crisis response simulations.

MPI was criticised for failing to pick up food safety issues during the development of the Fonterra WPC80 products contamination incident. The ministry, according to the government inquiries, did not know about the issue until the company reported to the ministry it wanted to recall impacted products after it first notified its impacted clients. To improve its visibility in the verification process, MPI took several steps, including establishment of a food safety directorate, to ensure the ministry was notified by the verifiers or the industry before it was too late. The new food act and reform bill empowered verifiers to enter food operators' facilities to conduct unannounced audits and obtain more information from food operators.

To ensure verifiers' independence as a third-party in the food product verification process, the NZ Government made changes concerning the relationship between MPI, verifiers, and the industry. To address perceived the conflict of interest between verifiers and food operators, it was recommended the industry pay verification service fees to MPI rather than to verifiers directly. The NZ Government was told to develop a competitive verification service market to ensure genuine independence of verifiers. To achieve this goal, SOE verifiers dominating the verification market were told to withdraw from the service market (MPI, 2013, October 8). It could be identified as a double-loop learning outcome if verifiers, such as AsureQuality and the NZFSA Verification Agency'

who were SOEs playing regulatory roles in the food safety regulatory system, withdrew from the market and uprooted the perceived conflict of interest. However, the NZ Government had no timeline to put a new model in place to facilitate competition in the government-dominated verification market.

6.6 Summary

The Fonterra case was an isolated incident triggered by a production accident. Though it was escalated by Fonterra's departure from its RMP, this study found NZFSA's approaches in handling the crisis were problematic as well. In the pre-crisis stage, NZFSA missed several opportunities to prevent the crisis from happening. AsureQuality did not uphold its duty in the reworking process. Nor did it report to MPI when it noticed the conflict between two Fonterra plants on the contamination issue. NZFSA was reportedly kept in the dark for more than five months until Fonterra recalled the impacted WPC80 products from markets at home and abroad. The problematic botulinum positive test report triggered an unprecedented global product recall. NZFSA was found to have been inefficient in the crisis response stage as well. Government inquiries found the tracing and recall system was not efficient. The chaotic crisis communication escalated the situation. MPI issued conflicting statements on the affected products. Different food safety government agencies released incoherent information. The public was confused and outraged. The incident and the problems revealed by it caused significant reputational damage to the dairy industry of NZ. The country's green and pure image for the food industry was at stake.

The two rounds of inquiries into the dairy food safety regulatory system and NZFSA and Fonterra's handling of the crisis established there were loopholes in the system and there had been mismanagement by the food safety government agencies. MPI accepted 23 recommendations from the inquiry team. The crisis-induced comprehensive organisational learning in NZFSA, included

passage of the 2014 FA, the 2018 FSLRA and a series of dairy food safety regulations, removing the CEO of MPI's power to food product inspection-exemplification, updating dairy food safety standards, renewing the crisis response framework, strengthening the food product tracing system, and redesigning the verification system. This crisis-induced learning can be categorised as single-loop learning.

As an OECD country and major dairy product exporting country, NZ was proud of its well-established dairy industry and dairy food safety regulatory system. Politically, NZ addressed special interest politics through a series of progressive reforms (Bray & Walsh, 1998). It was recognised as a poster social democracy underpinned by the ideology of progressive liberalism. This study found the NZ industry was operating as a generally healthy and sustainable model without obvious issues in the supply chain. Dairy farmers were well-organised, and their interest was sufficiently protected. In fact, they were among the best-positioned dairy farmers in the world (Painter, 2007). NZ exported more than 95% of its dairy products to overseas markets. No adulteration or other deliberate malpractice could be tolerated in such a socio-economic and political context.

Despite this, the NZ dairy industry was not immune from food safety product crises. In addition to WPC80 incident, foreign regulators detected DCD and nitrate contamination in NZ dairy products. The NZ dairy product verification system failed to pick up the problems. No verification agencies or auditors were held accountable for the incidents. This study found no evidence of behavioural changes in NZFSA to address the perceived conflict of interest in the SOE verifiers' role. MPI had no timeline to solve the underlying problem. In addition, NZ dairy farmers were still the disadvantaged group in the industry, struggling for certainty and transparency in times of crises (Alex, 2013, August 7).

CHAPTER 7 CONCLUSIONS AND IMPLICATIONS

Examining the data through the theoretical lens of crisis-induced organisational learning, this research investigated how CFSA and NZFSA, the food safety authorities in China and NZ, handled and learned from the biggest-ever food safety crises the two countries had ever experienced. A review of the crisis-induced organisational learning literature found few studies had been conducted to explore whether the two government agencies have learned from the crises in question and made related changes. To address the research gap, this study designed two research questions (see 3.6).

The two research questions establish links between management of food safety crises and related changes in food safety authorities and regulatory systems induced by the crises. A qualitative content analysis method was employed to examine the two sets of data corpus, consisting of news articles and government investigation reports on the two food safety crises. Data analysis found contrasting differences between the two food safety cases, such as the causes and scale of the two incidents, food safety governance and crisis response systems in the two countries, impacts on consumers, and consequent changes that occurred in the two public organisations and food safety regimes. This study also established numerous similarities between the dairy food safety crises, including human-error inflicted crises, conflict of interest embedded in the design of the dairy food safety regulatory systems, dereliction of duty of the food safety authorities, and factors inhibiting crisis-induced systemic organisational learning in the food safety agencies' legislation and regulations.

This final chapter starts with a comparison of the two cases, aiming to provide insights into the design of dairy food safety regulatory systems, food safety crisis response mechanisms, societal roots leading to the food safety incidents, government approaches employed in each of the three stages of crisis management, and socio-political factors facilitating or inhibiting organisational learning in

food safety government agencies in China and NZ. It is followed by a discussion of the practical and theoretical implications of the study, the conclusion and limitations of the study and problems for future research.

7.1 Implications from a comparison of the two food safety cases

The purpose of the comparison is not to demonstrate which food safety authority or system is superior to the other. The two dairy food safety crises happened at separate times and in two different socio-economic and political contexts. A comparison between them can distinguish the societal and political environments leading to food safety crises and factors influencing crisis-induced organisational learning in the food safety authorities. In doing so, the researcher aims to find out how the two public organisations operate within their broader socio-economic and political systems and how they evolve to fit ever-changing food safety landscapes. It can also shed light on underpinning values, philosophical ideologies, and the dynamics of food safety authorities of the two government agencies in their approaches to handling food safety crises and other public health crises. In the current COVID-19 pandemic, it is especially significant theoretically and practically to have a profound understanding of how a government agency responds to a public crisis and learn and improve from such practices.

Through analysing the two sets of data corpus, the researcher identified numerous similarities between the two food safety crises as well as differences (see Table 7). The two cases in question were the biggest-ever national food safety incidents in the two countries. They both were dairy product contamination incidents involving infant formula products. They were both avoidable incidents caused by human errors. Both food safety authorities were found to have failed to fulfil

their duties to prevent the crises from breaking out or at least contain them efficiently. The impact of both crises overflowed the dairy industries and dealt a heavy blow to the whole food industries. The

Table 7 A comparison between the two crises

	The Sanlu case	The Fonterra case
Similarities	Biggest ever food safety crisis in China	Biggest ever food safety crisis in NZ
	Central government involved in handling the crisis	National government involved in handling the crisis
	Dairy products contamination, mainly infant formula products	Dairy products contamination, mainly infant formula, nutritious products
	Unprecedented reputational damage for food products made in China	Unprecedented reputational damage for food products made in NZ
	Loopholes and underlying problems identified in the food safety regulatory system	Loopholes and underlying problems identified in the food safety regime
	Comprehensive changes occurred in CFSA and the food safety regime	Systemic changes in NZFSA and the food safety legislation/regulation
Differences	Caused by adulteration of melamine	Caused by a production accident
	Industry-wide crisis with most major dairy giants involved	Isolated incident involved no other companies
	6 babies dead and nearly 300,000 hospitalised	False alarm induced product recall, no casualties
	Consumer trust was lost and still has not been totally restored	Consumer trust was restored quickly
	Sanlu was sued and bankrupted	Fonterra was sued but survived
	Criminal charges leading to two executions, several life imprisonments and many jail terms	No criminal charges. Fonterra was fined 300,000 dollars by MPI and was ordered by court to pay 183 million to Danone
	Many top government officials including a minister sacked from positions	No NZFSA staff were held accountable and sanctioned

two infant formula product cases caused public panic and outrage due to mismanagement. The two food safety incidents attracted world-wide attention and caused unprecedented reputational damage

to the two countries. They both triggered government inquiries to review the dairy product regulatory systems and food safety crisis response systems. Both food safety crises induced organisational learning and led to significant changes in food safety authorities and legislation.

A comparison between the two cases demonstrates fundamental distinctions in the characteristics of food safety landscapes and governance in the two countries. The Sanlu case was caused by unethical business behaviour. Adulteration of melamine swept almost the whole Chinese dairy industry for years before the outbreak of the Sanlu incident. Most major manufacturers in the industry were involved in the infant formula scandal. The Fonterra case originated from a production accident in a Fonterra plant and was triggered by consequent false testing results. It was an isolated incident without the involvement of any other NZ dairy product manufacturers. Though there was a series of human errors during the crisis management, the two NZ Government inquiries found no adulteration or other unethical business behaviours. The causes of the two incidents were essentially different in nature; one was reckless and unethical business behaviour driven by pursuit of profit; the other was caused by a production accident escalated by mismanagement. The two incidents differed most significantly from each other in the harm they inflicted on consumers. The Sanlu melamine infant formula products killed six infants and sickened more than 300,000 babies, while no death or sickness cases were reportedly caused by the impacted Fonterra WPC80 products.

7.1.1 A comparison of approaches to handling food safety crises

To address Research Question 1, how did CFSA and NZFSA handle the food safety crises in question, the study conducted in-depth qualitative content analysis on the data corpus of the dairy product incidents. Data from this study established the food safety legislative and regulative frameworks that the food safety authorities and other related government agencies worked within at

the time. The food safety government agencies in China and NZ are operating within different regulatory frameworks and contrasting socio-economic and political contexts. Findings of this study established similar loopholes in both dairy food safety frameworks, including lack of collaboration and such training between government agencies for food safety crisis response due to frequent reorganisation of the food safety authorities, overlapping or divergent food safety standards, and unreliable testing capabilities. In both cases, food safety authorities were found to have been derelict in their duties in the pre-crisis stage, inefficient in product tracing and recall in the crisis stage, but effective in restoring food safety governance and learning from the crises in question. However, these problems had quite different socio-economic roots particularly in the Chinese and NZ contexts.

China differs from NZ in many ways. It is a country of thousands of years of history and boasts the biggest population in the world⁵⁷. It is culturally underpinned by ancient Chinese philosophies and ideologies, the dominant Confucianism (Li, 2021) in particular. Aotearoa NZ is culturally identified as an Anglo-Saxon Christian country with interplays of Māori and other minority cultures (Pratt, 2016). The OECD country has been running in a “settler capitalism” (Hopkins, 2003, p. 288) mode for 150 years. The population of NZ is less than five million, smaller than a medium-sized city in China. This study focuses on investigating evidence of crisis-induced organisational learning in the two food safety authorities and therefore does not elaborate on cultural factors influencing the learning process.

The two countries have been running under totally different political systems. The PRC has been running under the leadership of the Chinese Communist Party (CCP) since its foundation in 1949.

⁵⁷ The population was more than 1.3 billion in 2008. The current statistics is over 1.4 billion.

The Chinese government abandoned the socialist planned economy practice and initiated economic reform in the late 1970s. Though still a socialist republic, Chinese political ideology is changing (Lawrence & Martin, 2013, January 31). Many government features of the PRC today, such as collective leadership, centralisation of government power, and governing with severe laws and enforcement, reflecting a mixture of ideologies from home and abroad. The multiple-layer bureaucratic structure design of the food safety regulatory system showcases the centralised government mechanism. Though the segmented regulatory design was found problematic in this study, it was, in a sense, a pragmatic choice designed to supervise the huge numbers of dairy product manufacturers, upstream suppliers and downstream distributors to ensure food safety for domestic and overseas markets (Zhou, 2017). CFSA was powerful and resourceful enough to carry out food safety governance. NZ is run by governments under the leadership of the constitutional monarch Queen Elizabeth II (NZ Government, 2020). A NZ Government is normally formed by two or more parliamentary political parties elected through the Mixed Member Proportional (MMP) voting system. The power of NZ Governments is divided into three branches under the check-and-balance principle. Government agencies under such a system have restrictive power and resources carrying out their food safety governance. The flat structural design of the dairy food safety regulatory system was in line with its socio-political system and small population. NZFSA has a much smaller number of food manufacturers under its watch. In the year 2021 for example, statistics from D&B Hoovers (2021, July 20) showed there were 574 food manufacturing companies in NZ, while the number in China was 4,089,307.

The Chinese and the NZ dairy industries were operating in two quite contrasting socio-economic and political environments. The NZ's dairy industry was and still is operating in a comparatively stable or even static social environment. The success of a business organisation is based on mutual

trust with its stakeholders, including investors, customers, and government agencies. As a major dairy exporting country, the NZ dairy industry had a good reputation for maintaining mutual trust with key stakeholders through providing safe and high-quality dairy products to markets at home and abroad. However, it does not mean the NZ dairy industry is immune from food safety crises. Data suggests the Fonterra case was caused by an accident and a series of mismanagement from dairy business. Dereliction of duty in NZFSA was identified, but played out in a different way from the Chinese case. AssureQuality, the verifier, could have scrutinised Fonterra's reworking process and reported the contamination issue to MPI, but it did neither. The third-party watchdog took no action after one of its auditors noticed disputes between Hautapu and Darnum within Fonterra's internal system, nor did it report to MPI. The whole dairy food safety system was at a loose end until Fonterra had to report to the regulator itself. In this case, the verifier should have been held accountable, but this study found no evidence of its happening. The independence of the NZ dairy product verification system was found to have been compromised. The verification service market for the dairy industry had been dominated by SOEs. In this incident, AssureQuality was a crown-owned enterprise. It played a role as a food safety auditory agency but its service fee was paid by Fonterra, a routine practice in the industry (Dean et al., 2014, November 24). Obviously, conflict of interest existed in the role of verifiers within the NZ dairy food safety regulatory system.

In China, the dairy industry was a newly emerged sector, and it was operating in a drastically changing socio-economic environment characterised by rapid industrialisation and urbanisation processes. Chinese economic reform saved the country from the edge of bankruptcy and raised it up to becoming the second-biggest economic power in the world. At the same time, Chinese society fell into an "anomie" (Merton, 1964, p. 729) trap due to its drastic socio-economic changes. According to Huntington (2006) and Merton (1964), dramatic socio-economic changes in the process of

modernisation entail a class-stratified society with limited opportunities for disadvantaged social groups which fosters social instability and anomie and high crime rate. This social disruption induces white-collar as well as blue-collar crimes which were particularly phenomenal in transitional economies such as China, Russia, and Eastern European countries (Bakken, 2004). According to Zhao (2008), the crime rate in China, including white-collar crimes like counterfeiting and corruption, experienced a 10-fold annual increase since the implementation of the economic reforms. In an effort to determine the causes of the high rate of food crimes in China, Cheng (2012)'s study attributed them to the cheap capitalism mode the country was running, characterised by low price, inferior product quality, and degraded business ethics and social morality. China's economy was found to be under the influence of the invisible hand of the market and the visible hand of the triple helix formed by government, industry, and academia represented by political, economic, and intellectual elites who reached a kind of tacit agreement with transnational companies to exploit cheap labour and resources in China. Sanlu, a SOE and a joint venture with foreign company Fonterra, was such a product. The findings of this study echo the anomie theory and cheap capitalism theory. It explains the inconceivable attitudes and approaches employed by CFSA in the pre-crisis stage in handling Sanlu melamine adulteration which had existed in the Chinese dairy industry for years and became an open secret. AQSIQ and other Chinese food safety authorities received numerous complaints from different channels, including a doctor who was upset by the surge of kidney stones among infants and posted such cases online seeking interference of CFSA for months. CFSA chose to turn its back on the complaints and the devastating situation. Prior to the Sanlu case, the whole food industry in China was struggling to restore trust from the Chinese public after a series of food safety crises, especially the 2003 Fuyang infant formula scandal. The evidence of this study found in the Sanlu case showcases a class-stratified society where different social groups have access to corresponding

levels of food resources in terms of product quality and safety. A vast majority of the victims were young babies from low-income rural areas that were targeted by the low-priced inferior dairy products made by unethical manufacturers. Few Chinese social elites at home and foreign consumers were affected by the long time and widespread melamine contamination. It was not a coincidence but a result of the systemic design of the double criteria in food safety standards and enforcement. The study also found Chinese dairy farmers were consistently exploited by dairy firms. They were exposed to high risks of the industry but had no opportunities and power to gain a fair share of profits.

CFSA's dereliction of duty was embedded in a conflict of interest in the food safety agencies' role. It led to different accountability efforts from the industry and the food safety authorities. The Chinese government launched an industry-wide crackdown on food safety crimes and held responsible criminals and public officials accountable (China Daily, 2009, January 11). Grave penalties were handed out to 21 convicts and 191 accountable public officials, including two executions, various imprisonments, and numerous dismissals or relegations of public officials (China Daily, 2009, January 22, 2010, September 16, 2011, January 14a). Sanlu declared bankruptcy within three months of the outbreak of the scandal. Similar problems were identified in the Fonterra case as well. The WPC80 incident was caused by the dairy cooperative's failure to uphold its RMP as well as food safety auditors' noncompliance with food safety regulations. The opposition Labour Party criticised MPI's management of the crisis as a "super muck-up" (Radio New Zealand, 2014, December 9). According to Dean et al. (2014, November 24), AsureQuality was found to have been ineffective in performance of its duty. However, no food safety verifiers or regulators were held accountable during or after the incident.

A comparison between the two food safety crises and the food safety authorities' handling of the crises yields the following significant practical implications. Firstly, food safety crises are products of a particular socio-economic environment. Food safety problems in China were mostly caused by unethical behaviors in the industry and dereliction of duty by the food safety authorities. It was a tissue section of an anomic society due to radical socio-economic changes during the last few decades. The attempt to establish a communist utopia, in which extreme social equality is to be secured by an abundance of resources, proved to be a disaster. The 10-year Cultural Revolution caused profound damage to the very texture of social trust in Chinese society (Bai & Wu, 2020; Walder & Su, 2003). The traditional Chinese values underpinning a society of harmony, peace, humility, and compassion were greatly destroyed. A whole generation of Chinese people found themselves involved in another turmoil of socio-economic transformation heading towards a market economy. A class-stratified social structure was formed in the process of the economic reform, in which social elites reached a conspiracy to maximise profits and other social interests and deprived disadvantaged social groups of such opportunities. The Sanlu case, involving nearly the whole Chinese dairy industry, was a demonstration of food safety crimes committed in such a socio-economic setting. In contrast, the dairy industry had been well-established in NZ and its socio-economic and political environment could not tolerate the existence of unethical business practices like counterfeits or adulteration. Food safety incidents in NZ normally emerge as results of accidents or lax regulations. The Fonterra case was caused by an accident and escalated by the cover-up efforts of the company and the dereliction of duty of auditors in the verifier agency.

Secondly, neither severe legal punishments nor a rigorous food safety regulatory system can prevent food safety crises from happening. Food safety regulations and crisis management protocols, no matter how rigorous they are, cannot prevail without effective enforcement by food safety

authorities. A food safety authority needs to work hard on a daily basis to uphold food safety standards against RMPs and regulations. Both cases suggest food safety authorities could do better to prevent the crises from breaking out.

Thirdly, conflicts of interest in the role of a food safety authority, regardless of its socio-economic and political context, can always lead to lax regulation and controversial accountability processes. In this study, the Chinese local government and the NZ verifier had a conflicted role in dairy food safety regulatory systems and they both failed to fulfill their duties in the crises in question.

This case study also has the following theoretical implications for food safety and other public crisis management. In the crisis prevention stage, an independent verification system is the key to preventing a food safety incident from developing into a disaster. In the ever-changing dairy food safety landscape, it is more realistic to plan for a crisis rather than stop its occurrence. The upside is a major food safety crisis always gives its signs of coming, providing opportunities for proactive responses. The two food safety authorities, AQSIQ and AsureQuality in particular, had opportunities but failed to pick up important threads of an upcoming major crisis in the pre-crisis stage. In the crisis containment stage, the best approach to handling an infant formula food safety crisis is to tell the truth to the public, the sooner the better (Galloway, 2016). Food is a highly risky and sensitive industry because of its potential impact on the health of the public. Infant formula is a typical example in this sense. On top of other measures, efficient public crisis communication of all related information can prevent more consumers from being affected. More importantly, honesty and sincerity are the best elements for repairing reputational damage. Cover-up is the worse choice for handling a food safety crisis. It exposes more people to danger and crisis responders will therefore attract more responsibilities in the process of public accountability. This tell-the-truth approach is

applicable to management of all public crises, including the ongoing COVID-19 pandemic crisis. On top of openness, a quick response, cooperation, and information sharing are also crucial in response to cross-border public health crises (Deverell, 2011).

7.1.2 Factors influencing crisis-induced learning in CFSA and NZFSA

For RQ 2, what is the evidence of crisis-induced organisational learning in the CFSA and the NZFSA? In other words, did the crises in question trigger organisational learning and related changes in the two food safety authorities and the regulatory systems? The answer is yes. Through content analysis of the data corpus, this study identified substantial evidence of crisis-induced organisational learning in CFSA and NZFSA. The two crises triggered comprehensive changes in the dairy food safety authorities themselves as well as the dairy food safety regulatory systems, including new food safety laws and regulations, updated food safety standards, enhanced testing procedures and capacity, improved product tracing and recall systems, and restructured food safety agencies. Influenced by different socio-political factors in the two countries, these organisational learning outcomes were the results of different learning processes.

The Sanlu case in China was an industry-wide scandal. It was the most devastating scandal compared to a series of similar food safety crises. Government investigations established the incident was caused by enduring unethical business practice in the industry. The Chinese dairy food safety regulatory system was found to be a total failure. The segmented food safety regulatory system was found responsible for overlapping food safety standards, lax regulation, and corruption. The public and food safety researchers called on Chinese lawmakers to replace the broken system with an intergrated one. However, the 2009 Food Safety Law saved the segmented system by adding another layer of hierarchy on top. In 2018, the dairy food safety agencies were replaced by an updated one

made up of SAMR, NHFPC, and MARA. It was a result of overall political reform to uproot solidified vested interest in some government agencies (Wang & Wang, 2018, July 19). The updated CFSA was still struggling to overcome overlapping responsibilities and law-enforcement between the government agencies (Song & Chen, 2019, October 23). Meanwhile, the Fonterra case in NZ was a false alarm-triggered product recall. The government inquiries reported that the dairy food safety regulatory system was robust and still one of the best in the world. Therefore, the organisational learning outcomes in MPI, in accordance with the recommendations of the government inquiries, are mostly categorised as error-correction measures, or single-loop learning results. The FSLRA was passed in 2018, and NZ Food Safety was formed as one of the four government agencies in MPI (MPI, 2020, September 22). This move was obviously to clarify confusion in the ministry on who should be responsible for food safety.

Changing food safety standards proved to be a complicated issue within both food safety systems. Scientists from MPI as well as the government inquiry team suggested testing for SRC was not significant even though it revealed WPC80 contamination. There was a debate on whether it was unnecessary to mandate it. Considering many foreign clients required the specification, MPI finally added testing SRC as mandatory for high risk nutritional powders. CFSA, under MOH's watch, set up new dairy food safety standards in the wake of the scandal. Though there were arguments that no melamine at any level should be allowed in dairy products or any other food products, the updated standards controversially included melamine content limits for dairy products. The new standards for protein content and bacteria in raw milk were criticised as the lowest in the world. Mengniu and

Yili, two SOE flagships in the dairy industry⁵⁸, reportedly participated in and dominated the process of new dairy standard setting. The industry was found to be heavily involved in the standards updating processes in both cases. It was an important influencing factor facilitating or inhibiting depending on its interest-based perception on the issue of organisational learning in the two food safety authorities.

Chinese and NZ SOEs were involved in the dairy industry in different forms but led to problems of a similar nature: dereliction of duty in the regulatory systems. In the NZ setting, the verification process failed to pick up chemical contamination before and after the outbreak of WPC80 incident, such as DCD and nitrate contamination in Fonterra and Westland Milk. In WPC80 incident, government inquiries established the existence of a conflict of interest in the role of verifier AsureQuality. As a crown-owned enterprise being paid by the industry, it perceivably could not uphold its independence as a third-party role in the dairy food safety system. The inquiries found the verification market for the dairy industry was dominated by such SOEs. The inquiry committee recommended MPI address the two related problems, the industry's payment of verification service fee to verifiers and SOE verifiers' dominance of the market. In the wake of WPC80 incident, MPI addressed the first problem by charging service fees from food operators and pay to verifiers by the regulator itself, making sure verifiers were clients of the regulator rather than the industry. MPI had a vision and long-term plan to end SOE verifiers' domination by withdrawing them from the market. However, the regulator set no timeline for that. In the Chinese case, Sanlu was a local SOE and joint venture with a mixed ownership with other shareholders. The Shijiazhuang Municipal Council was

⁵⁸ Yili was a SOE until it turned into a private enterprise in 2016. Mengniu was established as a private dairy company. In 2009, it was acquired by China National Cereals, Oils, and Foodstuffs Corporation (COFCO) who purchased 20% of its share. In 2014, Danone and Arla Foods formed joint venture with COFCO Dairy Investments who represented the three party, owning 31.5% of its share in the company.

heavily involved in its management though Chinese government implemented SOE reforms trying to separate local government's political function from its managerial role in local SOEs. The conflict of interest in the Shijiazhuang Municipal Council's dual role as Sanlu's stakeholder and food safety regulator was perceived as a fundamental cause of its controversial approach in handling the scandal. All top officials in the council and local senior CFSA officials were consequently sacked from their positions in the public accountability process in the aftermath of the scandal. This study identified no evidence of crisis-induced organisational learning in CFSA to address the conflict of interest in the role of local governments in the industry. SOE dairy companies were still the main players in the industry and local governments were in charge of local food safety agencies. In times of food safety crisis, local governments remained in the system as first crisis responders.

In sum, the crises in question induced systemic learning in the food safety authorities in China and NZ (see Appendix 3 and 5, respectively). The new dairy food safety laws and regulations, upgraded food safety standards, strengthened testing capacities, and better organised product verification in the two countries can definitely improve dairy products' quality and safety. Comparing the crisis-induced changes in CFDA and NZFSA listed in the Appendix 3 and 5, the Chinese government relied heavily on administrative power to issue regulations by the State Council or food safety regulators while its NZ counterpart emphasised on legislations being implemented by government agencies. Policy changes on the Chinese side were therefore segmented while such changes on the NZ side looked more organised and cohesive. Of course, they were results from policy making and implementation processes and practice in the two countries. At the same time, they can help improve identification of food safety hazards and prevent potential crises breaking out at the pre-crisis management stage. A renewed dairy food crisis response mechanism and updated dairy product tracing and recall system enable food safety agencies to respond to future dairy food

safety crises with better prepared and coordinated teams and more efficient recall of affected products at the crisis-event stage. They have better procedures in place to recover from crisis disruptions and make further improvements at the post-crisis stage.

Thus, this case study can contribute to crisis-induced learning in public organisations in the following theoretical and practical aspects. This case study shows how CFSA and NZFSA managed the two dairy food safety crises at each of the three stages. Theoretically, this study explored the causal nexus between crisis management and organisational learning. Findings in this case study indicate a major food safety crisis can trigger learning in a public organisation. Due to its traumatic damage to both public health and the reputation of the dairy industry, the two crises put loopholes and their underlying root causes under the spotlight, exerting enormous public pressure on the governments to address the problems. These identified problems provided direct references for relevant changes in food safety authorities and regulatory systems.

This study echoes other research in demonstrating the complexity of the dynamic process of crisis-induced learning in public organizations (Broekema et al., 2017; Deverell & Olsson, 2009; Nathalie Schiffino et al., 2017). The process of crisis-induced learning in the two safety authorities was an outcome of multiple interplaying factors, including the nature of the crisis, its perceived damage on involved stakeholders, attribution of responsibilities and accountabilities, the reaction of the public, the reputational and financial impact on an industry, involvement of a government's political and financial interests, and the priority of the political agenda of a ruling government. This brings out another point that public organisations are poor learners, as suggested by organisational learning literature (Broekema et al., 2017; Deverell, 2010; Smith & Elliott, 2007; Stern, 1997). The Chinese and NZ governments carried out SOE reforms trying to eliminate the conflict of interest in

the organisations by separating managerial and political functions. Such reforms turned into long-term uphill battles due to the involvement of multiple stakeholders, interrelated accountability dimensions, and the ideological values of a ruling political party (Brødsgaard & Li, 2013; China Youth, 2013, April 8; Luke, 2010). It therefore is hard, if not impossible, a mission for a government agency to solve an underlying problem when it is itself a part of it. Findings from this study indicate it is quite necessary to expand Deverell (2009) and (Broekema et al., 2017)'s theoretical frameworks and include conflicts of interest potentially incorporated in the roles of public organisations when examining factors leading to a public crisis and inhibiting learning induced by such as crisis to protect their vested interests.

Findings of this study indicate a food regulatory system, no matter how rigorous it is, cannot ensure food safety without effective enforcement by the food safety agencies. To ensure food safety for consumers at home and abroad, the food safety authorities need open eyes to follow the trends in the world and open minds to cooperate and learn from others for better standards and collaboration in food safety crisis management. Some theories, including the three-stage crisis management model by Pearson and Mitroff (1993) and (Coombs & Holladay, 2010) in this study, note crisis-induced organisational learning occurs in the post-crisis stage. This study argues such learning can happen across all stages of crisis management. There was evidence of learning at the crisis-event stage, or what Deverell (2009) calls as intracrisis organizational learning, in both cases of this study. It can happen at the pre-crisis stage as well. A learning organisation can learn from other organisations' crises or its past crisis experiences (Broekema, 2018; Deverell, 2009; Deverell & Hansén, 2009; Pang, 2012).

The practical implications of this study indicate CFSA has a long list of tasks to fix the dairy food safety regulatory system. There is a need for more double-loop learning in the organisation and the regulatory system to uproot underlying problems. Firstly, SAMR should take action to create a sustainable dairy industry by ensuring dairy farmers' fair share of profits. For example, a national dairy farmer association, parallel to CDIA, should be established to represent Chinese dairy farmers' interests. Establishment of an independent verification system, using a third party auditor from a competitive verification service market, to ensure dairy food safety throughout the supply chain is necessary. Secondly, the conflict of interest underpinning the role of local governments as food safety regulator and first crisis responder needs to be addressed. This can be achieved through further implementation of the planned SOE reform to separate local governments' managerial roles from their political functions. Restructuring CFSA into agencies independent from local governments could be another solution. In addition, CFSA should be fully funded by government budgets rather than fines from food operators (Ross, 2012). Thirdly, the double-standard in the food safety regulatory system is another underlying problem responsible for repeated food safety scandals in China. The government emphasised its mission to uphold the party's value in social equality and justice. For NZFSA, MPI has worked out a well-planned schedule to address the long list of regulatory problems identified by the government inquiries. However, to decrease chemical contamination incidents, this study argues MPI needs to address two important issues, holding the responsible accountable and ensuring genuine independence and competitiveness in the verification market. Though dereliction of duty in NZFSA was identified in the crisis, no responsible individuals or organisations were held accountable. The biggest challenge for NZFSA, or MPI, is to end SOEs' dominance of the verification market and ensure genuine independence of the verifying agencies in the market. To achieve these learning outcomes, MPI needs to overcome socio-political factors in

NZ making public accountability and SOEs reform difficult (Gregory, 1998; Jacobs, 2000; Luke, 2010). Last but not least, the Chinese and NZ governments keep restructuring or rebranding the food safety authorities. Despite the positive effect of doing so, it has resulted in the overlapping standards and enforcement and poor collaboration between crisis response agencies. Thus, clarified responsibilities and accountability for each individual or department are key for a food safety authority to prevent dereliction of duty in government agencies and overlaps or gaps in the food safety regulations. Coordinated training across crisis response agencies can effectively achieve synergy in managing a major crisis. This is of practical significance for each country's public health agencies in handling the ongoing COVID-19 pandemic.

7.2 Conclusion

This qualitative study investigated crisis-induced learning in CFSA and NZFSA triggered by the Sanlu case and the Fonterra case. The dairy food safety crises in China and NZ were analysed against their own socio-economic and political contexts. This study identified the contrasting causes and underlying roots of the crises. CFSA and NZFSA employed different approaches to handling the dairy food safety crises. Nevertheless, a comparison between the two cases can shed light on crisis-induced learning and influencing factors in the contexts of the two countries.

Using the three-stage crisis management theoretical model, this study analysed the two food safety authorities' responses at each stage and found them problematic in handling the crises. The AQSIQ and AsureQuality were found to have been derelict in their duty in the preventive stage. The food safety agencies and other crisis responding agencies could not take coordinated actions at the containment stage. To restore reputational damage and consumer trust, both CFSA and NZFSA made comprehensive changes to address the loopholes in the regulatory systems at the post-crisis stage.

The results were mostly outcomes of single-loop learning. CFSA and NZFSA should address underlying problems including conflicts of interest in the roles of the food safety agencies, which called for happening of double-loop learning in the two food safety authorities.

The crisis-induced learning in the public organisations was influenced by multiple socio-economic and political factors. Both incidents provoked enormous social emotions due to the involvement and impact of infant formula products. Given the scale and magnitude of the incidents, both crises attracted wide media attention. The politicians in China and NZ were faced with huge political pressure to hold those responsible accountable and overhaul the food safety regulatory systems. Henson and Caswell (1999) recognised public pressure as a fundamental force driving governments to address public concerns such as food safety issues. These were key external factors facilitating learning in the two food safety authorities, as what were found in other such studies (Broekema, 2016; Broekema et al., 2017; Deverell, 2010; Deverell & Hansén, 2009). Internally, organisational structure, which impacts on an organisation's crisis management (Deverell & Olsson, 2009; Hart et al., 1993), played a positive role to drive learning in the two dairy food safety authorities. Reorganisation happened in both food safety authorities to facilitate learning in the organisation. Food safety responsibility and accountability within the authorities were clarified and crisis response training and education were carried out. However, organisational culture can be seen as a factor inhibiting deep learning. The conflict of interest in the roles of the food safety agencies, such as the SOE verifiers in the NZ case and the local government as regulators and crisis responders in the Chinese case, compromised their duties to uphold food safety rules were suspected to seek special interest for themselves. Both food safety authorities have achieved cognitive learning from the crises and were determined to uproot the underlying conflicts of interest. However, no substantial action has been taken to address the underlying problems. Instead, both governments decided to resolve the

conflicts of interest in the long run. NZFSA had a plan to withdraw SOE verifiers from the verification market. Meanwhile, the CCP top leaders were dedicated to deepening economic and political reform by separating governments from business management in SOEs (Zheng, 2018). Chinese President Xi Jinping called on the government to remember the party's primary vision and uphold its mission to work for the wellbeing of the Chinese people and revitalisation of the nation⁵⁹ (Xinhua News Agency, 2020, January 8) rather than for the benefits of the triple helix in China.

As a final comment, this study can enlighten food safety authorities as well as other government crisis response agencies in the following aspects. Crisis management is based on knowledge of the crisis cycle of an industry. The end of a crisis is the prelude of another upcoming one (Jie & Hasan, 2017). There are always signs of its coming. The underpinning idea for an organisation to learn from a major crisis is to get it better prepared for future crises. The Chinese aphorism “生于忧患，死于安乐”⁶⁰, meaning you can survive a crisis by worrying about its coming, and you can die in a crisis by losing vigilance, teaches people to have a sense of crisis in times of peace. Benjamin Franklin's quote “by failing to prepare, you are preparing to fail” echoes the same idea. Another implication of this study is organisational learning can happen at any stage of crisis management. To gain without pain is the best way for an organisation to achieve crisis-induced learning. It can be achieved through learning from others' crises or its past crises. This is a practical and significant way for public health agencies and other crisis response agencies of all countries in the world to learn from each other for better management of the COVID-19 pandemic and other public crises.

⁵⁹ It is widely quoted as “不忘初心，牢记使命” in Chinese, a quote delivering Xi Jinping's ideology to run the country.

⁶⁰ A quote from ancient Chinese philosophy Mencius or 孟子. Living between 372-289 BC, he was another great Chinese Sage after Confucius.

7.3 Research Limitations

This study is subject to a few potential weaknesses. The case study is limited, as all other qualitative studies, in the credibility of its findings due to subjective data interpretation (Bernard, 1994; Silverman, 2006). Generalization of findings from the two cases could be problematic. This research was based on content analysis of the data corpus only. Without participants and the official investigation report on the scandal, data truthfulness for the Sanlu case could be compromised. Around sensitive topics like the two food safety crises, obstacles in names of legal process or arbitrary decisions on ethical research procedures inhibited the researcher's access to key documents or inputs from participants. This study collected two huge data corpus sets. Cleaning, coding, and interpreting such big data sets was very challenging. It was likely some important information was missed in these processes.

This study focused on finding out problems through examining food safety government agencies' approaches in handling the crises and the crisis-induced learning in them. It established socio-economic and political factors influencing their crisis responses as well as facilitating or inhibiting learning in the two food safety authorities. It did not measure how each of the factors influenced the intricate learning processes and dynamics of the factors in the learning processes (Rogers & Williams, 2006). It is a very complicated and challenging process to evaluate factors influencing a government agency's approaches to handling a crisis and crisis-induced learning (Antonacopoulou & Sheaffer, 2014; Deverell, 2006; Rogers & Williams, 2006). There are even more factors influencing government crisis management decisions and organisational learning. On top of the socio-economic and political factors, decision makers' experience, perception, and personal values are also very important factors to be considered (Antonacopoulou, 2008; Broekema et al., 2019). Besides, this

study used the three-stage crisis management mode to examine how CFSA and NZFSA responded to and learned from the crises in question. It was arguably problematic to find a clear cut in time to divide the process into three stages.

Organisational learning is a comparatively new field of study (Scott, 2011). There are few theoretical frameworks applicable to examining crisis-induced learning in public organisations. The theories and models in this study need to be further examined and empirically tested. This study is arguably subject to limitations inherited from the under-developed theories, such as evaluation of crisis-induced organisational learning.

Finally, according to Birkland (2009), some organisations, especially government agencies, tend to produce fantasy documents in the wake of a crisis or disaster management to prove they have learned the lesson. It does not mean they have found the real solution and made related changes. The study investigated the incidents from the government's perspective only. Few viewpoints or inputs in the data were from the dairy industries, consumers, and victims. The learning outcomes from content analysis of the government documents could potentially be cognitive learning rather than behavioural changes in the food safety authorities.

7.4 Perspectives for future research

This study may inspire more research in further validating the findings of this research, examining other public crises, especially the ongoing global COVID-19 pandemic, induced learning in government agencies, and factors contributing to or inhibiting crisis-induced organisational learning within a certain socio-political and economic context.

To further validate and expand findings of this study, the researcher will further examine the food safety landscapes in each of the two countries in recent years separately, especially their food safety situations and related changes in food safety legislation and enforcement. To strengthen findings limited by the sole perspective from government agencies, future studies will explore food safety governance from the perspectives of the industry and consumers, especially those who were impacted by such crises. Further investigation should be designed to find out whether the implementation of organisational learning was successful and whether the publics in China and NZ were benefited for the changes. In other words, more research needs to be undertaken to investigate if the dairy food safety situations in Chinese and New Zealand have improved due to the crisis-induced learning in the authorities. It can be demonstrated as significant decrease in occurrence of dairy food safety incidents and improved consumer confidence in dairy products manufactured in the two countries due to implementation of the learning in the food safety authorities. Methodologically, interviews and surveys should be conducted to enrich data inputs. Quantitative approaches should be employed to strengthen data analysis and the reliability of findings.

In the time of a global pandemic crisis, the theoretical framework and research method in this study are applicable to examine how government agencies in a country responded to the COVID-19 crisis and how they made changes in related quarantine and other pandemic control policies. This study can shed light on finding loopholes and the underlying roots of a crisis response system, the compliance of government agencies in COVID-19 pandemic response and socio-economic and political factors influencing crisis-induced learning in the government agencies. Such research can generate practical recommendations for public health agencies to improve their responses to the current pandemic and future public health crises.

Public crisis communication could be a starting point in this regard, aiming to address problems such as coordinated public crisis communication and public communication for vaccination. For example, Shangguan et al. (2020) found problems in the structural design of the Chinese public health crisis response system, responsive rather than proactive approaches to handling a major crisis, unevenly distributed personnel and resources between urban and rural areas, such as what were identified in the food safety crisis in this study. The whole world has been locked down by the COVID-19 pandemic for more than two years. The outbreak and spread of the COVID-19 pandemic provoked multiple crises, testing crisis management by government agencies across the world. Public health agencies in many countries are struggling to cope with the spread of the virus. Meanwhile, they are faced with another top 10 threat to global health identified by the WHO, fighting against anti-vaccination movements (Dubé et al., 2021). Social media platforms have been found to be the main sources of such misinformation (Gu et al., 2018; Puri et al., 2020). The researcher may examine crisis communication approaches or strategies the public health agencies have employed to respond to such online misinformation and promote vaccination. It is especially important to understand where persuasive communication or crisis communication theories were effective in persuading its audience in a prolonged public crisis scenario. According to Croucher et al. (2021); Croucher et al. (2020), research findings indicate surfaced prejudice against Chinese and other Asian immigrants in western countries. Further research can examine how government agencies in the USA, Canada, the UK, and other related countries respond to such racial discrimination in time of such a major public crisis.

Food and drug safety are still significant societal problems in China. The crisis-induced organisational learning theory in conjunction with Cheng (2012) cheap capitalist theory and Bernburg (2002) and Zhao (2008) anomie theory can be employed to identify socio-economic factors

contributing to the crises and influencing learning in the government agencies in the Chinese context, which can potentially contribute to building a theoretical framework to examine crisis-induced learning in transitional economies in the world.

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APPENDICES

1. List of the 22 dairy firms whose infant formula products were contaminated by melamine

Company	Products	Number of samples	Number of disqualified	Melamine content (milligram/kg)
1. Shijiazhuang Sanlu Group, Ltd	Sanlu infant formula	11	11	2563
2. Shanghai Panda Dairy Co. Ltd	Panda Kebao infant formula	5	3	619
3. Qingdao Shengyuan Dairy Co. Ltd	Shengyuan infant formula	17	8	150
4. Shanxi Gucheng Dairy Co. Ltd	Gucheng infant formula	13	4	141.6
5. Jiangxi Bright Hero Dairy Co. Ltd	Hero infant formula	2	2	98.6
6. Baoji Huimin Dairy Co. Ltd	Huimin Infant formula	1	1	79.17
7. Mengniu Dairy Group. Ltd	Mengniu infant formula	28	4	68.2
8. Torador Dairy Industry (Tianjin)	Keqi infant formula	1	1	67.94
9. Guangdong Yashili Group	Yashili infant formula	30	10	53.40
10. Hunan Peiyi Dairy	Nanshan Peiyi infant formula	3	1	32
11. Heilongjiang Qilin Dairy	Qilin infant formula	1	1	31.74
12. Shanxi Yashili Dairy	Yashili infant formula	4	2	26.30
13. Shenzhen Jinbishi Milk	Jinbishi infant formula	2	2	18
14. Scient (Guangzhou) Infant Nutrition	Scient infant formula	20	4	17
15. Guangzhou Jinding Dairy Products Factory	Jinding infant formula	3	1	16.20

16. Inner Mongolia Yili Industrial Group	Yili infant formula	35	1	12
17. Yantai Ausmeadow Nutriment	Ausmeadow infant formula	6	6	10.70
18. Qingdao Suncare Nutritional Technology	Suncare infant formula	3	1	4.80
19. Xi'an Baiyue Dairy	Yubao infant formula	3	1	3.73
20. Yantai Leilei Dairy	Leilei infant formula	3	3	1.20
21. Shanghai Baoanli Dairy	Baoanli infant formula	1	1	0.21
22. Fuding Chenguan Dairy	Chengerzhuang infant formula	1	1	0.09

2. Nodes. Sanlu scandal, a sample of extracted NVivo codebook for the research

Name	Description	Files	References
1. Pre-crisis Head-in-the-sand approach		54	94
2. Crisis-stage Level-I emergency plan and industry-wide cleaning up		140	333
2.1 Initiating Level I emergency plan		68	141
2.2 Holding offenders and responsible public officials to account		114	280
2.3 Recalling and destroying melamine contaminated products		30	50
2.4 Providing medical treatment and compensation to victims		49	125

Name	Description	Files	References
2.5 Supporting affected milk farmers	Crisis communication problems, double food safety standards, foreign ban, imports of dairy products, loss confidence in cn consumers, supports to milk farmers	28	58
3 Post-crisis stage changes in the industry and food safety regime			
3.1 Identified loopholes in the food safety regulatory system		159	371
3.1.1 Segmented hierarchical design and lax regulation		50	106
3.1.2 Backward food safety standards and testing capacity		21	30
3.1.3 Problematic consumer right protection and transparency		55	99
3.1.4 Chaotic recalling and handling of contaminated products		10	16
3.2 Evidence of OL in the government agencies induced by the crisis	Sanlu scandal induced OL in time range: end of 2010? BE CAREFUL	161	370
3.2.1 Changes in food safety standards, legislation, and law enforcement		147	290
3.2.2 Changes in hierarchical		28	45

Name	Description	Files	References
design of food safety agencies			
3.2.3 Higher threshold to the dairy industry		135	346
3.2.4 Unlearned lesson by the food safety agencies		79	195
4. Roots of food safety issues in China		204	597
4.1 Bureaucratic problems and controversial accountability		80	142
4.2 Regional protectionism & corruption		32	57
4.3 Unethical practices in the dairy industry		168	383
4.4 Limited role of news media		14	15

3. Updated laws/regulations on dairy products in the wake of the Sanlu infant formula scandal

Regulations/Laws	Issuer	Effective date	Learning assessment
Regulation on the Supervision and Administration of the Quality and Safety of Dairy Product 乳品质量安全监督管理条例	The State Council	October 9, 2008	Single-loop learning
Outlines of the Restructuring and Revitalisation Plan for the Dairy Industry 奶业整顿和振兴规划纲要	The State Council	Nov. 19, 2008	Single/double-loop cognitive learning
the Food Safety Rectification Plan 食品安全整顿工作方案	The State Council	Feb. 6, 2009	Single-loop learning
Food Safety Law of the People's Republic of China 中华人民共和国食品安全法	NPC	June 1, 2009	Single-loop learning
Provisions on the Supervision and Administration of Production of Food Additives 食品添加剂生产监督管理规定	MOH	June 1, 2010	Single-loop learning
National food safety standard Infant formula 食品安全国家标准婴儿配方食品	MOH	April 1, 2011	Single-loop learning
National food safety standard older infants and young children formula 食品安全国家标准较大婴儿和幼儿配方食品	MOH	April 1, 2011	Single-loop learning
Regulations on the registration administration of overseas manufacturers of imported food 进口食品境外生产企业注册管理规定	AQSIQ	May 1, 2012	Single-loop learning
Notice of the State Food and Drug Administration on prohibiting the production of infant formula milk powder by entrustment, OEM, separate packing 国家食品药品监督管理总局关于禁止以委托、贴牌、分装等方式生产婴幼儿配方乳粉的公告	SFDA	November 27, 2013	Single-loop learning
Provisions on the Supervision and Inspection of the Infant Milk Powder Production Enterprises 婴幼儿配方乳粉生产企业监督检查规定	CFDA	Dec. 3, 2013	Single-loop learning
Detailed rules on examination of production permit for infant formula and young children formula milk powder 婴幼儿配方乳粉生产许可审查细则	CFDA	Dec. 16, 2013	Single/double-loop learning
Notice forwarded by the State Council General Office to promote infant formula milk powder business mergers and restructuring schemes 国务院办公厅关于转发工业和信息化部等部门推动婴幼儿配方乳粉企业兼并重组工作方案的通知	State Council	June 6, 2014	Single-loop learning
Measures for the Administration of Food Safety Spot Inspections 食品安全抽样检验管理办法	CFDA	Feb.1, 2015	Single-loop learning
National food safety standard for the use of food additives 食品安全国家标准食品添加剂使用标准	MOH	May 24, 2015	Single-loop learning
Administrative Measures for Food Recalls 食品召回管理办法	CFDA	Sept. 1, 2015	Single-loop learning
Management measures on food business license 食品经营许可管理办法	CFDA	October 1, 2015	Single-loop learning
Measures for the Supervision and Administration over Marketing and Quality Safety of Edible Agricultural Products 食用农产品市场销售质量安全监督管理办法	MOA	January 5, 2016	Single-loop learning
Measures for the registration of Infant formula recipes 婴幼儿	CFDA	October 1, 2016	Single/double-loop learning

配方乳粉产品配方注册管理办法			
Measures for the Investigation and Punishment of Illegal Acts Concerning Online Food Safety 网络食品安全违法行为查处办法	CFDA	October 1, 2016	Single-loop learning
National Plan for Food Safety During the Period of the Thirteenth Five-year Plan and the National Plan for Drug Safety During the Period of the Thirteenth Five-year Plan “十三五”国家食品安全规划和“十三五”国家药品安全规划	The State Council	February 14, 2017	Single-loop learning
Measures for the Supervision and Administration of Food Safety in Online Catering Services 网络餐饮服务食品安全监督管理办法	CFDA	January 1, 2018	Single-loop learning
Regulations on the Food Safety Responsibility System of Local Party and Government Leading Cadres 地方党政领导干部食品安全责任制规定	The State Council	February 5, 2019	Single-loop learning
Opinions of the CPC Central Committee and the State Council on Deepening the Reform and Strengthening Food Safety 中共中央国务院关于深化改革加强食品安全工作的意见	The State Council	May 9, 2019	Single-loop learning
National food safety standard-Maximum residue limits for veterinary drugs in food 食品安全国家标准食品中兽药最大残留限量	MOA	April 1, 2020	Single-loop learning

Source: official websites of CFSA and the State Council

4. NZ verification service in the food sector

Sector	Verification required by New Zealand law	Verification required for overseas market access	Verification Providers
Animal Products (non dairy)	Animal Products Act	yes	2 MPI and AsureQuality
Animal Products dairy	Animal Products Act	yes	2-3 MPI, AsureQuality and Eurofin
Plants	None	yes	3
Wine	Wine Act	no	Many
Food Act	Food Act	yes	Many
Live animals & germplasm	Animal Products Act	yes	2 MPI and AsureQuality

Source: MPI (2014, December 9)

5. The SRC testing results before and after the rework

Original Manufacture			Re-work Output		
Product	Cypher	SRC cfu/g *(Spores)	Material	Cypher	SRC cfu/g *(Spores)
Cheese Whey	GW02	<1	104579	JW17	6700
	C1080-	<1	3925		8200
	C1092	7	WPC 80		7200
		4			
		5			
Cheese Whey	GW03	9	104579	JW18	700
	C1093-	5	3925		800
	C1099	6	WPC 80		400
		13			
		11			
Rennet Casein Whey	GW03	4	104589	JW22	110
	R0865 –	3	Rennet		220
	R0877	1	4721		200
	726 bags	2			180
		3			210

Source: (MPI, 2013, August 25)

6. MPI's implementation of the inquiry recommendations

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
The wider view				
1	The Ministry, in consultation with the industry and other relevant government agencies, should focus on emerging risks and prepare a high-level risk register identifying such risks to dairy food safety and supply.	Food Safety	MPI is implementing a system for identifying and managing future strategic risks in partnership with the dairy industry.	Single-loop learning

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
2	The Ministry should convene a working group to develop a strategic plan to build up sector-wide dairy processing and regulatory capability.	Primary Industries	A Dairy Capability Working Group was established in July 2014. The Group has a work programme agreed with the Director-General; it meets monthly and is due to report in July 2015.	Single-loop learning
3	A centre of food safety science and research, which could be a virtual centre, should be established to ensure New Zealand remains a leader in the food safety field.	Science and Innovation Food Safety	Massey University has been announced as the host of the Food Safety Science and Research Centre. The 7 research organisations in the collaboration are together developing business and research plans and engaging with industry groups.	Single-loop learning
4	In collaboration with other government agencies, the Ministry should step up its role and resources, both here and abroad, to allow more effective interaction with New Zealand's most important, and emerging, export markets, particularly China.	Primary Industries	The Government committed an additional \$4.430 million in 2014/15 rising to \$8.295 million in 2017/18 and out-years to increase MPI's presence overseas. MPI has posted additional personnel, including a senior official, to China to boost capability in the region. Other overseas locations proposed for MPI staff include the Middle East, North Asia ex-China, South Asia, and Latin America. Recruitment for the 2014/15 deployments is complete and planning for future deployments ongoing.	Single-loop learning
5	All organisations in the sector should endeavour to increase collaboration, whether among regulators, the Ministry and the industry, or within the wider dairy industry.	Food Safety Primary Industries	An MPI-led review of existing forums and work programmes is underway to enable greater ongoing collaboration. Additional working groups proposed by the Inquiry have been established. Existing bodies such as the Dairy Companies Association of New Zealand Infant Formula Working Group and the Dairy Product Safety Advisory Council Infant Formula Working Group have picked up issues raised by the Inquiry.	Single-loop learning
Regulatory design				

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
6	<p>The Ministry should accelerate the standards integration programme, using specialist drafters, technical industry experts and recognised agencies from the start of the process. In particular:</p> <ul style="list-style-type: none"> ○ Risk management programme requirements should be elevated to regulations, along with the requirements for the notification and reporting of food safety events. ○ There should be a new requirement that risk management programmes be limited to food safety and related regulatory matters. ○ The Ministry, verifiers, laboratories and industry should jointly work on drafting and publishing escalation guidelines for food safety incidents. 	Food Safety	<p>As part of the Food Safety Law Reform Bill work, MPI is considering how primary legislation can be used to give clearer direction on the use of delegated legislation (regulations and tertiary notices).</p> <p>In the meantime, MPI has a specific programme underway to make sure tertiary legislation is developed in a clear and consistent way, is easier to find, and easier to understand. New processes, guides and templates have been developed to ensure that MPI's tertiary legislation is presented consistently, is written in plain English to aid understanding, and is legally robust.</p> <p>Limiting the content of RMPs is being addressed in the Food Safety Law Reform Bill work.</p> <p>MPI is also working closely with verifiers and laboratories on escalation guidelines, in consultation with the Parliamentary Counsel Office.</p>	Single-loop learning
7	Following the rewrite of the requirements for risk management programmes, the Ministry should receive and maintain records of full and up-to-date programmes.	Food Safety	Being progressed as part of the Food Safety Law Reform Bill work.	Single-loop learning
8	It is important that risk management programmes be periodically re-evaluated.	Food Safety	Being examined as part of the Food Safety Law Reform Bill work.	Single-loop learning
Role of the regulator				

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
9	A Food Safety and Assurance Advisory Council should be established to provide the Ministry with high-level independent strategic advice and risk analysis and report annually to the Director-General on the performance of the system.	Food Safety	<p>The Council was established in July 2014. It provides independent advice to the Director-General on strategic issues relating to food safety. The Council considers high level system and regulatory issues across New Zealand's entire food safety and assurance regime and advises on the performance of the system.</p> <p>The Council meets quarterly. The Director-General has approved a work programme for the 2014-15 year that will focus on measuring the performance of the food safety system, identifying risks and opportunities, and ensuring New Zealand is prepared to deal with food safety events and incidents.</p>	Single-loop learning
10	<p>The Ministry should consider the following aspects of its operations:</p> <ul style="list-style-type: none"> ○ Structure: ensure a more integrated focus on the dairy sector and food safety generally. ○ Roles: ensure greater clarification of multiple, and sometimes conflicting, roles. ○ Capacity and capability: ensure additional skilled staff in food safety generally and specifically in the dairy sector. ○ Visibility: ensure greater prominence of the Ministry's food safety role. ○ Risk communication: ensure greater resourcing of, and priority for, this role. ○ Engagement: hold regular workshops and participate fully in overseas forums. 	Primary Industries Food Safety	<p>A structural alignment of MPI's governance and other functions become effective in May 2014. It enabled greater visibility of, and focus on, food safety. A new Regulation and Assurance Branch has been established with a substantial focus on food safety. A new Food Policy Directorate has also been established. The Director-General Regulation and Assurance is now ultimately accountable responsible for the food safety system and for improving the visibility of MPI's food safety role.</p> <p>The Dairy Capability Working Group is addressing capability and capacity issues in the sector.</p> <p>MPI has developed a Risk Communication Framework that can be applied alongside other risk management practices.</p>	Single/double-loop learning

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
11	Additional funding should be allocated as appropriate to Vote Primary Industries and Vote Food Safety, targeted at food safety and dairy-related capability; China and new markets capability; the redrafting of regulations; and the Food Safety and Assurance Advisory Council.	Food Safety Primary Industries	The Government allocated an additional \$8-12 million per year to these Votes when it accepted the WPC Inquiry's recommendations. Initiatives underway using this funding include the Food Safety and Assurance Advisory Council, the Dairy Traceability Working Group, the Dairy Capability Working Group, food regulatory reform, and increasing MPI's presence in overseas markets.	Single-loop learning
Role of verifiers				
12	<p>The independent verification system should be strengthened in the following ways:</p> <ul style="list-style-type: none"> ○ Provide greater clarity of the verifier's role as agent of the Ministry to make clear the true client is the regulator, not the industry. ○ Subject dairy processing operators using template risk management programmes to more rigorous scrutiny. ○ Encourage verifiers and the industry (with Ministry approval) to consider how the regular auditing processes can provide more evaluation without straying into consultancy, ○ Involve verifiers in product dispositions featuring novel or improvised working. ○ Provide verifiers' accreditation reports directly to the Ministry to ensure full and transparent reporting. 	Food Safety	<p>Some of these recommendations require legislative changes and will be progressed as part of the Food Safety Law Reform Bill.</p> <p>Policy work is underway on a wider review of how the verification system is performing. This may result in further changes.</p> <p>In the meantime, verifiers are implementing two new Notices of Direction on export load-out and tracing and recall processes. Unannounced audits of specific premises have also commenced. MPI is maintaining contact with verifiers through Verifier Summits and regular teleconferences.</p>	Double-loop learning

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
13	The Ministry should carry out more analysis of audit information to identify areas of particular concern, emerging issues or risks and compliance trends.	Food Safety	As part of its data systems review, MPI has commissioned development of a framework for tracking audit recommendations internally and externally. This will help build a picture of dairy industry performance over time.	Single-loop learning
14	Accreditors and verifiers should endeavour to consult and collaborate as appropriate to ensure continued improvements to the accreditation and verification systems.	Food Safety	A project is underway to ensure that there is continual improvement in the accreditation and verification systems. This is being led by accreditation bodies with MPI providing feedback and support.	Single-loop learning
Testing: quality and integrity				
15	Sulphite Reducing Clostridia (SRC) testing should not be mandatory for all dairy products.	Food Safety	Sulphite Reducing Clostridia testing is not mandatory for all dairy products; no further action is required.	Single-loop learning
16	The Ministry should compile and maintain a list of accredited laboratories for non-standard or novel tests.	Food Safety	MPI has compiled a list of all laboratories and the tests for which they have been accredited. MPI is currently consulting industry and laboratories on their non-routine testing capabilities.	Single-loop learning
17	The Ministry should give priority and resources to better analysis of existing data to identify trends, including extending its surveillance programmes where appropriate.	Food Safety	MPI is now using Dairy Product Safety Advisory Council quarterly reports on critical exceptions, export non-conformances, and other surveillance data to strengthen and improve information for industry. It will extend this to include Dairy Companies Association of New Zealand, to improve its communication with companies not currently represented. Verifiers are also receiving this data to inform their verification work.	Single-loop learning
Implementation of food safety standards				

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
18	The Ministry, recognised agencies and industry should work to foster a positive food safety culture and identify mechanisms to evaluate the food safety culture within companies.	Food Safety	MPI structural alignment changes are enabling improved relationships between industry and MPI. Frontline food compliance services that are currently contracted to DHBs will be brought in-house to MPI by June 2015. The Food Compliance Services team will increase from 7 to 19 FTEs. These resources will enable MPI to evaluate companies' food safety cultures. MPI has also committed to implementing industry forums as a mechanism to improve food safety culture within companies.	Single-loop learning
19	The Ministry should promptly inform industry of new overseas market access requirements and where practicable consult industry about such requirements.	Food Safety	This is a core function of MPI, and information exchange takes place on a daily basis across the full range of industries producing food and animal material for export. Consultation with industry is currently underway on revised templates and process requirements for overseas market access, to make it easier for industry to identify what is required of them.	Single-loop learning
20	The compliance and enforcement tools in the Animal Products Act 1999 should be aligned with those in the Food Bill, which is currently before Parliament, and should include a full range of tools.	Food Safety	This work is being progressed through the Food Safety Law Reform Bill.	Single-loop learning
21	The Ministry should prioritise analysis of food safety compliance data.	Food Safety	MPI has almost completed work on a new verification performance monitoring and reporting framework and is finalising work on export performance verification reporting guidance.	Single-loop learning
Traceability, recall and contingency planning				

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
22	The Ministry should convene a working group to consider first, the most appropriate regulatory provisions for traceability of dairy products, and secondly, a code of practice or similar to guide industry in implementing such provisions.	Food Safety	<p>The Dairy Traceability Working Group, comprising members from the dairy and grocery industry, was convened in 2014. It provided its final report to the Director-General of MPI on 1 December 2014.</p> <p>The report proposes regulatory requirements for dairy traceability and recommends MPI undertakes additional work in a number of areas. It also presents a best practice guidance document to assist the dairy industry to establish or strengthen its traceability systems for recalls and to meet consumers' expectations.</p> <p>MPI is considering the recommendations in the report. Industry will be consulted on any proposed changes to current requirements. Any recommendations requiring legislative change will be addressed by the Food Safety Law Reform Bill.</p>	Single-loop learning
23	<p>Recall provisions should be revised, in particular:</p> <ul style="list-style-type: none"> ○ Mandatory recall provisions in food legislation should be aligned. ○ Voluntary recall obligations should be set out in regulations rather than in risk management programmes. ○ Regulations should require industry to simulate recalls, audited by verifiers. ○ Circumstances in which privileged statements can be made should be clarified. 	Food Safety	<p>Changes to mandatory recall powers were included in the Food Act 2014 (passed in June 2014).</p> <p>Other recommendations that require legislative change are being considered as part of the Food Safety Law Reform Bill.</p>	Single-loop learning

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
24	The Ministry should be given statutory responsibility for food safety contingency planning. Industry and regulators should simulate tracing, recall and general food safety incidents from time to time as part of such contingency planning.	Food Safety	Being progressed through the Food Safety Law Reform Bill.	Single-loop learning
Infant formula				
25	The Ministry should prioritise its infant formula work programme and complete the revision of food safety-related regulatory requirements for the manufacture of infant formula (and, if appropriate, ingredients for infant formula) within six months.	Food Safety	MPI continues to prioritise its infant formula work programme. Draft regulatory standards covering infant formula export labelling, traceability, and manufacturing were released for public consultation in 2014. MPI intends to issue the standards progressively in the first half of 2015 as technical details and drafting are finalised.	Single-loop learning
26	The Ministry, with input from the relevant working groups, should resolve whether infant formula and other high-risk products should routinely undergo Sulphite Reducing Clostridia (SRC) testing, based on scientific, risk-based and cost-benefit analysis.	Food Safety	Although this testing is not required, MPI has added SRC testing to a dairy testing programme for high-risk nutritional powders. In addition, the industry is undertaking enhanced SRC monitoring of these products as an interim measure until the end of the 2014 season.	Single-loop learning

	Inquiry recommendation	Lead Ministry	MPI / agency implementation	Learning assessment
27	The Ministry should strengthen requirements for exporters of infant formula to ensure traceability.	Food Safety	MPI has consulted on a regulatory notice to require 'export declarations' for infant formula exports to markets that do not require official assurances (e.g., Hong Kong). This notice would enable MPI to hold information about all infant formula exports to any market. It would also allow routine audits of infant formula exporters to ensure they are meeting their duties and obligations. The notice is still under development and must take account of the emerging trade in small package exports facilitated by large scale internet trading platforms. It is expected to be introduced in 2015.	Single-loop learning
28	Regulatory requirements under both the Animal Products Act 1999 and the Food Act 1981 should be aligned.	Food Safety	MPI has aligned requirements for producing infant formula for the domestic (New Zealand and Australian) markets by updating the criteria for registration of food safety programmes under the Food Act to mirror those in the Animal Products Act. All infant formula for export must be produced under the Animal Products Act, and requirements can vary depending on the intended market.	Single-loop learning
29	The Ministry, in consultation with the industry, should develop options to provide foreign markets with the assurance of authenticity of New Zealand-manufactured infant formula products.	Food Safety	Implementation of this recommendation is being integrated into MPI's wider work on ways to assist businesses to communicate Government-assured supply chain information to consumers. This work is also being informed by the Dairy Traceability Working Group, and will draw on recent significant improvements to the animal products electronic certification system	Single-loop learning

7. MPI consolidated list of tests for Animal Products-Dairy products-microbiology

Numerical Reference	Test	Animal Materials and products and associated things
Dairy (Raw Milk)		
30.1	Somatic cells	Raw milk for further processing (all species)
30.5	APC	Raw milk for further processing (all species)
30.6	Coliforms (total)	Raw milk for further processing (all species)
30.7	Thermodurics	Raw milk for further processing (all species)
Dairy Products-Microbiology		
31.1	APC / SPC / TCC	All dairy products
31.2	Bacillus cereus	All dairy products (including raw milk)
31.2.1	Bacillus cereus Enterotoxin	All dairy products
31.3	Campylobacter	All dairy products (including raw milk)
31.4	Clostridium botulinum	All dairy products
31.5	Clostridium perfringens	All dairy products
31.6	Coliforms (count)	All dairy products
31.7	Escherichia coli	All dairy products (including raw milk)
31.8	Enterobacteriaceae	All dairy products
31.9	Faecal coliforms	All dairy products
31.10	Listeria monocytogenes	All dairy products (including raw milk)
31.11	Lipolytic organisms	All dairy products
31.12	Salmonella	All dairy products (including raw milk)
31.13	Staphylococcal Enterotoxin	All dairy products
31.14	Staphylococcus aureus	All dairy products (including raw milk)
31.15	SRC	All dairy products
31.16	Yeasts and Moulds	All dairy products

31.17	Cronobacter spp. including Cronobacter sakazakii (previously genus name was Enterobacter)	Infant formula
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Source: MPI Consolidated List of Tests for Animal Products