CORPORATE SOCIAL RESPONSIBILITY STRATEGY IN PRODUCT HARM CRISIS MANAGEMENT: AN EMPIRICAL INVESTIGATION OF THE FASHION INDUSTRY

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Corporate Social Responsibility Strategy in Product Harm Crisis Management: An Empirical Investigation of the Fashion Industry

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CERTIFICATE OF ORIGINALITY

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(Signed)

LAM YUEN KIU (Name of student)

ABSTRACT

Today's consumers are not only interested in the technical benefits of a product, but also concern the corporate social responsibility (CSR) of the firms. CSR is a dominant factor of public opinion towards a firm's reputation. Consumers' perception of a brand's reputation influences their perception towards the firm's products. Effective CSR strategies are thus important for companies to create positive consumer's perception of their products and eventually enhance their brand value. Negative publicity, such as product harm crisis, weakens consumers' satisfaction, purchase intention, and brand evaluation. Positive publicity, such as taking CSR leadership, improves the consumers' perception towards the company.

In the current CSR literature, little attention has been paid to the contextual factors of product harm crisis and there is a lack of empirical evidence from the fashion industry. Previous studies argue that a product harm crisis is costly to firms and brings negative impact to firms' image and long-term performance, but there is no objective evidence of the impact of response strategies during a product harm crisis. Therefore, this research focused on the contextual factors of the relationship between product harm crisis management and firms' long-term performance.

This research consists of two sections. In the first section, we examined the effective strategic responses and moderators in managing product recalls in the fashion industry. Based on situational crisis communication theory (SCCT), we developed a research framework of product harm crisis management. We then examined the framework by 48 Consumer Product Safety Commission (CPSC) product recalls of fashion products

between the years 1990 and 2009 by 31 U.S. listed companies. The ordinary least square regression analysis of a year -2 to year 2 panel data set shows that the effectiveness of financial compensation and proactive recall strategy are stronger in recalling products targeted on highly vulnerable consumers. The findings contribute to fashion product recall management literature based on the SCCT framework and provide direct implications for operations managers to design remedy and recall strategies for product harm crisis in the fashion industry.

To explore more contingency factors for the research framework, in the second section, we expanded the scope of product harm crisis management by examining firms in semi-durable and durable consumer product industries in addition to the fashion industry. We examined 170 CPSC product recalls by 87 U.S. listed companies between the years 1987 and 2011. The negative impact on financial performance is more serious to recalls of high crisis severity and for companies with outsourcing practices. Also, we find no evidence that using suppliers in China will worsen the firms' profitability after a product recall in long run.

Overall, our results suggest that product recalls are beneficial to fashion firms. However, the effectiveness depends on different contingency factors and these factors are summarized in our research models. Managers should carefully examine the contingency factors in designing CSR strategies in both product harm crisis management, because the effective management will protect and build their brand in today's global market, which emphasizes the importance of corporate social responsibility.

PUBLICATIONS ARISING FROM THE THESIS

Conference Papers

2014 International Symposium on Business and Management (ISBM 2014), April 2-4, Nagoya University, Nagoya, Japan.

Lam, Y. K., Lo, C. K., 2014. Product recalls: repair efforts and long-term financial performance in the fashion industry. Proceedings of the 2014 International Symposium on Business and Management (ISBM 2014).

The Asian Conference on the Social Sciences 2014, June 12-15, Osaka International Convention Center, Osaka, Japan.

Lam, Y. K., Lo, C. K., 2014. Product harm crisis management: A systematic review and future research directions. Conference Proceedings: The Asian Conference on the Social Sciences 2014.

Referred Journal Papers

Lam, Y. K., Lo, C. K., Yeung, A. C., 2014. Contingency Perspective on Product Recalls and Long-term Financial Performance. **(Revision R1 under review in International Journal of Production Economics)**

Lam, Y. K., Lo, C. K., Yeung, A. C., 2014. A Systematic Review of Product Harm Crisis Management Literature. **(Submitted to OMEGA; Planned for submission to Journal of Supply Chain Management)**

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CHAPTER 1 INTRODUCTION

1.1 Research background

Branding is a primary competitive strategy for firms, especially for businesses in the fashion industry (Power & Hauge, 2008). Power and Hauge (2008) indicated that both the tangible and intangible attributes of a product must be considered in branding. Consumers are increasingly interested in the intangible attributes of products in addition to the tangible characteristics. Corporate social responsibility (CSR) policies and initiatives are perceived as the primary intangible attributes of a brand. Dawkins and Stewart (2003) demonstrated that CSR is evidently increasing in importance for almost every stakeholder and is not only considered by educated people. Although CSR does not have a universal definition, in the business sector, the World Business Council for Sustainable Development defined CSR as follows: "CSR is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large" (Moir, 2001). This implies that CSR is highly related to external stakeholders. CSR is a primary determinant of public opinion towards a firm (Dawkins & Stewart, 2003). Consumers' knowledge and opinion regarding a company can influence their product evaluation and, hence, affect their reactions towards the company's products (Brown & Dacin, 1997). Poor CSR strategies therefore negatively affect the brand value and image of a firm as well as consumers' future purchase intention for the company's products. Therefore, effective CSR strategies are crucial for companies to protect and improve their brand value and image.

News and announcements related to a firm's CSR affect brand image and brand value. Both positive CSR announcements, such as announcements concerning community support for minorities, and negative CSR news, such as news regarding poor product safety, quality and ethical issues, influence consumers' perceptions of a brand. Stammerjohan, Wood, Chang, and Thorson (2005) indicated that, although publicity is recognised as an efficient and credible means of communication between firms and their stakeholders, firms do not have complete control over the type of publicity to which the stakeholders are exposed. Publicity regarding a firm can be both negative and positive. Negative publicity weakens consumers' satisfaction, purchase intention, and brand evaluation (Pullig, Netemeyer, & Biswas, 2006). By contrast, positive publicity regarding a company or its products can improve consumers' perception of the company (Stammerjohan et al., 2005). Product harm crisis management is related to negative publicity; often an event or action is conducted to demonstrate a company's corporate responsibility for its products and to its customers. Product recall is a form of negative publicity, which has potential negative impact on firm performance, through which consumers become exposed to negative information on the potential hazards of a company's products.

This paper examined how companies effectively respond to product harm crisis. Although research on product harm crisis management is not a new topic in marketing literature, insufficient attention has been paid to the topic in operations management literature, and no related empirical studies on the fashion and textiles industry have been conducted. Only one paper in education literature examined the impact of product recalls in the fashion industry by using a descriptive approach (Norum & Ha-Brookshire, 2011).

1.2 Research question and objectives

From the contingency perspective, the match amongst management strategies, an organisation, and the environment affects the effectiveness of a strategy (Balkin & Gomez-Mejia, 1987). Thus, external factors, such as the industry type of a firm, and internal factors, such as firm characteristics and resources, affect the effectiveness of a strategy (Hofer, 1975). Therefore, a firm's CSR strategies in product harm crisis management should be contingent on external and internal factors. This study focused on answering the following research question:

What are the factors that affect a firm's CSR strategies in product harm crisis management, and what are the moderating effects of these factors on the firm's long-term performance?

This research addressed the gaps in the current knowledge on effective CSR strategies by examining the impact of various factors and their moderating effects on a company's performance in managing product harm crises. To answer the research question, this study used a theory-driven approach to investigate. The situational crisis communication theory (SCCT) (Coombs & Holladay, 2002) was used to examine how companies can react responsibly during a product harm crisis. Based on the SCCT framework, this study aims to contribute to product harm crisis management literature and give insights to operation management by exploring new situational moderators and examining their moderating effects on firms' long-term performance.

1.3 Research methodology

This study consists of two sections. Research section one (Chapter 3) focused on the fashion industry. Research section two (Chapter 4) extended the analysis to semi-durable and durable product industries.

Secondary data were used in all two sections in this study to investigate the long-term effectiveness of a firm's CSR strategies in product harm crisis management.

Because this study aimed to reveal how various situational moderators affect the effectiveness of CSR strategies, a hierarchical linear regression analysis was conducted to examine the multivariate relationships between the dependent variable (firm performance) and all independent variables. In each research section, a panel data set containing observations on multiple entities (such as firms) was used, and each entity was observed at two or more points in time.

1.4 Significance of thesis

This study provides several theoretical and managerial implications. First, it provides theoretical implications that enrich the literature on product harm crisis management. For product harm crisis management literature, on the basis of the SCCT theoretical framework, new situational moderators are contributed. Second, the results of this study provide decision-making guidelines according to which industrial practitioners can develop product harm crisis response strategies. A detailed discussion of the implications of this study is presented in Chapter 5.

1.5 Outline of the paper

This paper has five chapters. Chapter 1 presents the background, objectives and research questions, research methodology, significance of the paper, and an outline of the organisation of this paper. Chapter 2 reviews the literature on product harm crisis management and strategic leadership. Chapter 3 presents research section one, which focused on repair efforts in product recalls in the fashion industry. Chapter 4 presents Research section two, which extended the product recall sample data to semi-durable and durable product industries. Chapter 5 closes the paper by drawing conclusions and providing an overall discussion.

CHAPTER 2 LITERATURE REVIEW OF PRODUCT HARM CRISIS MANAGEMENT

This chapter aims to provide an in-depth review the literature concerning the conceptual framework of this study and its involved constructs. This chapter reviews the literature related to product harm crisis management and strategic leadership of CSR. The chapter is divided into five sections. First, an introduction of the key theory used in this study – SCCT is presented in section 2.1. Second, through a systematic review on product harm crisis management literature, the major research domains, research trend and summary of findings are presented in section 2.2. The systematic review provides a foundation for research model development of this thesis. Third, from the operations management perspective, the positive and negative impacts of product recalls are discussed in section 2.3. Finally, the main findings of the literature review are summarized in section 2.4.

2.1 Situational crisis communication theory

The sections of research on product harm crisis and strategic responses in this thesis are based on SCCT, which is a framework on crisis management and communication (Coombs, 2007b). SCCT serves as one of the key theories in crisis management literature. It describes a situational approach for responding to crisis and protecting organizational reputation (Coombs & Holladay, 2002). SCCT is developed from a number of studies that examined how a crisis might shape the selection of crisis response strategies and/or examined the effect of such strategies on reputation e.g., (Bradford & Garrett, 1995; Coombs & Schmidt, 2000; Coombs, 1995, 1999; Coombs & Holladay, 1996, 2001). It has been recently developed and enhanced by researchers

(Claeys, Cauberghe, & Vyncke, 2010; Coombs, 2004, 2007a, 2007b; Coombs & Holladay, 2002, 2008; Jeong, 2009; Sisco, Collins, & Zoch, 2010). One previous review paper has also studied the application of the theory in the crisis management literature (Avery, Lariscy, Kim, & Hocke, 2010).

SCCT is derived from the attribution theory, which holds that people will make judgments about the causes of events, especially unexpected events with negative outcomes (Weiner, 1985). Assessing crisis threat is important before responding to a crisis. The first step of assessing crisis threat is to identify the crisis type. SCCT identifies and groups various crisis types into three clusters based upon the level of attributions of organizational responsibility for a crisis: *victim cluster* contains crises that produce very weak attributions of crisis responsibility, and customers view the organization as a victim of the event; *accidental cluster* contains crises that produce minimal attributions of crisis responsibility and the event is considered uncontrollable by the organization; *intentional cluster* contains crises that produce very strong attributions of crisis responsibility and the event is considered intentional (Coombs, 2004; Coombs & Holladay, 2002). For the second step of assessing crisis threat, three intensifiers are suggested in SCCT: *crisis history*, whether an organization had similar crises in the past; *prior reputation*, the record of good or bad behaviour towards the stakeholders; *crisis severity*, amount of damage done by the crisis (Coombs & Holladay, 2002). Attributions of crisis responsibility are believed to intensify when there is either a history of crises or the relationships with stakeholders have been negative (Coombs, 2004).

SCCT holds that the reputational threat and negative affect increases after a crisis

(both of which are functions of situational factors) (Coombs, 2007b). Therefore, after assessing the crisis threat, choosing appropriate response strategies is critical for organizations to repair the reputation, to reduce negative affect and to prevent negative behavioural intentions (Coombs, 2007b). SCCT proposes three groups of crisis response strategies (*denial*, *diminish*, *rebuild*) according to the perceptions of accepting responsibility for a crisis (Coombs, 2006). SCCT provides guidelines for the use of crisis response strategies under different crisis situations. For instance, *rebuild* crisis response strategies should be used for accident crises with *crisis history* and/or negative *prior reputation* (Coombs, 2007b). The framework of SCCT is illustrated in Figure 2.1.

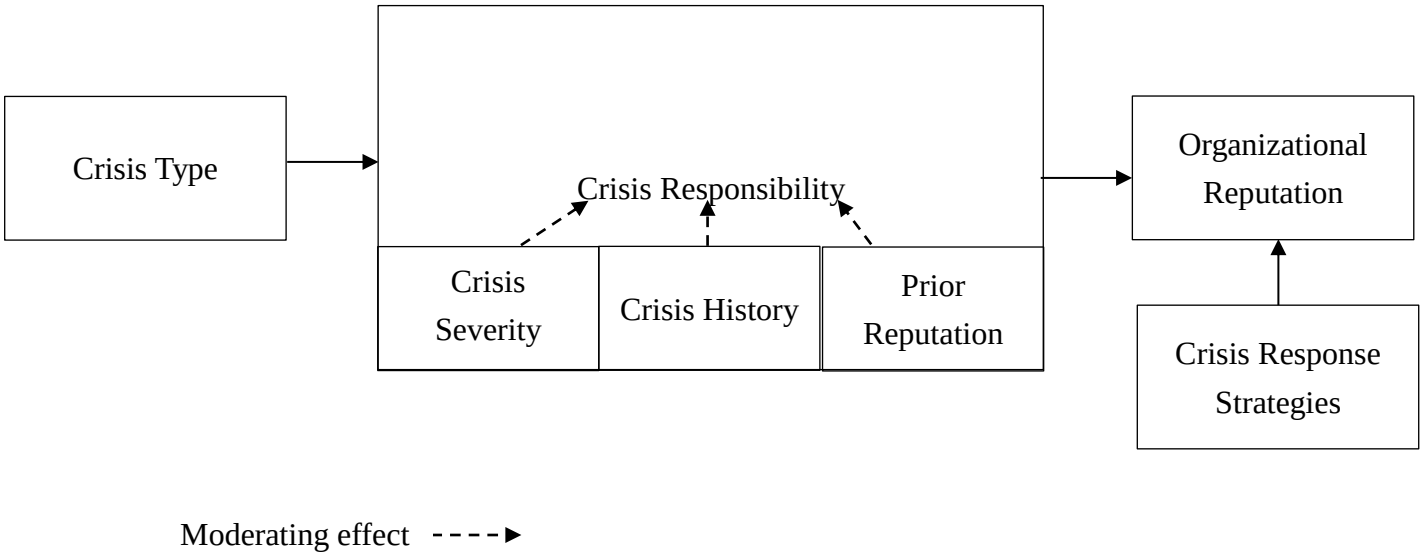

Figure 2.1 SCCT Framework

SCCT provides a theory-based system to match crisis response strategies to the crisis situation to best preserve the reputation of an organization (Coombs, 2004). A good reputation is a valuable asset that allows a firm to achieve persistent profitability (Roberts & Dowling, 2002). Research on firm reputation suggests a reputation-performance effect is bi-directional: a firm's reputation affects its financial performance and vice versa (McGuire, Scheeweis, & Branch, 1990). Therefore, it is important to investigate how situational factors affect a product harm crisis and how the crisis response strategies rebuild organization reputation and lead to better financial performance, based on the SCCT framework.

2.2 Systematic review of product harm crisis literature

There is no comprehensive review on product harm crisis in the literature. There are only two review papers on this aspect, and both showed limitations on their sample paper selection. Etayankara and Bapuji (2009) reviewed the product recalls related literature with only 87 sample articles. Standop and Grunwald (2009) reviewed the product recall articles for the retail sector only. This section provides a comprehensive and systematic review of product harm crisis literature.

2.2.1 Review methodology

Product harm crisis is an inter-disciplinary issue, and it occurs in various industries. Therefore, the sample articles are collected from the following five electronic databases to capture a wide range of journal articles.

1. Business Source Complete
2. Science Direct

3. ABI/INFORM

4. Emerald Fulltext

5. JSTOR

We conducted a full text search of journal articles in these databases by relevant keywords “product harm crisis”, “product recall”, “product crisis” and “recall crisis”. “Product crisis” was used because some marketing researchers have used this expression to describe product recall situations. Only peer-reviewed journals were used in the data collection. Master theses, doctoral dissertations, textbooks, news reports, and unpublished working papers are excluded. The review period is from 1993 to 2013. 155 articles from 104 journals were collected as sample.

2.2.2 Sample articles distribution

This section presents articles distribution based on year of publication, journal, product type and country researched, and the analytical approach. We further reveal the empirical studies by describing data analysis method, data sources and dependent variables.

a) Distribution of articles by year of publication

Figure 2.1 shows the articles yearly distribution from 1993 to 2013. Product harm crisis is receiving higher attention, especially after 2008, which may relate to the increasing number of product harm incidents, for instance, 2007 was called as “the year of recall” and many made-in-China products were recalled in global market places (Beamish & Bapuji, 2008).

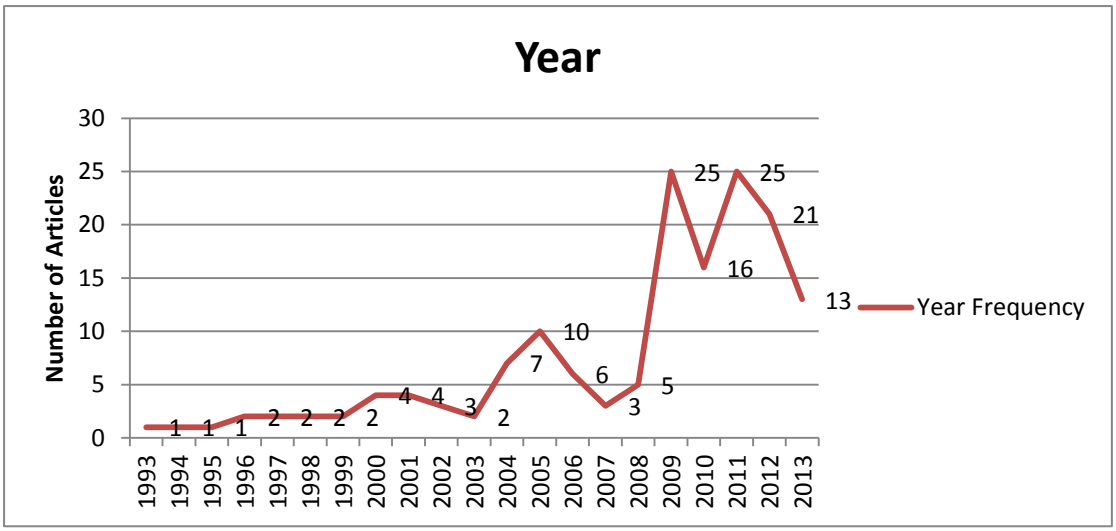

Figure 2.2 Article distribution by year of publication

b) Distribution of articles by journal

Sample articles were collected from a total of 104 journals. Table 2.1 presents a list of 14 journals that published three or more articles related to product harm crisis and the articles distribution. It shows a wide range of disciplines, from food safety to marketing and management to communication management. Public Relations Review publishes most articles examining communication between companies and the public, public relations, marketing and management. This distribution shows that the previous papers are mainly in literature of public communication, marketing and management, rather than in operations management.

Table 2.1

Journals publishing three or more articles on product harm crisis

Journal	Number of articles
Public Relations Review	12
British Food Journal	4
Business Horizons	3
Corporate Communications	3
Corporate Reputation Review	3
International Journal of Production Economics	3
International Journal of Production Research	3
Journal of Business Ethics	3
Journal of Marketing	3
Journal of Marketing Management	3
Journal of Marketing Research	3
Management & Organization Review	3
Management Science	3
Organization Development Journal	3

c) Distribution of articles by product type researched

As shown in Figure 2.2, 108 out of 155 sample articles (69.68%) cover research on one product type only while 25 articles (16.13%) report research on multi-product types. The remaining 22 articles (14.19%) do not mention a particular product type, and these articles are focused on general product recall issues. For example, some articles discuss the ways to increase the effectiveness of recall messages (Berman, 1999; Gibson, 1997, 2000a; Gurau & Serban, 2005; Nawasaki, Oono, & Inoue, 2009),

the supply chain issues in product recalls (Chao, Iravani, & Savaskan, 2009; Lyles, Flynn, & Frohlich, 2008; Tse, Tan, Chung, & Lim, 2011), and the optimal product recall timing (Sezer & Haksöz, 2012). Figure 2.2 shows that the frequently researched product types are food (47 articles: 30.32%), followed by automobiles and parts (32 articles: 20.65%), toys (10 articles: 6.45%) and pharmaceuticals (10 articles: 6.45%). Table 2.2 further illustrates the number of product types in multi-product-type research. Over three-quarters (19 articles: 76.00%) investigate two to four product types. The above statistics suggest future research may consider examining multiple product types other than food and automobiles, which could provide additional insights for other industries, such as fashion and textiles products.

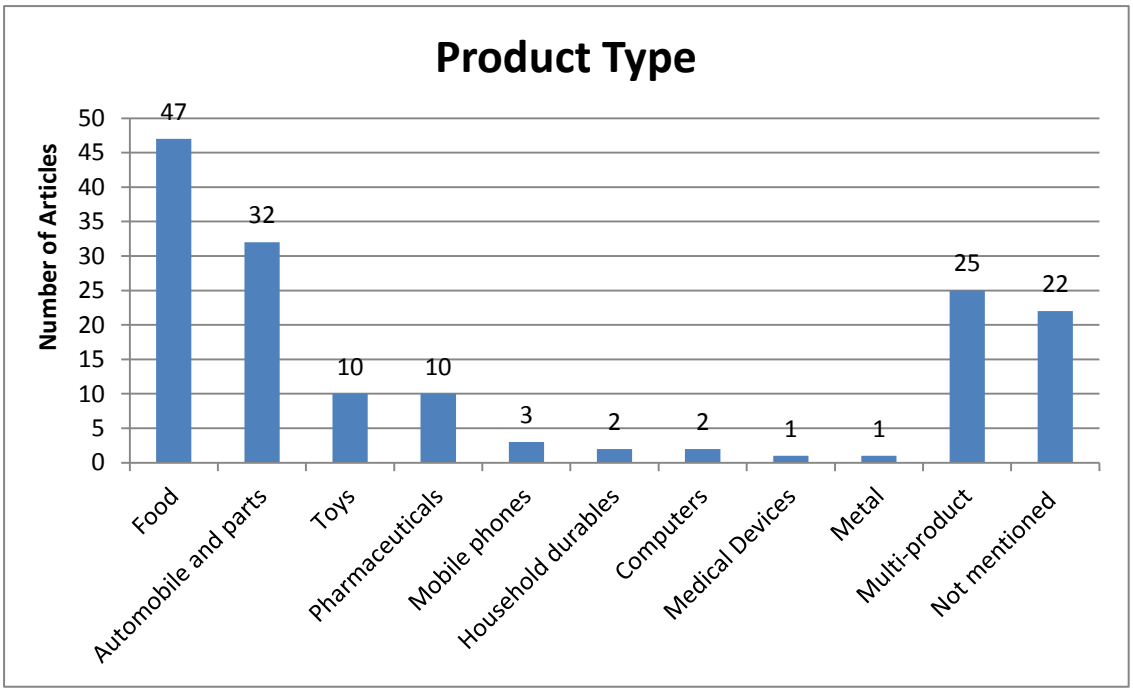

Figure 2.3 Article distribution by product type researched

Table 2.2

Number of product types in multi-product research

Number of product types researched	Number of articles
2-4	19
5-7	4
8-10	1
over 10	1
Total	25

d) Distribution of articles by country

Figure 2.3 shows that 105 out of 155 sample articles (67.74%) report research related to a single country and 43 articles do not specify it. Although some articles do not specify the country, these articles discuss product recall issues from a global

perspective. For instance, based on the case of Toyota's global massive vehicle recalls in 2009, a few conceptual papers discuss the product crisis issues in a global perspective (Andrews, Simon, Tian, & Zhao, 2011; Heller & Darling, 2011, 2012; Kumar & Schmitz, 2011). Also, there are empirical works that gathered data from internet sources, such as Facebook, without geographical boundaries (Byrd, 2012). Other general issues are examined irrespective of countries, including effective recall messages (Gibson, 1997), recall systems (Gibson, 2000a; Kumar, Dieveney, & Dieveney, 2009; Nawasaki et al., 2009; Piramuthu, Farahani, & Grunow, 2013; Wynn, Ouyang, ter Hofstede, & Fidge, 2011) and optimal recall time (Sezer & Haksöz, 2012). Only 7 articles (4.52%) obtained empirical data from multiple countries. Therefore, more research across countries is suggested. Figure 2.3 shows that United States (65 articles: 41.94%) and China (16 articles: 10.32%) are the most popular countries while other countries contribute less than 2.58%. It is surprising that only one article examined the large Japanese consumer market. European and Australian markets have also received little attention.

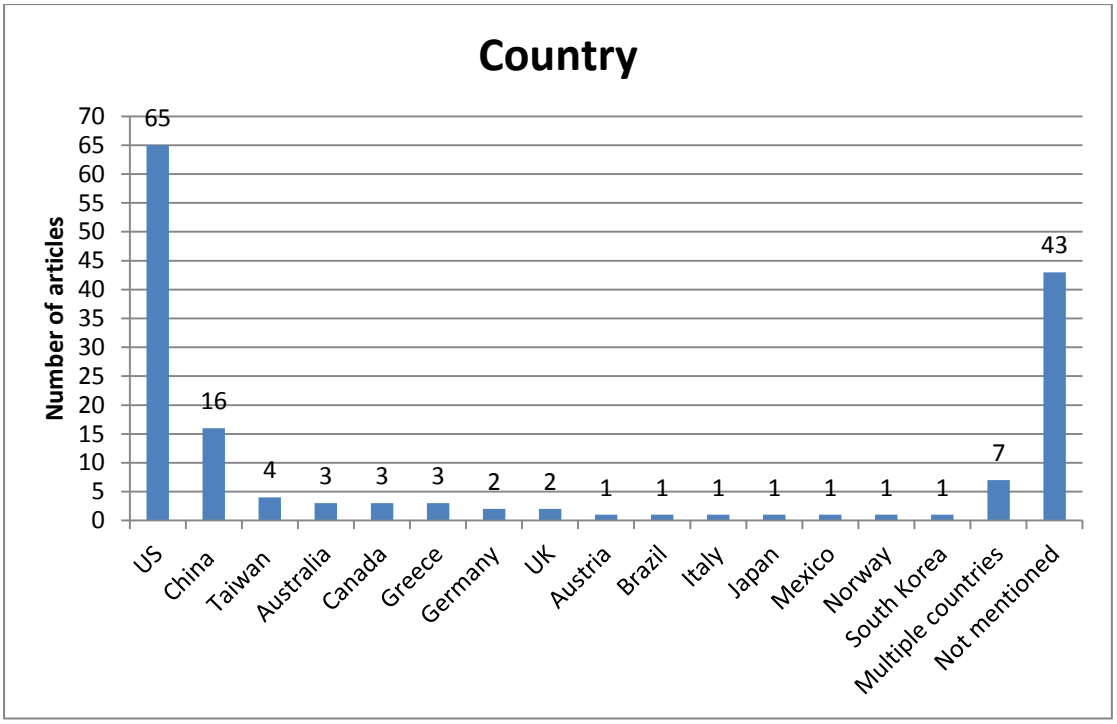

Figure 2.4 Article distribution by country researched

Figure 2.4 shows the distribution of the sub-sample of single-country research works (105 articles), by continent. The largest proportion (70 articles: 66.67%) is North America, including the U.S. and Canada, while there are only a few works that researched in Europe (10 articles: 9.52%) and Oceania (3 articles: 2.86%). The proportion of works on Asia (22 articles: 20.95%) is far more than the sum of the works on Europe and Oceania. More research works need to be conducted on Japan and countries in Europe because the product recall systems in these places are also well established and mature.

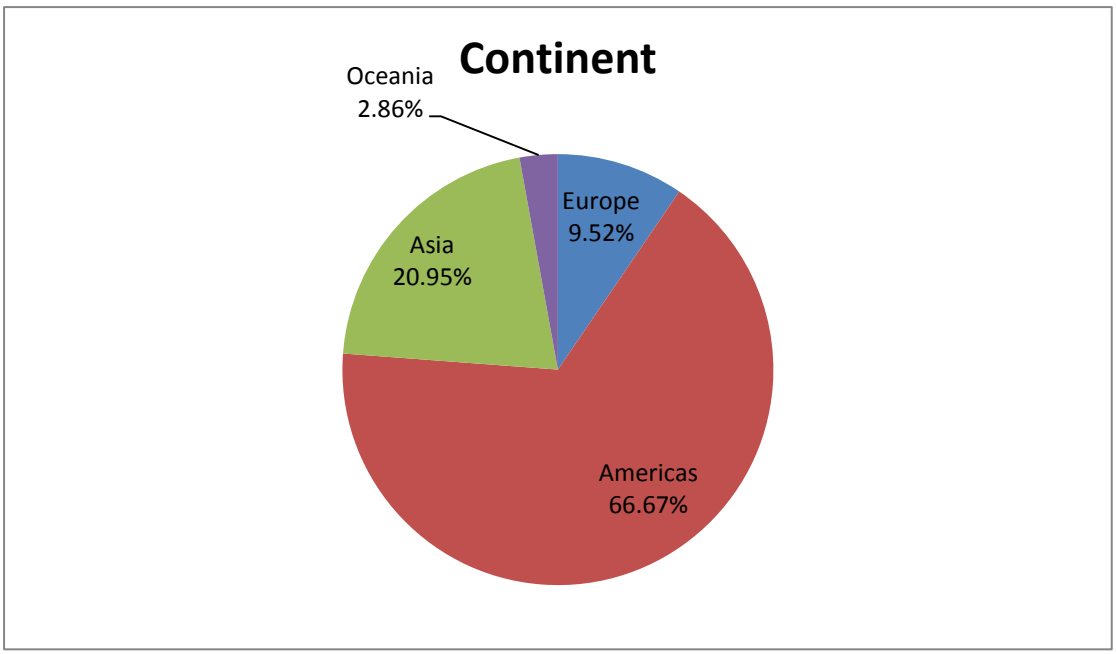

Figure 2.5 Article distribution by continent researched (single country researched)

e) Distribution of articles by analytical approaches

Figure 2.5 shows that the most frequently used analytical approach is empirical studies (100 articles: 64.52%). The rest are articles that do not present any empirical data. 45 articles (29.03%) are conceptual works and there are 10 mathematical modelling papers (6.45%).

We found that the majority of product harm crisis literature is based on empirical studies. It could possibly be because of the strong conceptual linkage between the crises and stakeholders, such as customers and government bodies, and thus lots of publicly available data sources for investigation. Unlike internal crisis of a company, product harm crisis is negative publicity in the public and the marketplace (Xie & Peng, 2009), which largely affects stakeholders, especially consumers who may suffer injuries and even death. Therefore, researchers have focused on investigating suitable

management from the perspective of stakeholders, rather than developing models for internal optimisation. The focus of the reviewed empirical works is the suitability of different crisis response strategies to stakeholders in order to lessen the impact, and the effect of different moderators involved in product harm crisis. On the other hand, the focus of modelling papers is on developing mathematical models on supply chain management (Piramuthu et al., 2013; Tse & Tan, 2012), recall planning such as optimal recall time (Sezer & Haksöz, 2012) and calculation of direct recall cost (Marino, 1997; Velthuis, Meuwissen, & Huirne, 2009). Future research may consider developing more optimization models for internal management.

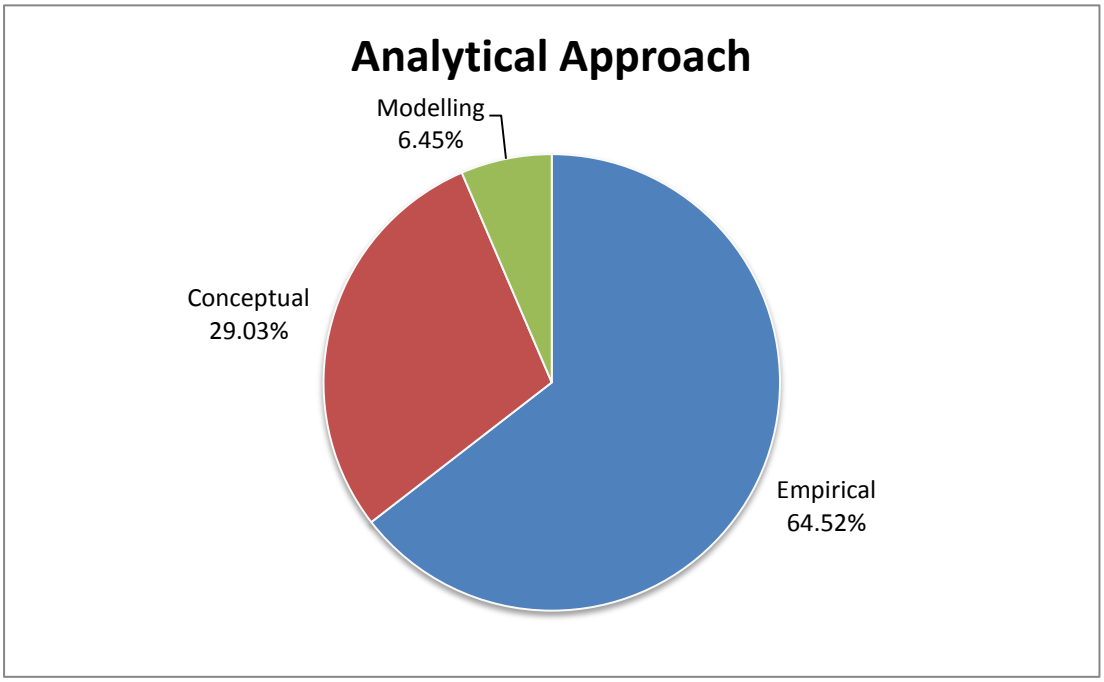

Figure 2.6 Article distribution by analytical approach

f) Distribution of articles in empirical studies

This section further shows the article distribution of empirical works, which is the analytical approach used in more than half of the reviewed articles (64.52%). There are 100 articles are empirical works.

Figure 2.6 presents the distribution of data analysis method among the empirical works. Over three-quarters of them (72 articles) used quantitative analysis, followed by 18 articles which used qualitative analysis, 5 articles only gave descriptive statistics of the data, and 5 articles used multi-methods, with both quantitative and qualitative analysis. Future research may consider using multi-methods to enhance the knowledge in the literature.

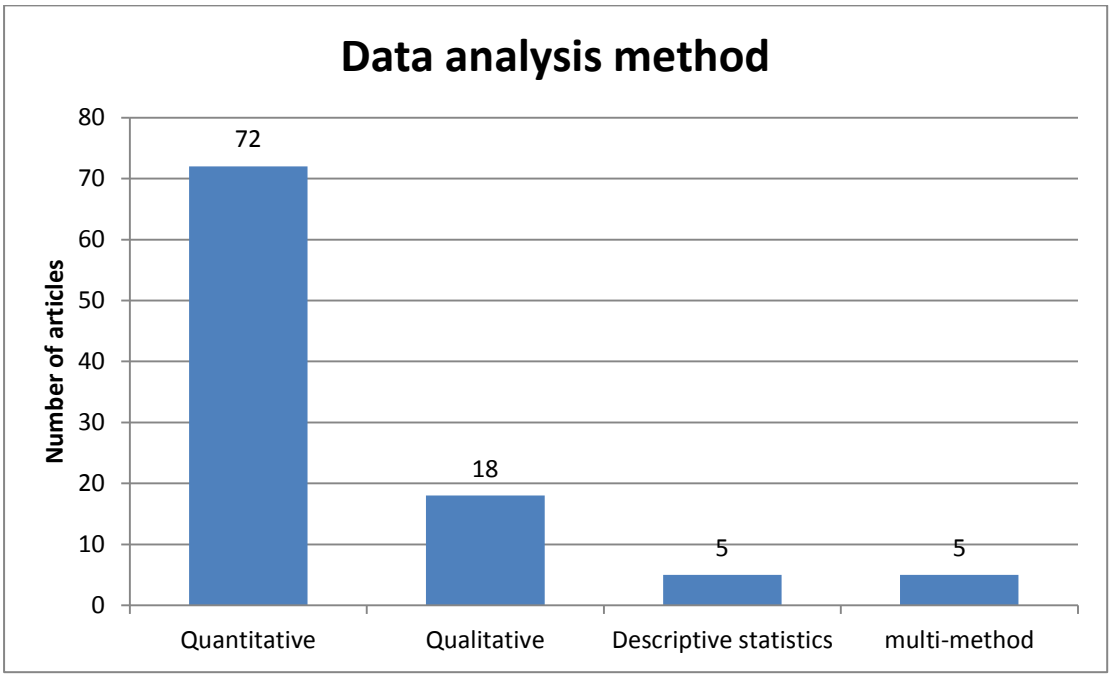

Figure 2.7 Article distribution by data analysis method in empirical studies

Figure 2.7 depicts the distribution of data sources in empirical studies, for end results analysis. Nearly half of them (46 articles) collected data from secondary archives, followed by experiments (31 articles), surveys (12 articles), interviews (8 articles) and

multi-sources (3 articles). Examples of secondary archives are stock price information from Standard and Poor's COMPUSTAT database, and market share data from third party research companies, such as ACNielsen. For research that used experiments, researchers assumed different scenarios and examined respondents' reactions. For research using multi-sources, researchers collected data from both primary sources such as surveys, and secondary sources such as sales data and media reports (Eagle, Hawkins, Kitchen, & Rose, 2005; Eagle, Rose, Kitchen, & Hawkins, 2005). Based on the above distribution, we suggest future studies may use more multi-source and in-depth interviews to obtain comprehensive insights.

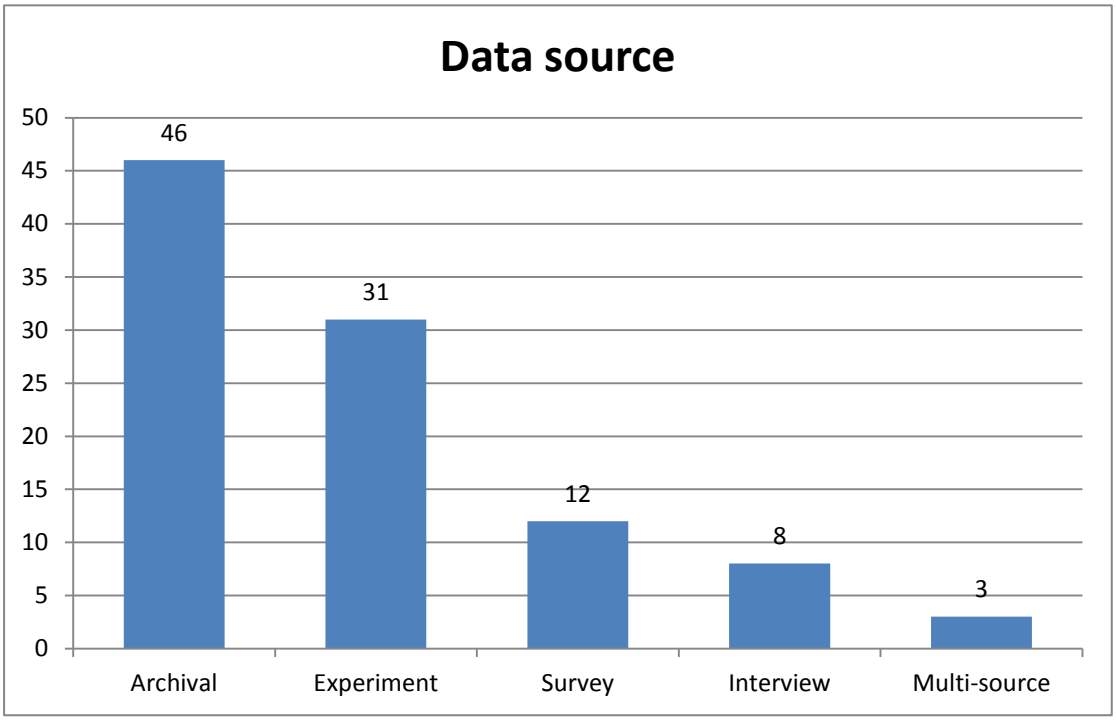

Figure 2.8 Article distribution by data sources in empirical studies

In the reviewed empirical works, quantitative analysis is the most frequently implemented analysis method (77 articles out of 100 empirical works). Figure 2.8 shows the distribution of dependent variables used in these works. The most

frequently used dependent variable type is stakeholders attitude, which accounted for 57.14% (44 articles), such as perceived degree of danger and purchase intention, followed by financial data (18 articles: 23.38%) such as stock price and market share, recall effectiveness (8 articles: 10.39%) such as customer response rate to recalls and number of accidents, and changes in consumer purchase (5 articles: 6.49%) such as changes in purchase frequency and consumer brand share. Only one empirical work used brand value and product quality performance as dependent variables. Therefore, we suggest future research may implement more varying measures, especially brand value and product quality performance.

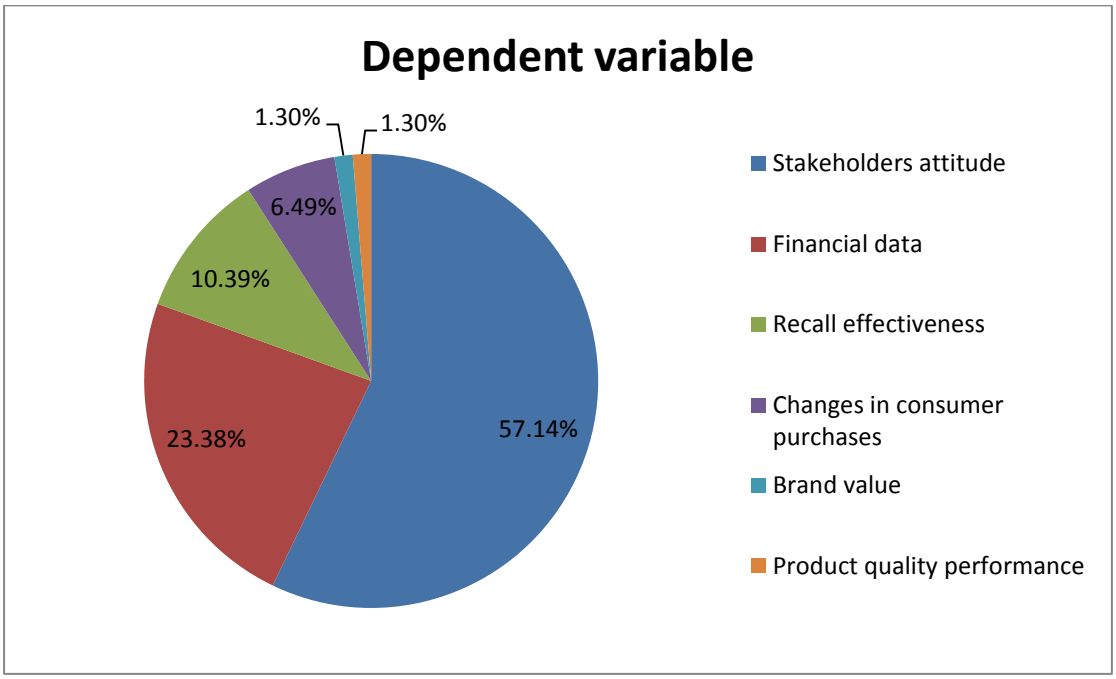

Figure 2.9 Article distribution by dependent variable in quantitative studies

2.2.3 Research domain in product harm crisis management

This section presents classification of research domains, identified from the structure of a key theory in crisis management and the features of product harm crisis. The article distribution by research domain is then presented.

Our research domain classification is presented in Figure 2.9. To avoid subjective biases on the naming of the product harm crisis domain classification, we adopt the constructs from SCCT, which is discussed in section 2.1.

The first domain identified is "Responsibility of product harm crisis". SCCT identifies crisis clusters based on attributions of crisis responsibility (Coombs, 2007b). In product harm crisis, manufacturers are seen as direct defendants (Kumar & Schmitz, 2011; Luo, 2008). However, there are other parties accountable for it. Therefore, examining the responsibility for causing the product harm crisis is a key domain.

The second key domain is "The impact of product harm crisis". A crisis poses a reputational threat, which is related to customer purchase intention and support for an organization (Coombs, 2007b), which in turn affects the firm performance. Studies related to the impact of product harm crisis on firm performance fit in this domain.

The third key domain is "Product harm crisis moderators". SCCT suggests a number of factors that affect the shaping of negative effects during a crisis, including the *prior reputation*, *crisis history* and *crisis severity* (Coombs, 2004). The SCCT framework suggests moderators can affect crisis impact level. Therefore, we classify the role of moderators in product harm crisis as a key domain.

Another key domain is "Product harm crisis response strategies", which is the last key component in the SCCT framework. The post-crisis communication between companies and stakeholders are critical. SCCT aims to develop guidelines to utilize

crisis response strategies to reduce negative crisis impact (Coombs, 2007b). Therefore, articles that discuss different crisis response strategies fall in this domain.

SCCT provides four key domains of product harm crisis management. On reviewing the entire product harm crisis literature, we identify one additional domain that is not covered by the SCCT framework. We define this domain as "Product harm crisis management with supply chain partners". Product recall is a reverse logistics activity that withdraws goods from consumers (Jayaraman, Patterson, & Rolland, 2003). Managing recalls after a product harm crisis is a part of the reverse supply chain because it requires logistical planning to take the product back efficiently and effectively from consumers (Berman, 1999; Hora, Bapuji, & Roth, 2011). Product recalls interrupt the supply chain and affect the players across it. Traceability can help build trust and long-term relationships among supply chain partners and consumers to reduce recall cost (Kumar & Schmitz, 2011), so maintaining the traceability of products, which requires cooperation between supply chain partners, is essential. Therefore, how to manage the crisis with supply chain partners is also a key domain in the context of product harm crisis.

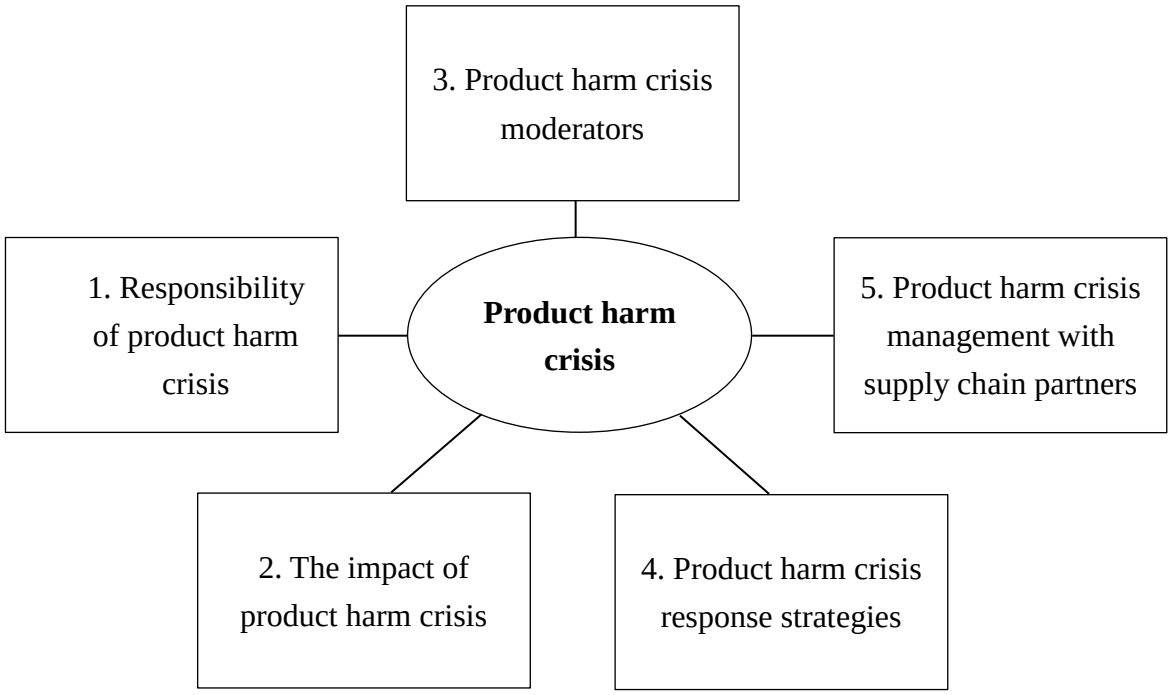

Figure 2.10 Research domain classification

As shown in Figure 2.10, the largest domain in this review is "Product harm crisis response strategies" (64 articles: 41.29%), followed by 48 articles (30.97%) in "Product harm crisis moderators", 18 articles (11.61%) in "The impact of product harm crisis", 16 articles (10.32%) in "Product harm crisis management with supply chain partners", 5 articles (3.23%) on "Other issues" and 4 articles (2.58%) in "Responsibility of product harm crisis". "Other issues" includes an overview of food recalls and the hazard involved (Salin, Darmasena, Wong, & Luo, 2006), the difference between nature of recalls issued by governments and manufacturers (Rupp & Taylor, 2002), business ethics issues in product recalls (Arce, 2005; Roman & Moore, 2012) and discussion on the role of theories such as attribution theory in the product harm crisis literature (Coombs, 2007a). It can be seen from the article distribution that little attention has been paid to the causes of product harm crisis. We believe building a deeper understanding of the causes would be useful for effective

prevention of such crises. A complete list of reviewed articles classified in different research domains is presented in Appendix A.

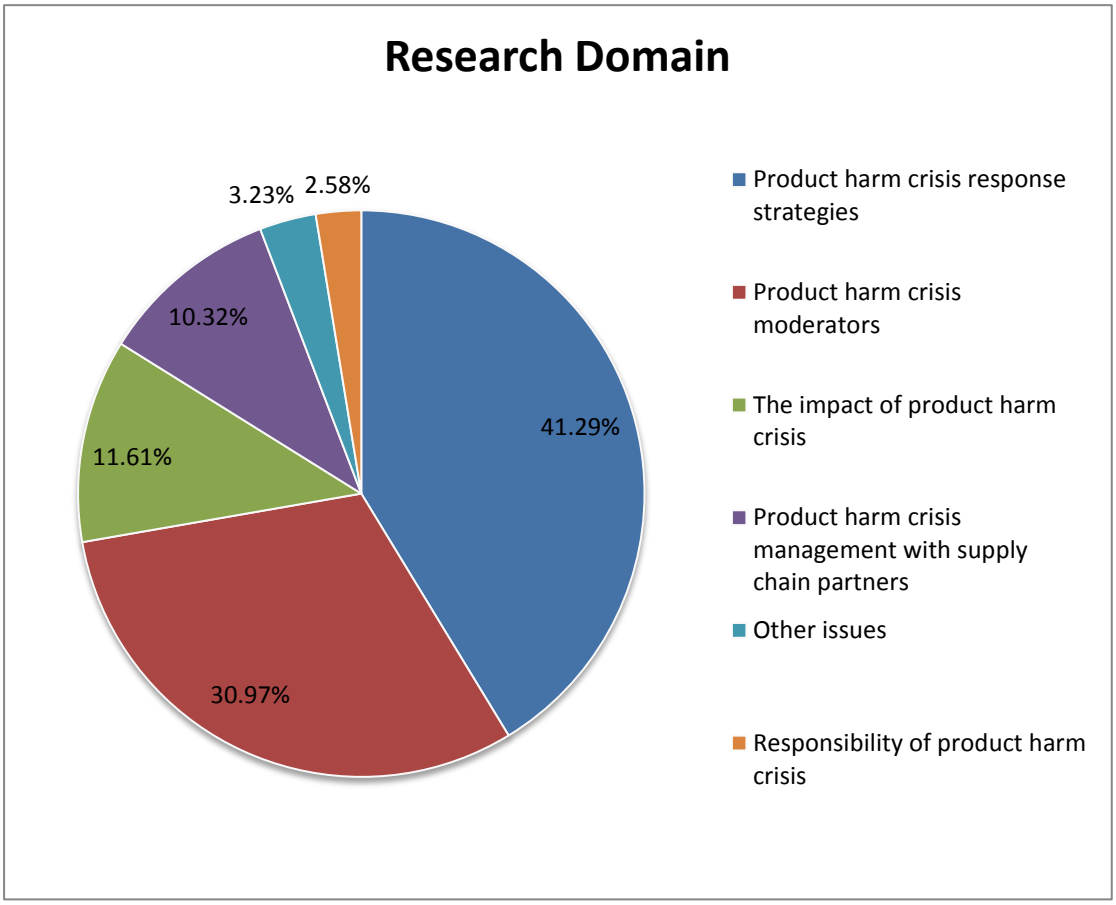

Figure 2.11 Article distribution by research domain

2.2.4 Summary of research issues and findings

This section presents a summary of key research issues and findings in the five domains classified, namely, "Responsibility of product harm crisis", "The impact of product harm crisis", "Product harm crisis moderators", "Product harm crisis response strategies" and "Product harm crisis management with supply chain partners".

a) Responsibility of product harm crisis

There are only 4 articles (2.58%) in this domain. Outsourcing to manufacturers in low cost regions is a common strategy to save production cost but this can lead to quality control problems. Manufacturers in these regions are viewed as the main defendants, (i.e., responsible for making defective products) (Luo, 2008). Nonetheless, with the globalization of supply chains, questions towards the responsibility for such crises have been raised. For example, Beamish and Bapuji (2008) noted the main reason of toy recalls in 2007 was flaws in product design, which is done in the toy companies headquarters, rather than poor manufacturing in Asian factories. Teagarden (2009) suggests the causes of defective products are poor manufacturing in China factories as well as U.S. retailers who pressured the suppliers for lower prices. Moreover, the question of responsibility had been raised for products which are components of another brand's products such as tires for vehicles (Noggle & Palmer, 2005). It is obvious that the responsibility for product harm crisis is a complex phenomenon and in most cases it cannot be the sole responsibility of a single party. More research works are needed on the issue to reveal the root causes and responsibility of product harm crisis, which could help crisis prevention.

b) The impact of product harm crisis

There are 18 articles (11.61%) discuss the direct impact of product harm crisis without focusing on the moderators. Researchers generally found that product harm crisis involves direct cost incurred on recall procedures (McDonald, 2009; Velthuis et al., 2009) and indirect cost, that is the negative impact on financial performance, such as stock prices (Govindaraj & Jaggi, 2004), sales (Van Heerde, Helsen, & Dekimpe, 2007), market share and penetration (Ma, Zhang, Li, & Wang, 2010); public attitude and buying behaviour such as purchase intention and demand (Marsh, Schroeder, &

Mintert, 2004), brand loyalty (Eagle, Hawkins, et al., 2005), public attitudes (Piotrowski & Guyette, 2010) and brand image (Custance, Walley, & Jiang, 2012; Gao, Knight, Zhang, & Mather, 2013), though some found certain positive impacts also, for example, number of accidents was reduced by product recalls (Bae & Benítez-Silva, 2011, 2013). It appears that very few works investigate the direct costs of a product recall; therefore case studies with detailed recall information would be a good addition to the product harm crisis literature.

c) Product harm crisis moderators

There are 48 articles (30.97%) focus on moderators that affect the level of the recall impact. This research domain is the second largest in our sample. On top of the three factors based on the SCCT framework, *prior reputation*, *crisis history* and *crisis severity* (Coombs, 2007b; Coombs & Holladay, 2002), researchers also examined the effect of other internal and external moderators. Internal moderators include product type, firm characteristics, level of CSR and timing of recall. External moderators include stakeholders' reactions and consumer characteristics. In total, nine moderators are discussed in this section.

1. Moderators in SCCT – Prior reputation

Prior reputation is a key moderator suggested in SCCT. Researchers report different findings on the moderating effect of reputation. Some studies found that more reputable firms suffer less from a product harm crisis (Cleeren, Dekimpe, & Helsen, 2008; Dawar & Pillutla, 2000; Haas-Kotzegger & Schlegelmilch, 2013; Jung, 2011; Siomkos & Shrivastava, 1993; Siomkos, 1999; Siomkos & Kurzbard, 1994) while others revealed that more reputed firms suffer more (Korkofingas & Ang, 2011; Rupp,

2004). However, the reputation effect depends on situations. Mooweon and Haunschild (2006) observed that the reputation effect depends on the uniqueness of product and organizational identity. Grunwald and Hempelmann (2010) found that reputation of high quality brands can help protect manufacturers from receiving blame, but do not have positive effect on perceptions on problem severity. Lei, Dawar, and Gürhan-Canli (2012) found that brands with positive prior reputation experience less blame from consumers to the brand, but only when the crisis is considered similar to other crises in the same industry.

2. Moderators in SCCT - Crisis history

Crisis history is another key moderator in SCCT. Researchers point out that the absence of recall history causes companies to suffer more. Wang, Salin, Hooker, and Leatham (2002) indicated that an initial food recall is associated with reduced financial returns and higher volatility while repeated recalls are not associated with strong reactions. Rupp (2004) also observed that significant goodwill loss caused by the initial recall of an automobile model. On the other hand, Thirumalai and Sinha (2011) revealed the benefits of the presence of recall history. The likelihood of recalls decreases with the number of prior recalls, indicating learning by organizations. Similarly, Seo, Jang, Miao, Almanza, and Behnke (2013) discovered that firms with a past history suffer less severe impacts on stock price compared to firms that have not experienced safety incidents in the past.

3. Moderators in SCCT - Crisis severity

Crisis severity is also a key moderator in SCCT. Generally, researchers observed that the higher the severity of the crisis, the more negative is the impact (De Matos &

Rossi, 2007; Haas-Kotzegger & Schlegelmilch, 2013; Korkofingas & Ang, 2011; Laufer, Gillespie, McBride, & Gonzalez, 2005; Siomkos, Triantafillidou, Vassilikopoulou, & Tsiamis, 2010; Sun, Chen, & Wang, 2012; Thomsen & McKenzie, 2001). Vassilikopoulou, Lepetsos, Siomkos, and Chatzipanagiotou (2009) found that the importance of several factors varies with severity of the crisis. Organizational response and time are the most important factors in medium-extent product harm crises, whereas social responsibility and external effects influence consumer purchase intentions most in severe crises.

4. Internal moderators- Product type

Negative effect of product harm crisis depends upon product type. Manufacturers (or brands) of some products are more vulnerable, for example, food (Haas-Kotzegger & Schlegelmilch, 2013; Zhao, Li, & Flynn, 2013), automobile (Chen & Nguyen, 2013; Yeung & Ramasamy, 2012), drugs and toys (Chu, Lin, & Prather, 2005). In the automobile industry, Rupp (2004) found that the type of defective components matters. For example, defective heater recalls are less costly while air bag recalls lead to larger equity losses. Yeung and Ramasamy (2012) also observed that some products cause more damage to the manufacturer or the brand when the negative impact does not diminish over time, including automobiles, luxury goods, apparel and technologies while financial services, beverages and electrical appliances which have greater effects on end users.

Product of other types, nature and characteristics were also examined. For example, in terms of country of manufacture, Laufer, Gillespie, and Silvera (2009) suggests that consumers view products manufactured in developing countries such as China and

Mexico less favourably. They found that a defective product made in a developing country results in a higher blame being attributed to the company compared to those made in a developed country (e.g., U.S.). In terms of substitutability, Bunniran, McCaffrey III, Bentley, and Bouldin (2009) found that substitutable products, such as drugs in the same therapeutic class, appeared to be affected more in a product harm event.

5. Internal moderators- Firm characteristics

Firm size is a key moderating factor that influences the magnitude of the impact on abnormal stock price after a product harm crisis (Salin & Hooker, 2001; Seo et al., 2013). Salin and Hooker (2001) observed that stock prices fell immediately after product recalls for smaller firms, but not necessarily for larger firms. Kalaignanam, Kushwaha, and Eilert (2013) also found that larger firms with more assets have higher ability to learn from product recalls and improve future product reliability than smaller firms. Moreover, Thirumalai and Sinha (2011) discovered that firms with a research and development focus, developing broader product portfolios, have a higher likelihood of another recall. Zhao et al. (2013) revealed that Chinese companies suffered greater financial losses than their western competitors.

6. Internal moderators- Level of CSR

CSR is the perceived "societal obligation" of an organization (Brown & Dacin, 1997). Examples are environmental conservation, support to employees and fair treatment to consumers. Researchers found that the crisis impact depends on the CSR level. It is found that high CSR level can moderate the negative impact of product harm crisis (Assiouras, Ozgen, & Skourtis, 2013; Jung, 2011; Kong, 2012; Minor & Morgan,

2011; Vassilikopoulou, Siomkos, Chatzipanagiotou, & Pantouvakis, 2009) and low CSR level firms suffer more in product harm crises (Lin, Chen, Chiu, & Lee, 2011; Siomkos et al., 2010). However, some scholars suggest CSR is more effective in some aspects. For example, Klein and Dawar (2004) found that CSR can moderate the impact of product harm crises on consumers' brand evaluations only for consumers who are CSR-sensitive. De Matos and Rossi (2007) noted that perceived CSR level of consumers has a significant effect on product judgment but not behavioral intentions.

7. Internal moderators - Timing of recall

Time also serves as a moderator in product harm crises. Vassilikopoulou, Siomkos, et al. (2009) found that time can heal the crisis impact. The product harm crisis effect is minimal a few months after the event. Moreover, Magno (2012) revealed that the longer the time taken to start the recall after primary signals of potential injuries, the more negative is the post-recall brand attitude. Their findings suggest that firms should immediately recall defective products, as early as possible. However, Gao, Knight, Zhang, Mather, and Tan (2012) discovered that the "early information" effect in a multi-brand product harm crisis where the first accused brand suffers more harm than firms that come in later.

8. External moderators - Stakeholders reactions

Researchers examined how external parties such as the press, government agencies and special interest consumer groups affect the product harm crisis impact. Positive stakeholder effect refers to external parties holding positive attitude towards the troubled company such as reporting its social responsibility record in the product recall process (Siomkos & Kurzbard, 1994). Positive stakeholder effect helps positive

changes of consumer attitude (Siomkos & Shrivastava, 1993; Siomkos, 1999; Siomkos & Kurzbard, 1994; Wei, Lo, & Lu, 2010). Conversely, negative stakeholder effect causes more negative consumer attitude towards the company (Sun et al., 2012; Yannopoulou, Koronis, & Elliott, 2010). Moreover, extensive news coverage is found to increase the harm by the crisis and it causes the companies to suffer more (Feng, Keller, Wang, & Wang, 2010; Seo et al., 2013).

9. External moderators - Consumer characteristics

Researchers indicate that demographic characteristics of consumers such as age and gender affect the extent of changes in attitude towards the companies. Laufer and Gillespie (2004) observed that women blame a company more than men for a product harm crisis because they feel more personally vulnerable. Older customers tend to blame the company less (Laufer, Silvera, & Meyer, 2005; Silvera, Meyer, & Laufer, 2012).

Other consumer characteristics were also examined in the literature. While Siomkos, Rao, and Narayanan (2001) revealed that there is no difference between changes of pre-crisis and post-crisis attitudes of positively and negatively oriented individuals, other consumer characteristics were observed to affect the extent of product harm crisis impact. Dawar and Lei (2009) revealed that consumers with lower brand familiarity are more sensitive and vulnerable to crisis information while consumers with prior crisis experience and product knowledge are less affected (Haas-Kotzegger & Schlegelmilch, 2013).

Some moderators discussed above have a concluding effect towards the product harm crisis. *Crisis history* is beneficial for firms with prior recall history; the higher is the *crisis severity*, the stronger is the negative impact; the higher is the CSR level, the weaker is the negative impact; and positive attitudes of external stakeholders leads to positive impact and vice versa. More works are suggested to explore internal moderators because these have larger implications to operations management and senior management.

d) Product harm crisis response strategies

There are 64 articles (41.29%) that discuss response strategies used to tackle product harm crises. This domain is the largest in our sample. Articles in this domain discuss on planning and choosing appropriate response to a product harm crisis, including crisis response strategy type, communication channels and style.

1. Accommodative and defensive strategies

Marcus and Goodman (1991) divided crisis responses into either *accommodative* or *defensive* approach. *Accommodative* strategies include proactive actions that accept responsibility, such as remedial action, whereas *defensive* strategies are passive actions that try to evade responsibility, such as denial.

The general belief is that *accommodative* strategies are more effective than *defensive* ones. *Accommodative* responses lead to higher customer trust and thus strengthen their future purchase intention, while *defensive* strategies lead to reputational damages (De Blasio & Veale, 2009; Haunschild & Rhee, 2004; Madera & Smith, 2009; Souiden & Pons, 2009). Also, *accommodative* responses are found more effective to

maintain perceptions of CSR and relationships with stakeholders (Haigh & Brubaker, 2010).

Successful cases in food, automobile, computers and personal care industries show that *accommodative* strategies are more effective than *defensive* ones. For example, the cases of Toyota's product recalls and Ford and Firestone tire recalls showed the companies tried to minimize the responsibility by slow and passive responses (Gibson, 2000b; Heller & Darling, 2011, 2012), and the recalling firms were blaming other companies for the product failure (O'Rourke, 2001). Coca-Cola denied responsibility in a product harm crisis which led to a total ban on its products by the Belgian government in 1999 (Tsang, 2000); Snow Milk Products' prompt apology for its product contamination cases and the immediate investigation of its production processes led to a successful resolution of the product harm crisis in 1955 (Wrigley, Ota, & Kikuchi, 2006). However, refusal to issue a recall resulted in severe damage to its firm reputation and sales in year 2000 (Wrigley et al., 2006). Some studies compared the cases of adopting *accommodative* and *defensive* strategies by different companies. For instance, Hargis and Watt (2010) noted that Johnson and Johnson proactively assumed responsibility for defective products even though it had no responsibility for the product harm. The actions quickly recovered the company's sales performance. However, in Bausch & Lomb's case of the potential linkage between its contact lens cleaner formula and eye infection, the slow and passive response worsened the financial and reputational damage. Venugopal, Soni, Tiwari, and Gupta (2012) suggest that Dell's proactive investigation of product harm crisis successfully helped protect its brand image, while Toyota passively recalling products led to reputation and sales loss. Moreover, senior management leadership is critical

for success of *accommodative* strategies. The honesty and compassion of the chief executive officer (CEO) during a crisis can rescue the company and earn trust from consumers (Charlebois, 2011; Stanwick & Stanwick, 2012).

Another school of thought believes that *defensive* strategies can be advantageous. Chen, Ganesan, and Liu (2009) observed that proactive recall strategies can have a more negative effect on firm value than passive ones. *Defensive* strategy tends to be effective when the organizational responsibility is not obvious and the organization's reputation is low (Dardis & Haigh, 2009).

Companies can also develop a combination of *accommodative* and *defensive* strategies. Miller and Littlefield (2010) studied how a food company made use of both *accommodative* and *defensive* strategies during its two product harm crises in the same year. For instance, it used *defensive* strategy at the early stage of the crisis, before food contamination was confirmed, but it took *accommodative* strategy with corrective actions and apology from the CEO in later stages. However, the combination of strategies only worked for the first product harm crisis but not for the second crisis. Miller and Littlefield (2010) suggest that failure in the second crisis was because the company failed to demonstrate how it had improved operations since the first recall (particularly the public are still aware of the company's recent recall) to the public, and that created a negative image (i.e., the firm is unable to learn from the mistakes from previous crisis).

2. Marketing and public relations strategies

Researchers also investigate marketing and public relations strategies. Carroll (2009) found that a firm was able to launch an effective marketing communications campaign and restored consumer confidence and normalize demand, helping the firm withstand a product harm crisis. Shah and Chen (2010) found that consumers consider public relations actions, such as CSR practices, are more credible than advertising in a product harm crisis. Piotrowski and Gray (2010) indicated that Toyota's marketing and public relations strategies were not effective during the product recall, leading to stronger negative impact.

3. Public communication strategies

Strategies used in public communication during product harm crises are examined in the literature. For instance, multi-channels communications, such as press releases, direct mailing, display ads and flyers, have positive influence when handling a product harm crisis (Gibson, 1997; Wang & Lu, 2010). Recall system has been computerized and has made use of the internet (Gibson, 2000a), but companies have to seek solutions in public communication strategies to improve recall effectiveness, as manufacturers have no simple approach to inform consumers who have little interest in recall notices (Gibson, 2000a; Nawasaki et al., 2009). Pranav (2011) suggest a few planning tactics for a successful communication strategy during a product recall.

The communication style and elements of a recall message to the public are also investigated in the literature. For instance, the perceived degree of danger of the defective product is found unrelated to the presentation style, vocabularies (Gurau & Serban, 2005), and photos (Coombs & Holladay, 2011) in a recall announcement.

Previous research works show that traditional *accommodative* strategies may not always be the best way to handle a product harm crisis. Companies may use different strategies simultaneously. More future works are needed to examine the usage of both *accommodative* and *defensive* strategies at various stages of the crisis. Research on marketing and public communication strategies in product harm crisis management has been sparse. Both practitioners and the academia should pay higher attention to the effectiveness of crisis response strategies, and specifically when they are more effective.

e) Product harm crisis management with supply chain partners

There are 16 articles (10.32%) in this domain. Product harm crisis management can be very complicated when many supply chain members are involved, especially in a globalized supply chain context. A number of studies examined the challenges in product recall supply chains (Donnelly, Karlsen, & Dreyer, 2012; Kinsey, Seltzer, Ma, & Rush, 2011; Lyles et al., 2008; Marucheck, Greis, Mena, & Cai, 2011; Tse et al., 2011) and they provide suggestions on effective recall management. For example, usage of technologies and systems are investigated. Radio-frequency identification (RFID) technology is beneficial for tracing the roles of different supply chain partners in a product recall, though it is costly (Kumar & Budin, 2006; Kumar et al., 2009; Piramuthu et al., 2013). Supply chain coodination, such as recall cost sharing contract, are also investigated. Supply chain contract, which allocates the total recall cost based on the responsibilities revealed from root causes analysis, is found more beneficial than a contract that provides for even sharing of the total recall cost by supply chain partners (Chao et al., 2009). Also, traceability optimization models and

workflow-based coordination frameworks between supply chain partners have been developed according to data and process required in product recalls (Wang, Li, & O'Brien, 2009; Wynn et al., 2011). In addition, marginal incremental analysis approach is suggested in supplier evaluation and selection processes which are important to reduce the risk of future product harm crisis because the quality of a manufacturer's products depends on the supplier's quality (Tse & Tan, 2011, 2012).

Effective product harm crisis management involves maintaining good traceability throughout the supply chain. The reviewed articles show that researchers have investigated ways to manage the crisis well with supply chain partners including technologies and different frameworks and models for supply chain coordination. We believe more research is needed on various ways to maintain traceability to give useful insights into roles of different supply chain players.

2.2.5 Conclusion from systematic review on product harm crisis literature

This systematic literature review covers 155 articles in the product harm crisis literature. Five research domains are identified, while four domains are based on the SCCT framework, and one domain is based on product harm crisis in supply chain context. Through this systematic literature review, research trend and research findings in product harm crisis literature are analysed and summarized. This review provides a primarily basis for our research on product harm crisis management as follows.

1. From the article distribution, it is found that the previous papers in the literature are mainly in literature of public communication, marketing and management, rather than

in operations management literature. Also, little attention has been paid to product harm crisis management for fashion and textile products.

2. From the five research domains identified, crisis response strategies and crisis moderators are found the largest two in the literature.

Therefore, our research aims to provide insights in the largest two domains - crisis response strategies and crisis moderators in the context of product harm crisis in fashion industry for operations managers. The next section will discuss the positive and negative sides of product recalls in firms' operations.

2.3 Product recalls

Product harm crisis response strategies and crisis moderators are the focus in our research. Product recalls that are publicly available can reflect how companies deal with the product harm crisis. We thus use product recalls as the research context. Product recalls are commonly used for managing a product harm crisis to reduce the risks of damages caused to consumers and to demonstrate that the firm cares for consumers (Laufer & Coombs, 2006). The U.S. Consumer Product Safety Commission (CPSC) issued an average of 360 product recalls per year from 2000 to 2004 (Mullan, 2004). Product recall can be a voluntary action by mandated by other parties such as the government. Voluntary product recall is the most common way to manage a product harm crisis (Laufer & Coombs, 2006). Almost all consumer products' recalls in terms of CPSC regulations are voluntary. On average, the mandatory (involuntary) recall process is used less than once a year (Mullan, 2004). To avoid ambiguity, we use the term "product recalls" to represent voluntary recalls in this study.

2.3.1 Positive and negative sides of product recalls

A voluntary product recall can be perceived as both a positive and negative event by their stakeholders. On the positive side, voluntary recall action is viewed as highly responsible, reflecting a company cares for consumers and the commitment to CSR (Shrivastava & Siomkos, 1989). Siomkos and Kurzbard (1994) found that if voluntary recall action is taken, the negative impact of consumers' attitude towards future purchase of the company's other products will be less affected. On the negative side, a voluntary product recall in general is an acknowledgement of a product defect, which can have negative effect on the company's overall image (Shrivastava & Siomkos, 1989). Klein and Dawar (2004) suggest that the loss of market share related to product recalls is due to the damage to company intangibles assets (particularly the brand value).

Product recall is costly to the recalling companies. Davidson and Worrell (1992) suggest that product recalls involve both direct and indirect costs. Direct cost refers to costs of the recall process, such as the recalled products' disposal cost. This cost is high particularly for products with high toxicity (e.g., lead). U.S. Environmental Protection Agency (EPA) requires the recalling company to take extra steps to ensure toxic materials do not contaminate the environment (Tang, 2008). Another direct cost is the inventory carrying cost. For instance, Mattel had to keep all recalled products in warehouses until they were no longer needed for further investigation and legal actions (Mattel, 2009). Other direct costs include potential liability and penalty payment for damages to consumers or properties (Chen et al., 2009).

Indirect cost includes cost of restoring reputation and reduction in future revenue. First, companies devote resources to restore public image. Recalling companies might redesign the product and/or packaging, improve the production system and test all other products to ensure product safety. Second, firms' revenue drops immediately due to the recall and this also affects future revenue due to the negative influence on companies' other products (Davidson & Worrell, 1992). Costs related to a product recall are high and long-lasting and place financial burden on the recalling company (Shrivastava & Siomkos, 1989).

Due to the potential impact on firm's operations and future profit, a number of studies investigate the impact of product recall on firms' stock price. Stock prices drop after product recalls because of the lower expected future earnings (Marcus, Swidler, & Zivney, 1987). Jarrell and Peltzman (1985) found that substantial drop in stock price occurred in cases of drugs and automobile recalls. Pruitt and Peterson (1986) also found substantial drop in stock price in toy, rubber, food, electrical, drugs and cosmetics products recalls. Davidson and Worrell (1992) investigated the impact of non-automobile products' recalls and they also found that the stock market reacts negatively to product recalls. The negative impact of product recalls on firms' stock price is well documented and it reflects that investors react basically the same way towards all types of product recalls. However, these studies only focus on stock markets' reactions to product recalls. Therefore, this study examines the long-term impact on firms' operations.

From this section, it can be seen that the literature suggest and provide findings to verify that product recalls are costly to firms. Response strategies to manage product

harm crisis well are thus important. These strategies are critical managerial decisions which are managed through the top management leaders in a firm.

2.4 Chapter summary

This chapter provides a discussion on the theoretical background of this study and the relevant concepts in the research. Each relevant concept in the research including SCCT and strategic responses in product harm crisis management have been reviewed in this chapter. Research section one, which focuses on product recalls in the fashion industry based on the SCCT framework will be presented in the next chapter.

CHAPTER 3 RESEARCH SECTION ONE: REPAIR EFFORTS IN PRODUCT RECALLS AND LONG-TERM FINANCIAL PERFORMANCE IN FASHION INDUSTRY

This chapter presents the research section one of this thesis. A study focused on product recalls in the fashion industry is presented. This chapter is divided into five sections. A brief background of this chapter is presented in section 3.1. The development of five hypotheses is presented in section 3.2. Data collection and methodology are presented in section 3.3. Results, discussion and implications are presented in section 3.4. . Finally, section 3.5 provides a summary of this chapter.

3.1 Background

Based on the SCCT framework, we conducted a systematic review on product harm crisis management literature in Chapter 2 (i.e., section 2.2). Among the five research domains identified, we found that crisis response strategies and crisis moderators are two most major domains. However, little attention has been paid to the issue in the operations management literature. This chapter, therefore, focuses on the effective strategic responses and moderators in managing product recalls in the operations management perceptive.

Product harm crisis management in the fashion industry is focused in this chapter. The SCCT framework describes a situational approach for responding to crisis in order to protect organizational reputation. Reputation and branding plays a significant role for firms, particularly for those in the fashion industry (Power & Hauge, 2008). Intangible attribute of a brand, including how firms react to a crisis in a responsible

way in stakeholders' perspectives become more and more important than tangible attributes (i.e., products). Previous studies have not yet paid attention on product harm crisis response strategies and crisis moderators in the fashion industry. Therefore, this chapter aims to examine the effective strategic responses and moderators in managing product recalls in the fashion industry.

As discussed in the summary of research findings in the systematic review in Chapter 2 (i.e., section 2.2.4), the major school of thought and research evidence support that *accommodative* responses in a product harm crisis are more beneficial to recalling companies. Therefore, we aim to examine the roles of different *accommodative* responses in product recalls as repair efforts after a product harm crisis. Xie and Peng (2009) identify functional and informational repair efforts as the key elements of *accommodative* responses and compared their effectiveness in repairing trust from consumers after negative publicity. Functional repair efforts refer to efforts to compensate the loss and sufferings in crisis through the use of instruments such as economic compensation; informational repair efforts refer to appropriate communication of information during the crisis handling process such as disclosing updated news to stakeholders (Xie & Peng, 2009). Their findings show that functional repair efforts tend to be more effective on rebuilding consumers trust on the ability of the company than informational repair efforts. However, the survey-based study might not provide adequate insights on *accommodative* responses. The insights of the study are only based on responses of undergraduate students from a university in China. The findings might not be generalized to other countries and stakeholders of different ages and occupations. This chapter, therefore, aims to develop a deeper understanding by objective measurements in managing product recalls.

This chapter examines the effectiveness of two strategies that represent functional repair effort and informational repair effort in a product recall respectively, which are financial compensation and proactive recall strategy.

Product harm crisis is highly related to end-use customers. In the fashion industry, consumers are active participants in the construction of brands (Power & Hauge, 2008). Consumer vulnerability, which is related to the nature of target customers, thus is included in our research model as a situational moderator to examine the effectiveness of strategies in product recalls.

3.2 Hypotheses development

3.2.1 Consumer vulnerability

Product recalls have negative financial impact on firms in general, and it is possible that some companies suffer more due to the magnitude of consumer vulnerability. Vulnerability refers to susceptibility to injury or to being taken advantage of by another person (Smith & Cooper-Martin, 1997). Morgan, Schuler, and Stoltman (1995) suggest that vulnerable consumers are conceived as small groups of consumers who have "unusually susceptible" reactions to products that are otherwise harmless when used by most people. Examples of vulnerable consumers are children, the elderly, medically underserved, drug addicts and alcoholics (Smith & Cooper-Martin, 1997). Chu, Lin, and Prather (2005) found that companies in the drugs industries suffer the most in terms of stock prices from their recall announcements, followed by the toy industry. Product recalls have the least influence on companies' stock prices in the

rubber and automotive parts industries. Industries in which the targeted consumers are highly vulnerable (drugs and toys) are found to suffer more than other industries from product recalls. Defective products place higher risk to highly vulnerable consumers as they are more susceptible to harm caused by defective products. Highly vulnerable consumers are dependent on others to protect them from danger (Murphy & Popa, 2012) and thus the impact of a product recall affects a larger number of stakeholders than in a case of less vulnerable consumers. In cases of highly vulnerable consumers, legal claims against manufacturers' negligence can also be of higher value. Therefore, we hypothesize:

H1 The negative impact of product recalls on financial performance is more serious for recalled products targeted on highly vulnerable consumers.

3.2.2 Financial compensation

Financial compensation is a primary form of functional repair effort (Xie & Peng, 2009), in order to remedy the loss to who suffered in a crisis to repair their trust. In a product recall, a remedy (refund, replace or repair) is provided to affected consumers (Davidson & Worrell, 1992). The choice of the remedy strategy can thus be classified into financial and non-financial. It is generally believed that financial compensation can help to repair trust as it is more easily observed than other recovery strategies, and it implies that the harm-doer also admits fault and asks for forgiveness (Schmitt, Gollwitzer, Förster, & Montada, 2004). However, the impact of compensation to firm performance is questionable. While compensation may help to repair trust from consumers, Xie and Peng (2009) claim that compensation means that a company have to abandon some profit obviously. Moreover, Davidson and Worrell (1992) found that

a refund strategy lead to greater extent of drop in stock prices as it cost more when company provide financial compensation than other remedy strategies. Therefore, a financial compensation is expected to be more negatively related to the financial performance. Therefore, we hypothesize:

H2 The negative impact of product recalls on financial performance is more serious for recalls using financial compensation.

3.2.3 Proactive recall strategy

In product harm crisis management, a product recall can be issued before or after any safety incidents had occurred. Proactive recall strategy is a kind of informational repair effort. Informational repair effort refers to the communication of updated information such as disclosing updated news during the crisis handling process (Xie & Peng, 2009). Proactive recalls (i.e., product recalls which are issued before any safety incidents) occurs much earlier than passive recalls (i.e., product recalls which are issued after safety incidents) in the investigation process (Chen, Ganesan, & Liu, 2009; CPSC, 2012). For a proactive recall strategy, news and updated information is released to stakeholders once potential hazards are found through internal inspection. Thus, a proactive recall strategy is an informational repair effort because it implies the proactive attitude of a company towards a product harm crisis. A company have greater willingness to provide the most updated information to consumer before any safety incidents occurred, whereas passive recall strategy delays the release of the recall information implies the passive attitude towards the crisis. An early recall reduces the change and damage of further harm and may also strengthen the firm's legal position in product liability suits (Shrivastava & Siomkos, 1989). The potential

harm caused can thus be contained and reduced by proactive recalls. Therefore, a proactive recall strategy is expected to reduce the harm by a product recall to the financial performance. Therefore, we hypothesize:

H3 The negative impact of product recalls on financial performance is less serious for recalls using proactive recall strategy.

3.2.4 Financial compensation and consumer vulnerability

Strategies in a product recall may have different impact among products targeted on different consumer groups. In other words, the same strategy may not be suitable for all products.

As mentioned in section 3.2.2, that product recalls using financial compensation is expected to be more negatively related to the financial performance. However, from the consumer perspective, financial compensation is more preferred than non-financial. Previous studies showed that economic compensation helps to repair trust from consumers as it is a responsible action e.g., (Schmitt et al., 2004). Also, financial compensation implies that a company is willing to give up some profits to remedy the loss among the consumers involved in the crisis, so it shows the company's concern for consumers' interest and societal welfare rather than self-interest (Xie & Peng, 2009). Thus, such responsible actions can help to repair the reputation among the consumers. With varying levels of consumer vulnerability, consumers react to remedy strategies in product recalls differently. Financial compensation is perceived as more responsible by highly vulnerable consumers who are more susceptible to harm caused by defective products and their protectors than

the other consumers. For example, a safety incident involved a children fashion product is perceived as more serious by parents, who buy items for their children (i.e., highly vulnerable consumers) than an incident involved an adult fashion product targeting mature consumers. The effectiveness of the financial compensation (i.e., functional repair effort) is thus expected to be stronger for products targeting highly vulnerable consumers. Therefore, we hypothesize:

H4 For products targeted on high vulnerable consumers, the effectiveness of financial compensation on the impact of product recalls on firm performance is stronger.

3.2.5 Proactive recall strategy and consumer vulnerability

Similar to remedy strategy, the same recall strategy may not be suitable for all products. Consumers view a proactive recall strategy as a responsible action because the recall is carried out early before any incidents and/or deaths (Chen et al., 2009). Consumers with different levels of vulnerability have different reactions to recall strategies in product recalls. Proactive recall strategy is perceived as more responsible by highly vulnerable consumers who are more susceptible to harm caused by defective products and their protectors than the other consumers. For example, a children fashion product incident is perceived as more serious by parents, who buy items for their children (i.e., highly vulnerable consumers) than a safety incident involved an adult fashion product targeting mature consumers. The effectiveness of the proactive recall strategy is thus expected to be stronger for products targeting highly vulnerable consumers. Therefore, we hypothesize:

H5 For products targeted on high vulnerable consumers, the effectiveness of proactive recall strategy on the impact of product recalls on firm performance is stronger.

Figure 3.1 presents the conceptual framework and hypotheses development of this chapter.

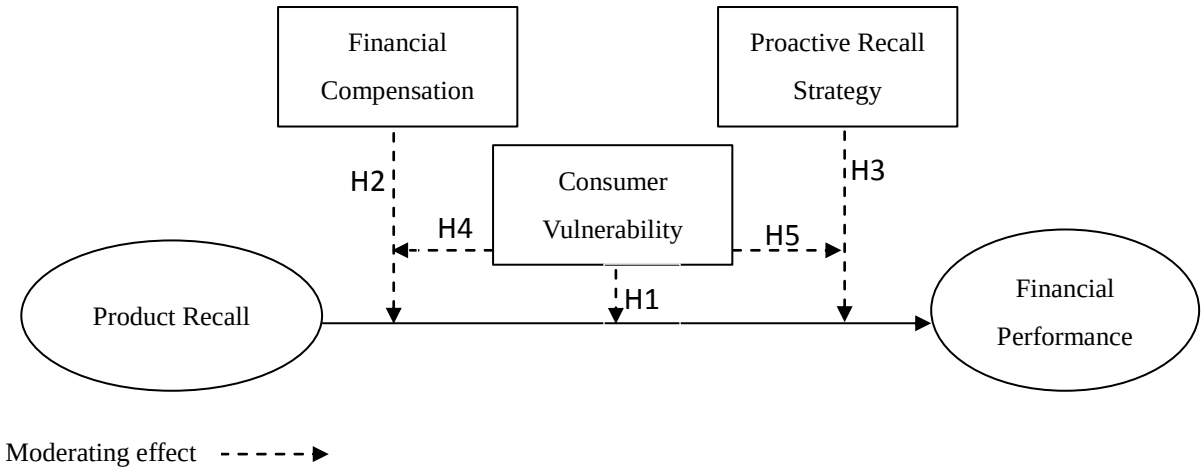

Figure 3.1 Conceptual framework and hypotheses development

3.3 Data collection and methodology

3.3.1 Data collection

In U.S., CPSC, one of the federal agencies responsible for product safety issues, has jurisdiction over more than 15,000 kinds of consumer goods including fashion products, and thus we decided to use this data source for product recall announcements. Recall announcements issued by the CPSC and companies in voluntary cooperation are publicly available on the website of CPSC (www.cpsc.gov), so we are able to capture information of recalls by listed companies in the fashion industry. We collected the annual financial data of the corresponding companies from the COMPUSTAT database of Standard and Poor's. To focus on the fashion industry, we used the industry classification system by Fama and French (1997), a commonly used industry classification system, to choose recall announcements from manufacturers, wholesalers and retailers of fashion products for the fashion industry which the products are under their brand names.

A recall announcement from CPSC contains the following information: the name of the recalling company; the announcement date of the recall; the product brand name; units of the recalled product; product description; hazard description; hazard type; the price range per unit of product; number of reported incidents or injuries; country of manufacture; the name of manufacturer; remedy for the recall to the consumer; and a photo of the recalled product.

Our initial sample consisted of 171 recall announcements by 48 U.S. listed companies in the fashion industry between years 1985 and 2011. The year of the recall was taken

according to the date of recall corresponding to the fiscal year of the listed company to analyze the effect on financial performance. For example, the year of the recall is 1994 for the recall on 22/4/1994 by Levi Strauss & Co, which has its fiscal year-end in November. Every state in the U.S. has mandatory “statute of limitations”, which is a time limit within which lawsuits must be filed. The time limit is two years for product liability actions for many states in the U.S. (NOLO, 2013). Therefore, we measured the abnormal change of financial performance until two years after a product recall as the dependent variable as the potential cost of dealing with lawsuits involved product liability mainly occur within two years period.

Companies may issue more than one product recall within the two years period, so we have to control that by the following measures. First, product recall announcements that do not have another product recall during the period were shortlisted. Second, the first product recall announcement was chosen as our sample if there are more than one product recall announcements during a two years period. The confounding product recalls were used as a control for these samples. For example, Levi Strauss & Co announced 5 recalls through CPSC between 1985 and 2011, one in 1994, three in 1997 and one in 2001. Based on the logic we stated above, the recall in 1994, the first recall in 1997 and the recall in 2001 were taken as sample announcements (with two confounding recall announcement from 1997 being controlled). This procedure can ensure that each selected announcement is independent, and impact of multiple recalls is controlled. There were 95 announcements left for further investigation after these measures. We further omitted samples that the financial data were not available because the recall occurred before the company was listed publicly. Our final penal

dataset consists of 48 product recall announcements issued by 31 firms between years 1990 and 2009, as follows.

Table 3.1 Recall number of final sample

SIC code	Description	Company Name	No. of recalls (final sample)	No. of companies (final sample)
2300-2390	Apparel and other finished products			
		CARTER (WILLIAM) CO/DE	1	
		CARTER'S INC	2	
		GILDAN ACTIVEWEAR INC	1	
		GUESS INC	2	
		GYMBOREE CORP	4	
		JONES APPAREL GROUP INC	1	
		LEVI STRAUSS & CO	3	
		OSHKOSH B'GOSH INC -CL A	1	
		POLO RALPH LAUREN CP -CL A	1	
		QUIKSILVER INC	2	
		SUNBEAM CORPORATION	2	
		TOMMY HILFIGER CORP	1	
		TRUE RELIGION APPAREL INC	1	
		UNDER ARMOUR INC	1	
			23	14
3020-3021	Rubber and plastics footwear			
		LACROSSE FOOTWEAR INC	1	
		NIKE INC	4	
		REEBOK INTERNATIONAL LTD	1	
			6	3
3100-3111	Leather tanning and finishing			
		DECKERS OUTDOOR CORP	1	
			1	1
3140-3149	Footwear except rubber			
		STRIDE RITE CORP	1	
		TIMBERLAND CO -CL A	1	
		WOLVERINE WORLD WIDE	1	
			3	3

5130-5139	Wholesale - apparel			
		ACTION PERFORMANCE COS INC	1	
			1	1
5600-5699	Retail - apparel & accessories			
		CHARMING SHOPPES INC	1	
		CLAIRES STORES INC	1	
		COLDWATER CREEK INC	2	
		EDDIE BAUER HOLDINGS INC	1	
		FAO INC	2	
		GAP INC	3	
		NORDSTROM INC	2	
		ROSS STORES INC	1	
		WET SEAL INC	1	
			14	9
Total			48	31

3.3.2 The research model

a) Dependent variable: abnormal change of return on assets (ROA)

ROA is a traditional firm financial performance. It is defined as the ratio of a firm's operating profit to its total assets. To examine the long term financial impact, we used the abnormal ROA change from year -2 to year 2, which is computed by subtracting the ROA at year -2 by ROA at year 2, as the dependent variable. Previous studies on product recalls used stock prices as the measure (Cheah, Chan, & Chieng, 2007; Chen et al., 2009; Chu et al., 2005; Davidson & Worrell, 1992). Different from stock prices that only short term daily changes in firm value perceived in the investment market, ROA shows the long term annual changes of financial performance. Antle and Smith (1986) indicate that stock prices are relevant for firm valuing but do not necessarily contain all information for evaluating the firm management performance. Return on equity (ROE), which is one another traditional measure of long term performance,

cannot show the risk level that a company is exposed or the general efficiency with a firm's total assets are employed (Hsu & Boggs, 2003). Therefore, we used abnormal change of ROA between pre-event year and post-event year, as the indicator of financial performance to obtain a more comprehensive view of the financial impact.

b) Independent variables

We created categorical variables in this section. First, we identified whether the end-user of the recalled fashion product is children, which is one of the highly vulnerable consumer segments (Smith & Cooper-Martin, 1997). We coded 1 for recalls that involve children fashion product and 0 otherwise. The following is an example of children fashion product: "Children's Hooded Jackets and Sweatshirts with Drawstrings Recalled By Burlington Coat Factory Due to Strangulation Hazard… Hazard: The hooded jackets and sweatshirts have drawstrings through the hood and/or waist which can pose a strangulation or entrapment hazard to children". Second, for remedy strategy, we identified whether a recall provided financial compensation or not. We coded 1 for recalls that provide financial compensation and 0 otherwise. Third, for recall strategy, we collected the number of safety incidents related to the recalled product as shown in each CPSC recall announcement. We coded 1 for recalls with no safety incidents (either injury or death) reported (i.e., proactive recall strategy) and 0 for recalls with safety incidents reported (i.e., passive recall strategy) (Chen et al., 2009).

To test the two hypotheses on the interaction effects, we created two dummy variables to account for the interaction effects. First, if a recall is issued for a children fashion product with financial compensation as remedy, we coded 1 for the variable "High

Consumer Vulnerability x Financial Compensation" and 0 otherwise. Second, if a recall is issued for a children fashion product with any safety incidents reported, we coded 1 for the variable "High Consumer Vulnerability x Proactive Recall" and 0 otherwise.

c) Control variables

We controlled for several variables that may influence the extent of financial impact of product recalls. First, three firm specific control variables were obtained from the COMPUSTAT database. These variables are pre-event data for analysing the panel data set. ROA at year -2 was controlled as it is highly correlated with the abnormal ROA change from year -2 to year 2. Total assets (in million dollars) in year -2 constituted the control for the firm size as larger companies may be more able to absorb the potential costs of a product recall and it is a predictor of ROA as well. We also controlled for the levels of technology intensity, which is a predictor of long term ROA (Cui & Mak, 2002). We controlled the firm's levels of technology intensity by its R&D intensity in year -2, which is a ratio calculated by dividing research and development expenses by its total assets.

Second, we controlled for the effect of industry conditions and general economic conditions on firm's ROA by the variable industry ROA change (at the two-digit SIC code level). It is computed by subtracting the industry average ROA in year -2 by industry average ROA in year 2.

Third, as discussed in section 3.3.1, we controlled for the number of confounding recalls within the two years event study period (i.e., year -2 to year 2).

Forth, we controlled the three factors suggested in SCCT: *crisis severity*, *crisis history* and *prior reputation* (Coombs, 2007; Coombs & Holladay, 2002). For *crisis severity*, we controlled for the number of injuries and deaths reported in a recall announcement. The extent of negative financial impact will be larger when more injuries and deaths reported in a recall announcement, because consumers will perceive the recalled product as more dangerous. For *crisis history*, we controlled for the number of recalls announced prior to each announcement. For *prior reputation*, we observed the organizational reputation from three objective brand ranking sources (Interbrand Best Global Brands, Fortune World's Most Admired Companies and BrandZ Top100) at year -2. We coded for the variable with reference to the ranking list of these sources at year -2 of each recall announcement. The coding ranged from 0 to 3. For example, we coded 3 if the company was ranked on all three sources; we coded 1 if the company was ranked only on one of the sources.

Last, as this study focuses on the fashion industry, we controlled two factors related to fashion industry, including the type of the fashion product (i.e., apparel and non-apparel products), and whether the product is a national branded product or private label branded product by a retailer. We coded 1 if the recalled product is an apparel product and 0 otherwise. We coded 1 if the recalled product is private label branded product and 0 if it is national branded. Private label brands are brands owned by a retailer or wholesaler (Hyman, Kopf, & Dongdae, 2010) that are the only brands that require the retailer taking full responsibility for product development, sourcing and warehousing, advertising, and promotions (Dhar & Hoch, 1997).

3.3.3 Data analysis

Multiple regression analysis was adopted to investigate the multivariate relationships between the dependent variable (i.e., abnormal ROA change) and all independent variables. A panel data set contains observations on multiple entities such as firms, where each entity is observed at two or more points in time. We used year as the time unit. The focal point of time *t* represents the year of a product recall announcement; *t-1* represents the year before the announcement; *t+1* represents the year after the announcement. Our panel data set contains recall information at *t* and financial data of multiple firms at *t-2* and *t+2*. We analysed the data using ordinary least square (OLS) regression based on the following formula:

$$\begin{aligned} t\text{-}2 \text{ to } t\text{+}2 \text{ Abnormal ROA Change}_i = {} & \beta_0 + \beta_1\ t\text{-}2 \text{ ROA}_i + \beta_2 \text{ Industry ROA Change}_i + \beta_3\ t\text{-}2 \text{ Firm Size}_i + \beta_4\ t\text{-}2 \text{ R\&D Intensity}_i + \beta_5 \text{ Multiple Recalls}_i + \beta_6 \text{ Crisis History}_i + \beta_7 \text{ Prior Reputation}_i + \beta_8 \text{ Crisis Severity} + \beta_9 \text{ Apparel Product}_i + \beta_{10} \text{ Retailer Private Labelled Product}_i + \beta_{11} \text{ High Consumer Vulnerability}_i + \beta_{12} \text{ Financial Compensation}_i + \beta_{13} \text{ Proactive Recall}_i + \beta_{14} \text{ High Consumer Vulnerability x Financial Compensation}_i + \beta_{15} \text{ High Consumer Vulnerability x Proactive Recall}_i + \varepsilon_i \end{aligned}$$

t-2 to *t+2* Abnormal ROA Change$_i$ is the abnormal ROA change from *t -2* to *t+ 2*; *t-2* ROA$_i$ is the ROA at *t-2*; Industry ROA Change$_i$ is the change in average industry ROA from *t-2* to *t+2*; *t-2* Firm Size$_i$ and *t-2* R&D Intensity$_i$ are total assets and R&D intensity, respectively, at *t-2*; Multiple Recalls$_i$ is the total number of recalls throughout *t-2* to *t+2*; Crisis History$_i$ is the number of prior recall announcements; Prior Reputation$_i$ is the brand reputation observed from the three objective brand

ranking sources at *t-2*; Crisis Severity$_i$ is the number of injuries and deaths. The rest are categorical variables: Apparel Product$_i$ captures whether the recalled product is apparel product or not; Retailer Private Labelled Product$_i$ captures whether the product is under a private label of a retailer; High Consumer Vulnerability$_i$ captures whether the target consumer of the recalled product is children (i.e., highly vulnerable consumers); Financial Compensation$_i$ captures whether the remedy is financial compensation or not; Proactive Recall$_i$ captures whether the recalling company used a proactive strategy or not; High Consumer Vulnerability x Financial Compensation$_i$ captures whether a financial compensation is used as a remedy for a children fashion product or not; High Consumer Vulnerability x Proactive Recall$_i$ captures whether a proactive recall strategy is used for a children fashion product or not.

Table 3.2 presents the correlation coefficients and the descriptive statistics of independent variables. To verify the independence of each variable, we checked their variance inflation factor (VIF) based on the OLS regression method, and the maximum value is 3.640, which is far below the traditional rule of thumb threshold value of 10 and a more stringent threshold value of 6 (Cohen, Cohen, West, & Aiken, 2003). The Durbin-Watson statistics of the model is 2.355, which lies between the upper and lower bounds (0.788 and 2.439) for a sample size between 45 and 50 with 15 predictors excluding the intercept. This result suggests that the autocorrelation among the residual values is not significant ($p>0.05$) (Savin & White, 1977). The above statistics show that interpretation of the regression coefficients is not affected adversely by multicollinearity.

Table 3.2 Pearson correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 *t-2* to *t+2* ROA Abnormal Change	1													
2 *t-2* ROA	-.665***	1												
3 Industry ROA Change	-.073	-.021	1											
4 *t-2* Firm Size	.127	.094	-0.212*	1										
5 *t-2* R&D Intensity	-.024	-.006	-.005	-.044	1									
6 Multiple Recalls	.051	-.021	-.143	.173	-.044	1								
7 Crisis History	.368***	-.257**	-.225*	.402***	-.094	.289**	1							
8 Prior Reputation	.197*	.022	.039	.727***	-.074	-.056	.394***	1						
9 Crisis Severity	.058	.001	-.139	.282**	.359***	.260**	.058	.047	1					
10 Apparel Product	-.074	.015	.140	-.027	-.150	.041	.037	.004	-.181	1				
11 Retailer Private Labelled Product	-.006	-.004	.105	.092	-.423***	-.016	-.226*	.084	-.127	-.142	1			
12 High Consumer Vulnerability	.188	-.118	.170	.131	-.060	-.114	.160	.074	-.183	.643***	-.192*	1		
13 Financial Compensation	-.093	.089	.297**	.161	-.292**	.091	-.016	.142	.040	.101	.094	.094	1	
14 Proactive Recall	-.187	.078	.158	-.236*	.015	-.252**	-.347***	-.058	-.233*	.221*	.169	-.007	-.121	1
Mean	-.025	.199	-.428	2084.693	.003	1.896	1.479	.188	1.083	.438	.313	.542	.813	.542
Median	-.021	.205	-.007	806.892	.003	1.000	.000	.000	.000	.000	.000	1.000	1.000	1.000
S.D.	.125	.110	2.645	2731.902	.004	1.225	2.250	.641	5.111	.501	.468	.504	.394	.504

***. Correlation is significant at the 0.01 level (1-tailed).

**. Correlation is significant at the 0.05 level (1-tailed).

*. Correlation is significant at the 0.1 level (1-tailed).

3.4 Results, discussion and implications

3.4.1 Results

The OLS regression results are reported in Table 3.3. The control model only includes the control variables. It explains about 38.1 percent of variance of the abnormal ROA change from *t-2* to *t+2*. One strong control variable is found. The coefficients of *t-2* ROA is negative and significant ($p<0.01$).

The full model includes all variables in our model. The overall variance explained is about 45.0 percent, independent variables for testing our hypotheses on interaction effects explain an additional variance of about 6.9 percent from the control model.

For hypothesis testing, H1, which stated that the negative impact of product recalls is more serious for products targeted on highly vulnerable consumers, is supported. The coefficient of products targeting highly vulnerable consumer (i.e., children fashion product) is negative and significant ($p<0.1$). H2, which stated that the negative impact of product recalls is more serious for recalls using financial compensation as remedy, is also supported. The coefficient of financial compensation is negative and significant ($p<0.05$).

H3, which stated that the negative impact of product recalls is less serious for recalls using product recall as recall strategy is not supported. The coefficient of proactive recall is negative and significant ($p<0.05$).

For interaction effects, H4, which stated that the effectiveness of functional repair effort is greater on recalls of products targeting highly vulnerable consumers, is supported. The coefficient of the interaction between the two is positive and significant ($p<0.05$). H5, which stated that the effectiveness of informational repair effort is greater on recalls that the end users are highly vulnerable consumers, is also supported. The coefficient of the interaction between the two is positive and significant ($p<0.05$).

Table 3.3 Results from OLS regression for *t-2* to *t+2* ROA abnormal change

		Control Model		Full Model	
Intercept		.110	2.210 **	.256	2.793 ***
t-2 ROA		-.719	-5.132 ***	-.676	-5.018 ***
Industry ROA Change		-.002	-.409	.003	.451
t-2 Firm Size		.000	-.042	.000	-1.106
t-2 R&D Intensity		-.972	-.195	-4.483	-.795
Multiple Recalls		-.001	-.043	.000	-.025
Crisis History		.007	.831	.008	.918
Prior Reputation		.032	.860	.048	1.283
Crisis Severity		.001	.278	.003	.889
Apparel Product	a	-.015	-.486	-.047	-1.182
Retailer Private Labelled Product	b	-.001	-.019	.023	.602
High Consumer Vulnerability	c			-.137	-1.412 *
Financial Compensation	d			-.132	-1.963 **
Proactive Recall	e			-.098	-1.839 **
High Consumer Vulnerability x Financial Compensation				.172	1.952 **
High Consumer Vulnerability x Proactive Recall				.116	1.768 **
N			48		48
Adjusted R square			.381		.450
Change in Adjusted R square					.069
t-statistics are in parentheses					

Significance levels (one-tailed tests) of independent variables: p < 0.1*; p < 0.05**; p < 0.01***

a Base category: Non-apparel product

b Base category: National branded product

c Base category: Non-children fashion product

d Base category: Non-financial compensation

e Base category: Passive recall strategy

3.4.2 Discussion and implications

This chapter contributes to fashion product recall literature based on the SCCT framework. We provide an objective approach on financial performance and bring in a new situational moderator, consumer vulnerability, which is critical and highly-related to product harm crisis management.

Figure 3.2 shows how this chapter contributes to product recall management in the fashion industry based on the SCCT framework.

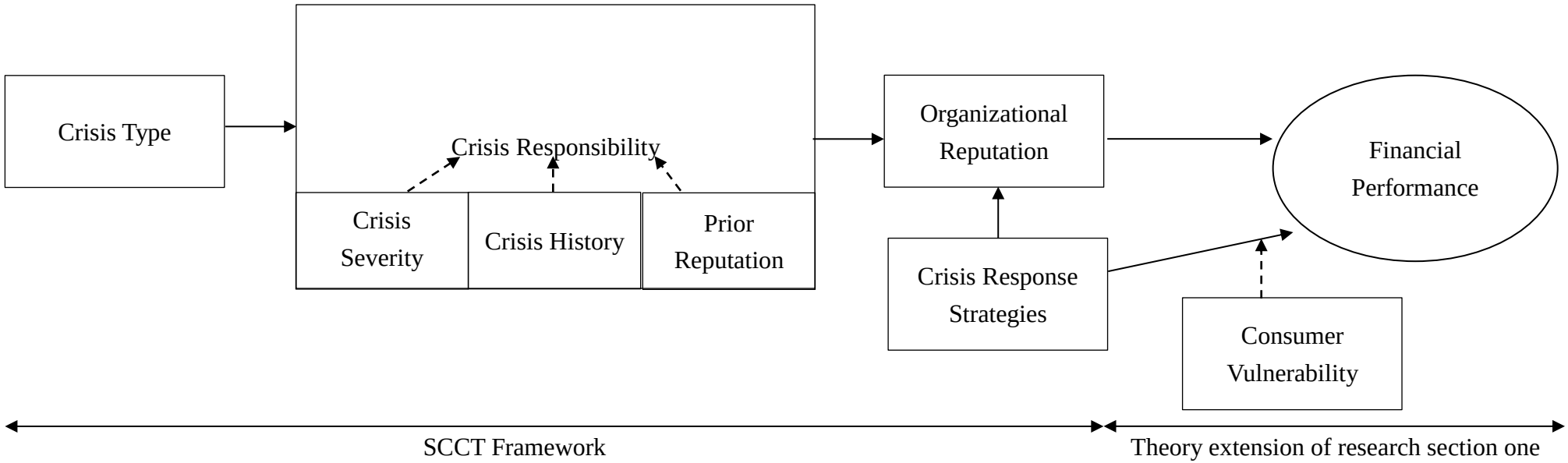

Figure 3.2 Research section one and SCCT framework

Our results have managerial implications to the fashion firms in managing product recalls. Based on our findings, the decision of product recall strategy in the fashion industry must be linked to consumer vulnerability of the recalled product.

First, our results show that the negative impact of recalled products targeting highly vulnerable consumers (i.e., children fashion product) is larger than other products. This implies that the main customers of children fashion product, parents, react more negatively than consumers of other products. Children are viewed as vulnerable consumer segment that needs great care and extended protection, and parents expect and seek safe options for them (Murphy & Popa, 2012). Thus, after a product recall, the purchase intention of parents for children fashion products reduces much more than consumers of other products. This lead to a larger negative financial impact on the recalling companies of fashion products targeted on children. This implies that fashion companies should pay special attention to product safety, in terms of product design and inspection of manufacturing process of their products when the targeted consumers are highly vulnerable.

Second, our results show that the negative impact of recalls using financial compensation is larger. This implies that there is high cost involved in financial compensation in product recalls and the stakeholders may not view this remedy as a suitable strategy for fashion products. However, the results on the interaction effect between consumer vulnerability and remedy strategies reveal that financial compensation indeed effectively reduce the negative impact of recalls, especially for children fashion products. Parents are particular cautious about the safety of children

products and our results in H1 shows that the negative impact of recalls of children fashion products are larger than other products. Our results on the interaction effect show that parents, the main customers of children fashion products, view a financial compensation as a more responsible action than other products. Therefore, managers should pay attention to the vulnerability of the target consumers when choosing remedy strategies.

Lastly, there is no evidence that using proactive recall strategy benefits the firms' profitability in the long run. Our results show that the negative impact of recalls using informational repair effort (i.e., proactive strategy) is larger, which are in line with the findings by Chen et al. (2009). Chen et al. (2009) argue that investors may interpret the use of proactive strategy as a signal of inevitable financial damage due to inevitable costs of a product recall, and thus investors react more negatively to a proactive recall. Our results extend the findings because the negative relationship between proactive strategy and long term financial performance reflects the valid existence of financial damage intercepted by investors. However, our results on the effect of interaction between consumer vulnerability and recall strategies reveal that proactive strategies indeed effectively reduce the negative impact of product recalls for companies recalling fashion products targeted on children. As mentioned, parents are particular cautious about the safety issues of children products. They thus view a proactive recall strategy for a children fashion product as a more responsible action reflecting a concern of consumer safety before any incidents than other products. Therefore, managers should pay attention to the vulnerability of the target consumers when choosing recall strategies.

These findings provide a clearer agenda for the operations managers in the fashion industry to decide which remedy and recall strategies should be adopted in product harm crisis management. Our findings suggest that when choosing these strategies, managers might carefully consider the vulnerability of the targeted consumers of the recalled product.

3.5 Chapter summary

This chapter focuses on product recalls in fashion industry based on the SCCT framework. It examined the effectiveness of *accommodative* responses with the moderating effect of consumer vulnerability. In the next chapter, the research section two of this thesis, a study which extends the sample to include a wider scope of consumer product industries will be presented. We aim to provide additional implications in product harm crisis management by revealing differences between the two research sections.

CHAPTER 4 RESEARCH SECTION TWO: CONTINGENCY FACTORS IN PRODUCT RECALLS AND LONG-TERM FINANCIAL PERFORMANCE IN SEMI-DURABLE AND DURABLE PRODUCT INDUSTRIES

This chapter presents the research section two of this thesis. A study focused on product recalls in industries of semi-durable and durable products is presented. This chapter is divided into five sections. A brief background of this chapter is presented in section 4.1. The development of five hypotheses is presented in section 4.2. Data collection and methodology are presented in section 4.3. Results, discussion and implications are presented in section 4.4. Finally, section 4.5 provides a summary of this chapter.

4.1 Background

In this chapter, we extend our sample to include a wider scope of consumer product industries to explore more contingency factors to expand the SCCT framework and to compare the results between fashion firms and the overall manufacturing and retail industries. In Chapter 3, we only focused on the firms in the fashion industry. Thus, environmental factors including industry type were excluded. From the contingency perspective, the effectiveness of realizing management strategies depends significantly on the existence of a match among strategy, organization and environment (Balkin & Gomez-Mejia, 1987). In other words, both external factors, such as the broad economic environment and industry type, and internal factors, such as organizational characteristics and resources (Hofer, 1975) affect the effectiveness of a strategy. Therefore, in this chapter, we aim to examine contingency factors not only in the fashion industry, but across industries to provide a greater generalization

of the theoretical and managerial implications to branded manufacturers and retailers in different industries.

As mentioned in section 3.1, product harm crisis is highly related to end-use customers, thus we develop a hypothesis and explore the contingency factor of *crisis severity*, which is directly related to the safety and benefits of customers. Furthermore, product recalls is highly related to supply chain management, as identified in section 2.2.3, we explore contingency factors related to supply chain management, including outsourcing practice and country of manufacture. In addition, the interaction effects between the *accommodative* responses (i.e., functional repair effort and informational repair effort) and consumer vulnerability are examined to make comparison with the results of research section one.

4.2 Hypotheses development

The first three hypotheses in this chapter focus on the following contingency factors: *crisis severity*, outsourcing practice, country of manufacture. The last two hypotheses focus on the interaction effects between consumer vulnerability and functional repair effort; and consumer vulnerability and informational repair effort, respectively. The following paragraphs present the explanations of each hypothesis.

4.2.1 Crisis severity

The level of *crisis severity* posed by the recalled products can affect the impact on firms' financial performances. As product harm crisis is highly related to end-use customers, the level of *crisis severity* is linked to the severity of injury that the recalled product caused. Injury severity is the primary determinant of consumers'

hazard-risk perceptions for consumer products rather than the likelihood of getting hurt (Wogalter, Young, Brelsford, & Barlow, 1999). If the defective product has a high level of perceived danger, customers will have lower purchase intentions towards that brand in future (Murphy & Popa, 2012). The stock market also reacts more negatively towards recalls of products perceived as more dangerous (Cheah, Chan, & Chieng, 2007). Injury severity of the recalled product affects consumers' perceptions of the seriousness of the product recall, so customers' reactions towards product recall are dependent on injury severity (i.e., *crisis severity*). Product recalls with higher level of *crisis severity* are expected to have greater financial impact on firms. Therefore, we hypothesize:

H1 The negative impact of product recalls on financial performance is more serious for recalls with higher crisis severity.

4.2.2 Outsourcing practice

The cost of a product recall should be affected by the outsourcing practices of the company. Outsourcing refers to branded manufacturers attaching brand names to finished products produced by independent contractors based on specifications set by the manufacturers. Industries that produce semi-durable consumer goods, such as toys, footwear and electronic machinery are more likely to outsource their production than other industries (Feenstra & Hanson, 1996). Tang (2008) maintains that it is common for outsourcing companies to introduce additional measures, including inspections and audits after a product recall. For example, as part of the response to toy recalls in 2007, Mattel has increased the number of inspections of contactors and their sub-contractors for compliance with its quality and safety procedures (Mattel, 2009).

Tang (2008) also states that recovery of costs associated with additional inspections and audits after a product harm crisis is one of the main challenges for companies that heavily rely on outsourced production. These companies need to absorb the extra costs of the additional inspections and audits or pass some of the cost on to consumers and this can hurt long-term financial performance. Moreover, due to the differences in organization culture with overseas contractors, it can be difficult to align the expectations of inspections. Manufacturers need to pay for extra efforts (in terms of either resources or time) to cultivate stronger relationships with contractors, in order to ensure they understand the importance of product safety and inspections after product recalls.

Instead of increasing the number of inspections or developing stronger ties with contractors, some companies simply source from new contractors after a product recall. For example, Nike ended its relationship with a Taiwan contractor because the shoes that it produced had excessive lead (CNNMoney, 1999). However, contractor selection is a lengthy and costly process. The long learning curve of the new contractor might affect the manufacturers' production schedule and product quality, at least in the initial years. Manufacturers are increasingly concerned about supplier/contractor selection approaches and criteria (Vonderembse & Tracey, 1999) and this involves complex selection procedures with substantial cost and time. Therefore, we hypothesize:

H2 The negative impact of product recalls on financial performance is more serious for products that involved outsourcing of production.

4.2.3 Country of manufacture

Country of manufacture affects the perceived quality of products by consumers. Iyer and Kalita (1997) found products manufactured in developing countries such as U.S. are perceived as higher quality than those manufactured in developing countries such as China. In a product harm crisis, products manufactured in China are found less efficient to be recalled compared to those manufactured in other countries (Hora, Bapuji, & Roth, 2011). The direct cost during the recall procedure is therefore higher especially for China-made products. Moreover, media and the public attribute the quality problems to China's suppliers rather than the brand owners when the products are outsourced to China's suppliers. For example, media focuses on the problem of excess lead level in China-made toy products and blame the China's suppliers for the faults (Beamish & Bapuji, 2008); a survey conducted by Reuters/Zogby reported that the majority of respondents (close to 80%) are apprehensive about buying products made in China after the large scale recalls of China-made products such as food and toys in 2007 (Ryan, 2007). Further, Beamish and Bapuji (2008) states that despite their findings that design flaw by brand owners is the major problem as opposed to a manufacturing error for the China-made product recalls were reported, the media and the public still blamed China's suppliers for the product defects. The possible reasons are the often reported inadequacies of the regulatory system in China and the incidences of corruption, which build the perception of weak legal or ethical standards of China (Beamish & Bapuji, 2008). The blame on China suppliers implies that consumers are sensitive towards the country of manufacture and there are pressures from media and the public towards the brand owners to remove China's suppliers from their supplier list. Due to the negative public perception towards China-made

products and the unsureness on whether the brand owners will remove the China's suppliers on their supplier lists, the future purchase intention of consumers towards the company's products and the reputation of the recalling company will be affected when the company uses a China's supplier for its production. In other words, the indirect cost of a product harm crisis will be larger. Therefore, we predict that the country of manufacture will have an impact on the level of the product recall effect on firm performance, especially for China-made products. We hypothesize:

H3 The negative impact of product recalls on financial performance is more serious for products made in China.

4.2.4 Financial compensation and consumer vulnerability

In Chapter 3, we found that consumer vulnerability is a key moderator to affect the effectiveness of *accommodative* responses in product recalls by fashion firms. Other than fashion products, product harm crisis is also highly related to end-use customers for semi-durable and durable products. Therefore, in this chapter, we also develop and test for interaction effects between *accommodative* responses and consumer vulnerability.

Financial compensation is identified as a kind of functional repair effort for product recalls in Chapter 3. Compared to non-financial compensation, financial compensation is more preferred from the consumer perspective. Schmitt, Gollwitzer, Förster, and Montada (2004) indicated that financial compensation can help to repair trust from consumers as it is a responsible action. Also, financial compensation implies the willingness of a company to give up some profits to remedy the loss of the

consumers is high, so it shows the company's concern for consumers' interest and societal welfare rather than self-interest (Xie & Peng, 2009). Thus, such responsible actions can help to repair the reputation among the consumers after a product harm crisis. However, consumers of varying levels of vulnerability react to remedy strategies in product recalls in different ways. Compared to other consumers, highly vulnerable consumers who are more susceptible to harm caused by defective products and their protectors perceive financial compensation as a more responsible action than other consumers. For example, a safety incident involved a children toy product is perceived as more serious by parents, who buy items for their children (i.e., highly vulnerable consumers) than an incident involved a household product targeting mature consumers. The effectiveness of the financial compensation is thus expected to be stronger for products targeting highly vulnerable consumers. Therefore, we hypothesize:

H4 For products targeted on high vulnerable consumers, the effectiveness of financial compensation on the impact of product recalls on firm performance is stronger.

4.2.5 Proactive recall strategy and consumer vulnerability

Similar to remedy strategy in a product recall, the same recall strategy may not be suitable for all products. Proactive recall strategy is identified as a kind of informational repair effort for product recalls in Chapter 3. Consumers view a proactive recall strategy as a responsible action because the recall is issued early before any safety incidents reported (Chen, Ganesan, & Liu, 2009). With varying levels of consumer vulnerability, consumers have different reactions to recall strategies in product recalls. Highly vulnerable consumers who are more susceptible

to harm caused by defective products and their protectors perceive proactive recall strategy as more responsible than other consumers. For example, a safety incident involved a baby product is perceived as more serious by parents, who buy items for their children (i.e., highly vulnerable consumers) than an incident involved a household product targeting mature consumers. The effectiveness of the proactive recall strategy (i.e., informational repair effort) is thus expected to be stronger for products targeting highly vulnerable consumers. Therefore, we hypothesize:

H5 For products targeted on high vulnerable consumers, the effectiveness of proactive recall strategy on the impact of product recalls on firm performance is stronger.

Figure 4.1 presents the conceptual framework and hypotheses development of this chapter.

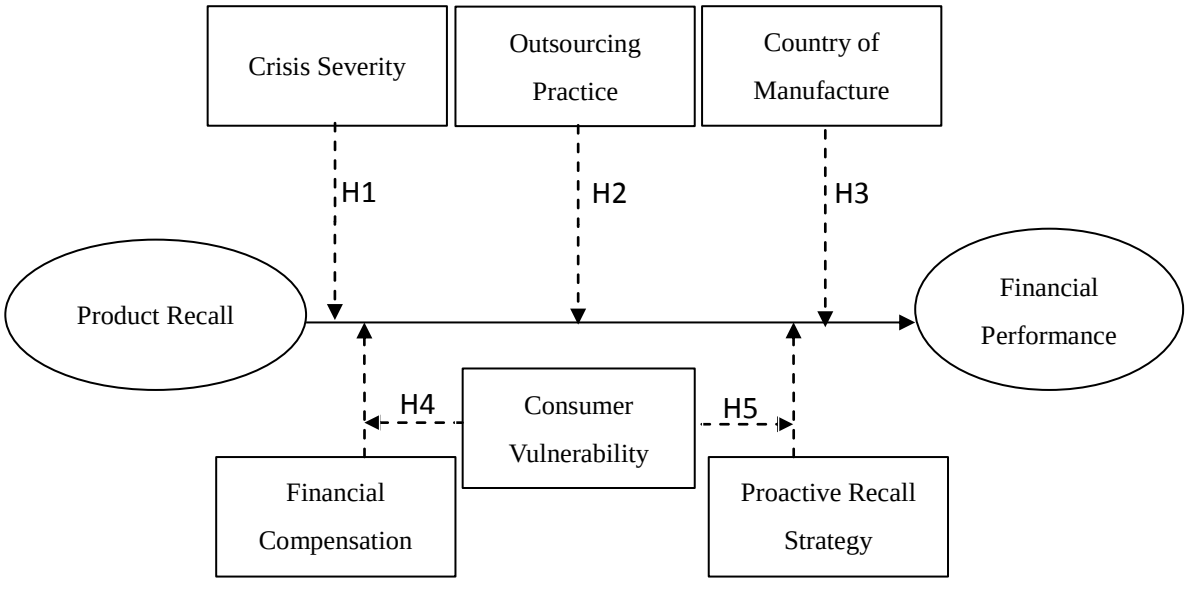

Figure 4.1 Conceptual framework and hypotheses development

4.3 Data collection and methodology

4.3.1 Data collection

Similar to research section one (Chapter 3), we collected product recall announcements by publicly listed companies through the CPSC website and the annual financial information of the corresponding companies from the Standard and Poor's COMPUSTAT database.

In this chapter, we extended our sample to include a wider scope of consumer product industries. Following previous studies of product recall, we selected industries of semi-durables and durable products. However, we excluded the automobile industry because automotive-related recalls occur more frequently than other industries (Davidson & Worrell, 1992). Consumer goods can be classified into three groups, based on durability: durables, semi-durables and non-durables. Durables are goods that generally have a lifespan of three years or more; semi-durables are goods that generally have a lifespan of more than one year but shorter than that of durables; and non-durables are goods that can be used once only (Clancy, 2011). The semi-durables category comprises goods such as household textiles, kitchen utensils, clothing, footwear, jewellery and toys. The "durables excluding autos" category comprises goods such as furniture, appliances, tools, watches and computers (Morel, 2007). Industries of non-durables, such as food, were excluded from our analysis because the lifespan of non-durables is considered very short and past research shows that the demand for non-durable goods is independent of time (i.e., current sales do not have a negative impact on future sales) (Elmaghraby & Keskinocak, 2003), and thus provide

limited implications for impact on firms' long-term performance (Murakami, Oguchi, Tasaki, Daigo, & Hashimoto, 2010).

Following previous studies of product recall, the automobile industry was excluded in this study. Davidson and Worrell (1992) eliminated recall announcements by automotive companies because the number of recalls from the "Big Three" automobile producers is larger than all other recalls combined in their sample. Therefore, inclusion of a huge number of automobile recalls may lead to sample bias. Apart from manufacturers, large retailers such as Wal-Mart and Sears sell and market products of their private labels (Hora et al., 2011). Therefore, we have included recalls of private label branded consumer products of retailers in our sample.

Our initial sample consisted of 1054 recall announcements by U.S. listed companies within semi-durables and durable consumer products industries between years 1984 and 2011. The year of the recall was taken according to the date of recall corresponding to the fiscal year of the listed company as the same method as in research section one. We also controlled the impact of multiple recalls in the same way as research section one (see section 3.3.1).

After the measures, there were 459 announcements left for further investigation. We further omitted samples where financial data were not available because the recall occurred before the company was listed publicly, leaving 268 eligible announcements. We further excluded samples that the outsourcing practices (i.e., self manufacturing or outsourcing) and the country of manufacture could not be identified clearly. Finally, from the 179 announcements left, we excluded recalls where the data for the control

variables were missing. Our final penal dataset consists of 170 product recall announcements issued by 87 firms between years 1988 and 2011, as follows.

Table 4.1 Recall number of different industries of final sample

Industry	SIC code	Description	No of recalls	No. of companies	% of total recalls by industry
Apparel					
	2300-2390	Apparel and other finished products	15	11	
	3020-3021	Rubber and plastics footwear	6	3	
	3140-3149	Footwear except rubber	2	2	
			23	16	13.53
Computers					
	3570-3579	Office computers	17	8	
			17	8	10.00
Household					
	2510-2519	Household furniture	9	7	
	2590-2599	Misc furniture and fixtures	1	1	
	2840-2843	Soap & other detergents	1	1	
	2844	Perfumes cosmetics	2	1	
	3630-3639	Household appliances	16	8	
	3750-3751	Motorcycles, bicycles and parts	2	1	
	3860-3861	Photographic equip	3	3	
			34	22	20.00
Toys and recreation					
	3650-3651	Household audio visual equip	3	1	
	3940-3949	Toys	28	13	
			31	14	18.24
Retail					
	5310-5311	Retail - department stores	14	6	
	5330-5331	Retail - variety stores	31	9	
	5600-5699	Retail - apparel & acces	10	7	
	5944	Retail - jewelry stores	1	1	
	5945	Retail - hobby, toy and game shops	5	2	
	5730-5733	Retail - radio, TV and consumer electronic stores	4	2	
			65	27	38.24
Total			170	87	100.00

4.3.2 The research model

a) Dependent variable: abnormal change of return on assets (ROA)

Similar to research section one, we measured the abnormal change of financial performance year -2 to year 2 as our dependent variable, which is computed by subtracting the ROA at year -2 by ROA at year 2.

b) Independent variables

Three independent variables were created for our hypotheses testing on the contingency factors. First, each CPSC recall announcement contains the number of injuries and deaths. The level of *crisis severity* is higher when the number of injuries and deaths associated with the recalled product increases, because consumers will perceive the recalled product as more dangerous when more incidents of injuries and deaths are reported. Thus we counted the total number of injuries and deaths to test the hypothesis on *crisis severity*.

Second, the name of the manufacturer of the recalled product is usually shown in a CPSC recall announcement. We checked and confirmed carefully if the manufacturer is a subsidiary of the company that issued the recall through their official websites. We coded 1 for recalls where the product is made by a manufacturer or its subsidiaries other than the company that issued the recall and 0 otherwise.

Third, for country of manufacture, a recall announcement usually contains information about the country of manufacture of the recalled product. We coded 1 for products manufactured in China and 0 otherwise.

To test the interaction effects for our hypotheses testing, we first added independent variables of *accommodative* responses to our model: we created variables on remedy and recall strategies by the same method as in section 3.3.2: we coded 1 for recalls that provide financial compensation and 0 otherwise; we coded 1 for recalls used proactive recall strategy and 0 otherwise. Then, we created two dummy variables of interaction effects for our hypotheses testing : if a recall is issued for a product targeted on high vulnerable consumers (i.e., children) with financial compensation as remedy, we coded 1 for the variable "High Consumer Vulnerability x Financial Compensation" and 0 otherwise; if a recall is issued for a product targeted on high vulnerable consumers with any safety incidents reported, we coded 1 for the variable "High Consumer Vulnerability x Proactive Recall" and 0 otherwise.

c) Control variables

We controlled for similar variables as in research section one that may influence the extent of financial impact of product recalls. First, we controlled the same firm specific control variables as in research section one: ROA, R&D intensity and total assets in year -2. Second, we also controlled the industry ROA change (at the two-digit *SIC* code level) for for the effect of industry conditions and general economic conditions on firm's ROA. Third, we controlled for the number of confounding recalls within the event study period (i.e., year -2 to year 2). Forth, we controlled the consumer vulnerability to test if it is also a key factor in product recall as in research section one. We coded 1 for recalls that involve products targeted on children and 0 otherwise; Forth, we controlled the two factors suggested in SCCT other than *crisis severity* (i.e., *crisis history* and *prior reputation*) with the same method performed in research section one. Also, we controlled if the recall impact is

different whether a product recall was announced by a fashion firm. To identify fashion firms, we used the industry classification system by Fama and French (1997) to identify product recall announcements from firms in the fashion industry. We coded 1 if the recalling company belongs to the fashion industry and 0 otherwise.

4.3.3 Data analysis

Similar to research section one, multiple regression analysis was adopted to investigate the multivariate relationships between the dependent variable (i.e., abnormal ROA change) and all independent variables. We also used year as the time unit. The focal point of time *t* represents the year of a product recall announcement; *t-1* represents the year before the announcement; *t+1* represents the year after the announcement. Our panel data set contains recall information at *t* and financial data of multiple firms at *t-2* and *t+2*. We analysed the data using ordinary least square (OLS) regression based on the following formula:

$$\begin{aligned} t\text{-}2 \text{ to } t\text{+}2 \text{ Abnormal ROA Change}_i = {} & \beta_0 + \beta_1\, t\text{-}2 \text{ ROA}_i + \beta_2\, t\text{-}2 \text{ Industry ROA Change}_i \\ & + \beta_3\, t\text{-}2 \text{ Firm Size}_i + \beta_4\, t\text{-}2 \text{ R\&D Intensity}_i + \beta_5 \text{ Multiple Recalls}_i + \beta_6 \\ & \text{Fashion Industry}_i + \beta_7 \text{ High Consumer Vulnerability}_i + \beta_8 \text{ Crisis History}_i + \\ & \beta_9 \text{ Prior Reputation}_i + \beta_{10} \text{ Crisis Severity}_i + \beta_{11} \text{ Outsourcing Practice}_i + \beta_{12} \\ & \text{Country of Manufacture (China)}_i + + \beta_{13} \text{ Financial Compensation}_i + \beta_{14} \\ & \text{Proactive Recall}_i + \beta_{15} \text{ High Consumer Vulnerability x Financial} \\ & \text{Compensation}_i + \beta_{16} \text{ High Consumer Vulnerability x Proactive Recall}_i + \varepsilon_i \end{aligned}$$

t-2 to *t+2* Abnormal ROA Change$_i$ is the ROA change of the company from *t-2* to *t+2*; *t-2* ROA$_i$ is the ROA at *t-2*; Industry ROA Change$_i$ is the change in average industry ROA from *t-2* to *t+2*; *t-2* Firm Size$_i$ and *t-2* R&D Intensity$_i$ are total assets and R&D

intensity, respectively, at *t-2*; Multiple Recalls$_i$ is the total number of recalls throughout *t-2* to *t+2*; Fashion Industry$_i$ captures whether the recalling company belongs to the fashion industry; High Consumer Vulnerability$_i$ captures whether the recalled product of targeted on high vulnerable consumers (i.e., children); Crisis History$_i$ is the number of prior recall announcements; Prior Reputation$_i$ is the brand reputation observed from the three objective brand ranking sources at *t-2*; Crisis Severity$_i$ is the number of injuries and deaths; Outsourcing Practice$_i$ captures whether the recalled product is manufactured by a contractor; Country of Manufacture (China)$_i$ captures whether the product is manufactured in China; Financial Compensation$_i$ captures whether the remedy of the recall is financial compensation or not; Proactive Recall$_i$ captures whether the company used a proactive strategy or not; High Consumer Vulnerability x Financial Compensation$_i$ captures whether a financial compensation is used as remedy for a children product or not; High Consumer Vulnerability x Proactive Recall$_i$ captures whether a proactive recall strategy is used for a children product or not.

Pearson correlation matrix (Table 4.2) shows there are no high correlations among the independent variables. Based on the OLS regression, the maximum variance inflation factor (VIF) is 4.255 from our model, which is far below the traditional rule of thumb threshold value of 10 and a more stringent threshold value of 6 (Cohen, Cohen, West, & Aiken, 2003). The Durbin-Watson statistics of the model is 1.740, which lies between the upper and lower bounds (1.504 and 1.972) for the critical values at 5% significance level for sample sizes between 150 and 200 with 16 regressors excluding the intercept (Savin & White, 1977). These statistics indicate that interpretation of the regression coefficients is not affected adversely by multicollinearity.

Table 4.2 Pearson correlation coefficients

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 t-2 to t+2 ROA Abnormal Change	1														
2 t-2 ROA	-.507***	1													
3 Industry ROA Change	-.053	.043	1												
4 t-2 Firm Size	.075	-.186***	.023	1											
5 t-2 R&D Intensity	.049	-.058	.215***	.091	1										
6 Multiple Recalls	-.049	-.017	.084	.265***	-.094	1									
7 Fashion Industry	.022	.156**	-.097	-.167**	-.187***	-.175**	1								
8 High Consumer Vulnerability	-.098	.083	.047	-.226***	-.084	.011	.113*	1							
9 Recall History	-.016	-.143**	.113*	.256***	-.083	.714***	-.132**	.025	1						
10 Prior Reputation	.023	.015	-.017	.398***	.264***	.050	.008	-.039	.079	1					
11 Injuries and Deaths	-.130**	.140**	.345***	.075	.252***	.092	-.017	-.056	-.015	-.039	1				
12 Outsourcing Practice	-.233***	.029	-.061	.081	-.127**	.091	-.135**	.022	.107*	.028	-.136**	1			
13 Country of Manufacture (China)	.005	.088	.110*	.019	-.009	.099*	-.073	.225***	.076	.069	.027	-.006	1		
14 Financial Compensation	-.070	.193***	-.143**	-.039	-.393***	.140**	.185*	.276***	.018	.048	-.070	.054	.268***	1	
15 Proactive Recall	-.227***	.107*	-.031	.039	-.086	-.014	.098	.224***	.011	-.107*	-.233***	.056	.166**	.183***	1
Mean	.008	.159	.051	14422.667	1.460	3.671	.135	.424	5.053	.206	2.453	.335	.653	.506	.400
Median	-.009	.156	.013	2663.950	.000	2.000	.000	.000	2.000	.000	.000	.000	1.000	1.000	.000
S.D.	.176	.098	3.628	29231.809	2.566	4.072	.343	.496	8.292	.564	8.610	.473	.477	.501	.491

***. Correlation is significant at the 0.01 level (1-tailed).

**. Correlation is significant at the 0.05 level (1-tailed).

*. Correlation is significant at the 0.1 level (1-tailed).

4.4 Results, discussion and implications

4.4.1 Results

The OLS regression results are reported in Table 4.3. The control model only includes the control variables. It explains about 23.9 percent of variance of the abnormal ROA change from *t-2* to *t+2*. Two strong control variables are found. The coefficient of *t-2* ROA is negative and significant ($p<0.01$). The coefficient of fashion industry is positive and significant ($p<0.1$).

The full model includes all variables in our model. The overall variance explained is about 31.3 percent, independent variables for testing our hypotheses explain an additional variance of about 7.4 percent from the control model. The coefficient of *t-2* ROA is negative and significant ($p<0.01$). The coefficient of the fashion industry is positive and significant as in the control model ($p<0.1$), which implies that product recalls is particular useful for fashion firms to repair their brand image and value after a product harm crisis. Also, coefficient of proactive recall is negative and significant ($p<0.01$), indicating that there is no evidence that using proactive recall strategy will benefit the firms' profitability in the long run, as the same results in research section one (Chapter 3).

For our hypotheses testing, H1, which stated that there is greater negative impact on financial performance of product recalls where the *crisis severity* is higher (i.e., the higher the number of injuries and deaths) is supported ($p<0.05$). H2 is also supported. It stated that recalls of products made by outsourced production are more negatively related to financial performance. The coefficient of this variable is negative and

significant ($p<0.01$), showing that companies that outsource their production suffer more than those who manufacture products on their own. H3, which stated the negative impact of product recalls on financial performance is more serious for products made in China is not supported. The coefficient of China made products (i.e., country of manufacture (China)) is positive and significant ($p<0.1$), there is no evidence that using suppliers in China will worsen the firms' profitability after the recall in the long run. For H4 and H5, there are no significant results to support them. This shows that the effectiveness of either functional or informational repair effort in product recall management in semi-durable and durable product industries does not depend on consumer vulnerability.

Table 4.3 Results from OLS regression for t-2 to t+2 ROA abnormal change

		Control Model		Full Model	
Intercept		.164	5.429 ***	.180	5.377 ***
t-2 ROA		-.959	-7.551 ***	-.870	-6.913 ***
Industry ROA Change		-.001	-.186	.001	.155
t-2 Firm Size		.000	-.279	.000	.680
t-2 R&D Intensity		.002	.318	.004	.759
Multiple Recalls		.002	.402	.001	.274
Fashion Industry	a	.054	1.485 *	.056	1.569 *
High Consumer Vulnerability	b	-.023	-.924	-.035	-.842
Recall History		-.002	-1.002	-.002	-.800
Prior Reputation		.011	.461	-.012	-.499
Injuries and Deaths				-.003	-2.264 **
Outsourcing Practice	c			-.076	-3.087 ***
Country of Manufacture (China)	d			.040	1.497 *
Financial Compensation	e			.014	.398
Proactive Recall	f			-.101	-2.963 ***
High vulnerability x Financial Compensation				.004	.082
High vulnerability x Proactive Recall				.040	.807
N			170		170
Adjusted R square			.239		.313
Change in Adjusted R square					.074
t-statistics are in parentheses					

Significance levels (one-tailed tests) of independent variables: $p < 0.1$*; $p < 0.05$**; $p < 0.01$***

a Base category: Non-fashion industry

b Base category: Non-high consumer vulnerability product

c Base category: Production not outsourced

d Base category: Non-China made products

e Base category: Non-financial compensation

f Base category: Passive recall

To compare fashion and non-fashion industries, an additional partial correlation analysis was conducted to test the relationship between high consumer vulnerability and the dependent variable (*t-2* to *t+2* Abnormal ROA Change) in the above OLS regression model. The results are reported in Table 4.4. The table shows that the abnormal change in ROA in *t-2* to *t+2* is significantly correlated with consumer vulnerability ($p<0.1$) when controlling whether the product recall is from firms in fashion industry or not. The results are in line with the supported H1 in Chapter 3, which found the negative impact of recalled products targeting highly vulnerable consumers is larger than other products. Results in Table 4.4 show that consumer vulnerability is a key moderator in product recall management particularly for fashion industry.

Table 4.4 Results from partial correlation

Control Variable	Variables		
		t-2 to *t+2* ROA Abnormal Change	High Consumer Vulnerability
Fashion Industry	*t-2* to *t+2* ROA Abnormal Change	1.000	-.101*
	High Consumer Vulnerability	-.101*	1.000
***. Correlation is significant at the 0.01 level (1-tailed).			
**. Correlation is significant at the 0.05 level (1-tailed).			
*. Correlation is significant at the 0.1 level (1-tailed).			

4.4.2 Discussion and implications

This chapter contributes to product recall literature based on the SCCT framework. We provide an objective approach on financial performance and bring in new contingency factors related to supply chain management (i.e., outsourcing practise and country of manufacture), which are important because product harm crisis is interrelated with supply chain management as identified in section 2.2.3. Also, we

confirm the importance of the factor of *crisis severity*, which is suggested in SCCT, in the context of product harm crisis.

Figure 4.2 shows how this chapter contributes to product recall management based on the SCCT framework.

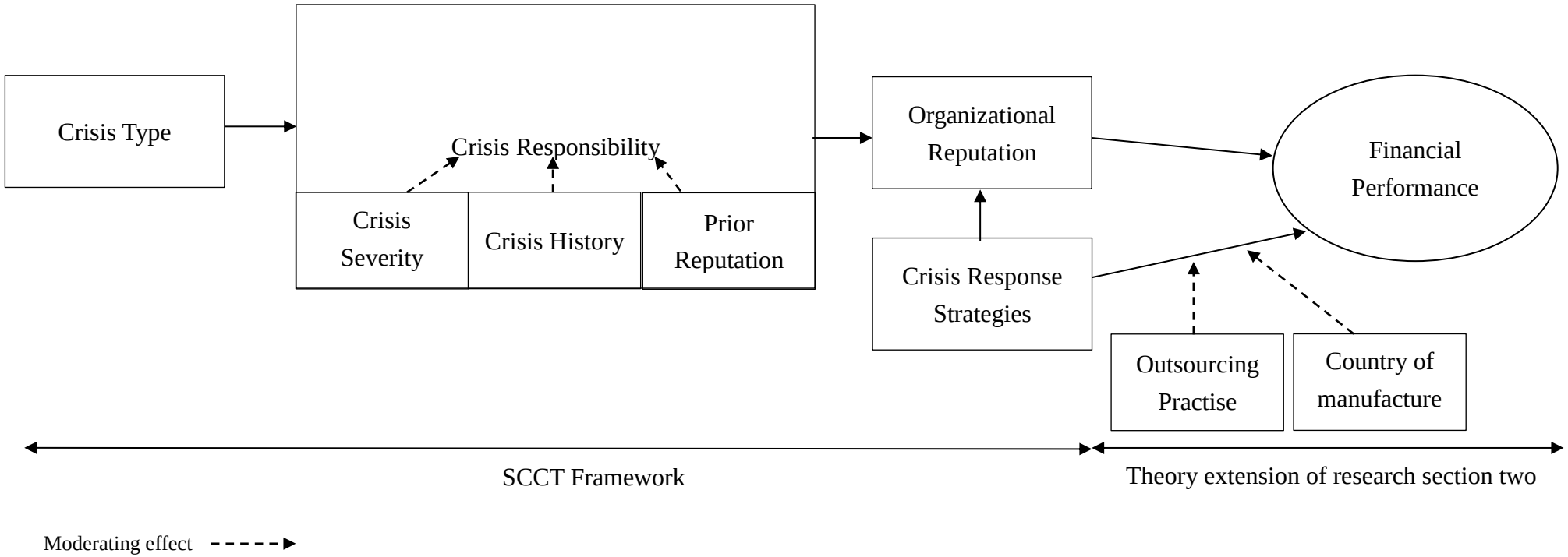

Figure 4.2 Research section two and SCCT framework

Our results have managerial implications to firms in semi-durable and durable product industries. Based on our results, three contingency factors are important in product recall management, which is *crisis severity*, outsourcing practice and country of manufacture.

First, our results show that recalls associated with higher *crisis severity* level (i.e., higher number of injuries and deaths reported) have greater financial impact. Our study suggests that higher *crisis severity* level is more negatively associated with the abnormal ROA change. This suggests that the consumers perceive these recalls as more serious and they are more cautious about the safety of the recalling company's other products. Therefore, managers should pay extra attention when there are high number of injuries and deaths involved with their recalled products.

Second, our findings reveal that companies suffer more if the products are produced by contractors. Outsourcing practices may reduce production cost but if a product harm crisis occurs (despite the product has been recalled), the negative impact on firms operations is more significant. Large extra costs are involved in the additional inspections and audits of contracted manufacturers, and there is lengthy process of changing contracted manufacturers after a product recall if the company decides to terminate the contract with the existing contractor. Therefore, managers should pay more attention to product safety inspections during the manufacturing when the production is outsourced.

Third, in terms of country of manufacture, our results show no significant negative impact to the firms' performance when a recalled product is manufactured in China. In other words, there is no evidence that using suppliers in China worsen the firms' profitability after the recall in the long run. This implies that consumers might be over-reacted to China-made products during a product recall. Managers should be aware that the media and public pressure of removing suppliers in China after a product recall might not be a suitable strategy.

Last, there are no significant results to support either H4 or H5. This suggests that the *accommodative* responses effectiveness in product recall management in semi-durable and durable product industries does not depend on consumer vulnerability. In other words, consumer vulnerability does not have moderating impact on either financial compensation or proactive recall strategy. Our results show that consumer vulnerability is not necessary a key moderator in product recall management when examining all semi-durable and durable product industries. The impact is only applicable and significant in the fashion industry as found in Chapter 3.

4.5 Chapter summary

This chapter presents a study extended the sample to include semi-durable and durable product industries. It examined moderating effects of additional contingency factors including factors related to supply chain in a product recall. In the next chapter, which is the final chapter of this thesis, conclusions, implications, limitations and future research directions will presented.

CHAPTER 5 CONCLUSIONS AND IMPLICATIONS

This study addressed the following research question:

What are the factors that affect a firm's CSR strategies in product harm crisis management, and what are the moderating effects of these factors on the firm's long-term performance?

To answer this question, a comprehensive review of literature related to the research question was conducted, and a research gap was identified, as presented in Chapter 2. On the basis of this literature review, two studies, which are presented in Chapters 3 and 4, were conducted to examine product recalls by using the SCCT theoretical framework.

This final chapter discusses the outcomes generated in response to the research question. Section 5.1 presents a summary of the findings and implications for academics and practitioners. Section 5.2 discusses the limitations of the study and suggestions for future research. Finally, section 5.3 presents a chapter summary and concluding remarks.

5.1 Summary of findings and implications

This research contributes to operations management literature on product harm crisis management. This section summarises the primary findings of this study and presents the theoretical and managerial implications.

5.1.1 Product harm crisis management and SCCT

Based on the SCCT framework, research sections one and two contribute to the

literature on product recall literature. We investigated product harm crisis management in the fashion industry and in semi-durable and durable consumer product industries. Previous research has not used an empirical approach to study the impact of product harm crisis management financial performance according to the SCCT framework. We introduced new crisis situational moderators and tested the effectiveness of response strategies. The major findings and implications of research sections one and two are summarised as follows.

First, the results reveal that it is beneficial for fashion firms to use product recalls to restore their brand image and value after a product harm crisis. Managers of fashion firms should therefore implement product recalls in cooperation with government agencies, such as the CPSC, to manage product harm crises.

Second, consumer vulnerability is determined to be a primary factor in product harm crises in the fashion industry, but not necessarily in other semi-durable and durable product industries. The results in research section one imply that the level of consumer vulnerability of fashion products affects the effectiveness of remedial and recall strategies used by fashion firms. The effectiveness of such strategies was observed to be higher for fashion products targeting children, which are a typical example of a highly vulnerable consumer group. On the other hand, the interaction effects analysed in research section two show that the effectiveness of remedial and recall strategies does not depend on consumer vulnerability. Therefore, managers of fashion firms should pay substantial attention to the level of consumer vulnerability when designing remedial and product recall strategies.

Third, amongst the existing factors in the SCCT framework, *crisis severity* is determined to be a crucial factor in semi-durable and durable product industries. The severity of product harm crises was found to be significantly related to the long-term performance of these industries. Therefore, managers in these industries should pay attention when high numbers of injuries and deaths are related to their recalled products.

In both research sections one and two, the proactive recall strategy is determined to be more negatively correlated with long-term financial performance. This finding is consistent with the findings reported by Chen, Ganesan, and Liu (2009), who revealed that, compared with passive strategies, proactive strategies have a more negative effect on a firm's short-term value. The results of this paper confirm the negative impact of a proactive recall strategy on long-term financial performance. Because of the inevitable costs of a product recall, stakeholders interpret the use of a proactive strategy as an indication of financial damage (Chen et al., 2009). This study reveals that long-term financial damage occurs after the use of a proactive strategy, as predicted by stakeholders. Thus, a proactive strategy has both a short-term (Chen et al., 2009) and long-term impact on a firm's financial performance. Managers in semi-durable and durable product industries should therefore pay attention to the use of recall strategies during a product harm crisis.

Overall, the findings of this research suggest that the effectiveness of CSR strategies handling product harm crisis management depends on specific contingency factors. Operations managers should pay close attention to the significant factors identified in this research. This research contributes to product harm crisis management literature

by applying the SCCT framework. The findings can assist TMTs in designing more effective strategies for product harm crisis management.

5.2 Limitations and recommendations for future research

This research has several limitations. First, since long-term financial data are available only for listed companies in the COMPUSTAT database, the financial impact regarding unlisted companies could not be estimated. Second, the samples in this research were collected from the United States. Valuable findings might be obtained from studies that explore CSR strategies in product harm crisis management and top management appointment in other countries. Future research in other regions and countries, such as China and Japan, may improve the generalizability of the findings in this study.

Third, the research sections on product recalls focused on recalls by the CPSC, which monitors only semi-durable and durable consumer goods. Following previous studies on product recall, this study excluded the automobile industry because recalls in this industry occur more frequently than in other industries. In addition, we did not examine recalls in industries that produce nondurable goods, such as food, drugs, and alcohol, which are outside the jurisdiction of the CPSC. The recall procedures differ amongst federal agencies (CPSC, 2012; FDA, 2012). Such differences may result in differences in the costs of product recalls; hence, including all recalls by all federal agencies may lead to inconsistencies. To give comprehensive insights on the basis of the SCCT framework, future researchers can consider analysing the financial impact of product recalls on nondurable consumer goods industries by using data from corresponding federal agencies, such as the FDA.

5.3 Concluding remarks

Chapter 5 concludes the paper by providing a general discussion on the theoretical and managerial implications of the study, stating its limitations and suggesting future research directions for CSR strategies in product harm crisis management.

Overall, this research explored new situational moderators and their moderating effects on firms' long-term performance. This research contributes to both operational management and the literature. For operational management, managers of recalling firms can benefit from the insights provided in this study when handling product harm crises. For the literature, this study contributes to product harm crisis management literature based on the SCCT framework with additional contingency factors and their moderating effects on firms' long term performance.

APPENDIX A

COMPLETE LIST OF SAMPLE ARTICLES BY RESEARCH DOMAIN

Research Domain	Sample Articles
1. Responsibility of product harm crisis	Beamish and Bapuji (2008); Luo (2008); Noggle and Palmer (2005); Teagarden (2009)
2. The impact of product harm crisis	Bae and Benítez-Silva (2011); Bae and Benítez-Silva (2013); Choi and Lin (2009a); Custance, Walley, and Jiang (2012); Dawar (1998); Eagle, Hawkins, Kitchen, and Rose (2005); Gao, Knight, Zhang, and Mather (2013); Govindaraj and Jaggi (2004); Ma, Zhang, Li, and Wang (2010); Maggini et al. (2004); Marino (1997); Marsh, Schroeder, and Mintert (2004); McDonald (2009); Piotrowski and Guyette (2010); Van Heerde, Helsen, and Dekimpe (2007); Velthuis, Meuwissen, and Huirne (2009); Xi and Peng (2010); Zhao, Zhao, and Helsen (2011)

3. Product harm crisis moderators	Assiouras, Ozgen, and Skourtis (2013); Bunniran, McCaffrey III, Bentley, and Bouldin (2009); Chen and Nguyen (2013); Chu, Lin, and Prather (2005); Cleeren, Dekimpe, and Helsen (2008); Dawar and Lei (2009); Dawar and Pillutla (2000); De Matos and Rossi (2007); Feng, Keller, Wang, and Wang (2010); Gao, Knight, Zhang, Mather, and Tan (2012); Grunwald and Hempelmann (2010); Haas-Kotzegger and Schlegelmilch (2013); Jung (2011); Kalaignanam, Kushwaha, and Eilert (2013); Klein and Dawar (2004); Kong (2012); Korkofingas and Ang (2011); Laufer and Gillespie (2004); Laufer, Gillespie, McBride, and Gonzalez (2005); Laufer, Silvera, and Meyer (2005); Laufer, Gillespie, and Silvera (2009); Lei, Dawar, and Gürhan-Canli (2012); Lin, Chen, Chiu, and Lee (2011); Magno (2012); Minor and Morgan (2011); Mooweon and

	Haunschild (2006); Rhee (2009); Rupp (2004); Salin and Hooker (2001); Seo, Jang, Miao, Almanza, and Behnke (2013); Silvera, Meyer, and Laufer (2012); Siomkos (1999); Siomkos and Kurzbard (1994); Siomkos and Shrivastava (1993); Siomkos, Rao, and Narayanan (2001); Siomkos, Triantafillidou, Vassilikopoulou, and Tsiamis (2010); Sun, Chen, and Wang (2012); Thirumalai and Sinha (2011); Thomsen and McKenzie (2001); Vassilikopoulou, Lepetsos, Siomkos, and Chatzipanagiotou (2009); Vassilikopoulou, Siomkos, Chatzipanagiotou, and Pantouvakis (2009); Vassilikopoulou, Chatzipanagiotou, Siomkos, and Triantafillidou (2011); Wang, Salin, Hooker, and Leatham (2002); Wei, Lo, and Lu (2010); Yannopoulou, Koronis, and Elliott (2010); Ye, Zhao, Prahinski, and Li (2013); Yeung and Ramasamy (2012); Zhao, Li, and Flynn (2013)

4. Product harm crisis response strategies	Andrews, Simon, Tian, and Zhao (2011); Bauman (2011); Berman (1999); Byrd (2012); Carroll (2009); Charlebois (2011); Chen, Ganesan, and Liu (2009); Choi and Chung (2013); Choi and Lin (2009b); Cleeren, van Heerde, and Dekimpe (2013); Coombs and Holladay (2011); Dardis and Haigh (2009); De Blasio and Veale (2009); Eagle, Rose, Kitchen, and Hawkins (2005); Felcher (2003); Freitag (2002); Gibson (1995); Gibson (1997); Gibson (2000a); Gibson (2000b); Gurau and Serban (2005); Haigh and Brubaker (2010); Hargis and Watt (2010); Haunschild and Rhee (2004); Heller and Darling (2011); Heller and Darling (2012); Jacobs (1996); Joel (2011); Koronis and Ponis (2012); Kramer, Coto, and Weidner (2005); Laestadius, Lagasse, Smith, and Neff (2012); Laufer and Coombs (2006); Laufer and Jung (2010); Li and Tang (2009); Liu, Kerr, and

	Hobbs (2009); Madera and Smith (2009); Martinelli and Briggs (1998); Miller and Littlefield (2010); Millner, Veil, and Sellnow (2011); Moll (2003); Nawasaki, Oono, and Inoue (2009); Olaniran, Scholl, Williams, and Boyer (2012); O'Rourke (2001); O'Rourke (2006); Peijuan, Ting, and Pang (2009); Peng and Chen (2011); Piotrowski and Gray (2010); Pranav (2011); Rubel, Naik, and Srinivasan (2011); Sezer and Haksöz (2012); Shah and Chen (2010); Shang and Hooker (2005); Shehane, Huan, and Ali (2010); Souiden and Pons (2009); Standop and Grunwald (2009); Stanwick and Stanwick (2012); Taneja, Pryor, and Sewell (2012); Tsang (2000); Uzumeri and Snyder (1996); Venugopal, Soni, Tiwari, and Gupta (2012); Wang and Lu (2010); Wasserman and Dure (2008); Wrigley, Ota, and Kikuchi (2006); Zavyalova, Pfarrer, Reger, and Shapiro

	(2012)
5. Product harm crisis management with supply chain partners	Chao, Iravani, and Savaskan (2009); Donnelly, Karlsen, and Dreyer (2012); Hora, Bapuji, and Roth (2011); Kinsey, Seltzer, Ma, and Rush (2011); Kumar and Budin (2006); Kumar and Schmitz (2011); Kumar, Dieveney, and Dieveney (2009); Lyles, Flynn, and Frohlich (2008); Marucheck, Greis, Mena, and Cai (2011); Piramuthu, Farahani, and Grunow (2013); Tse and Tan (2011); Tse and Tan (2012); Tse, Tan, Chung, and Lim (2011); Wadhwa and Lien (2013); Wang, Li, and O'Brien (2009); Wynn, Ouyang, ter Hofstede, and Fidge (2011)
Other issues	Arce (2005); Coombs (2007); Roman and Moore (2012); Rupp and Taylor (2002); Salin, Darmasena, Wong, and Luo (2006)

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