

The Role of Social Capital in Building Organizational Resilience

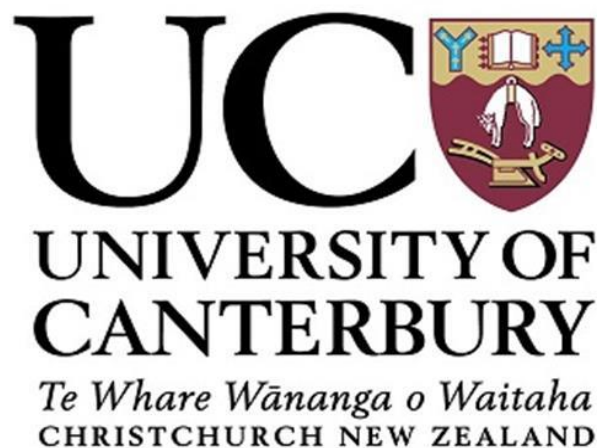
By Xin Jia

This thesis is submitted in partial fulfilment of the requirements for the
degree of

Master of Commerce in Management

Department of Management, Marketing and Entrepreneurship

University of Canterbury



2018

Abstract

Organizational resilience refers to a firm's capability of coping successfully following disruptions. Resilient firms are also able to improve themselves after the disruptive events. However, implementing coping strategies requires a variety of resources, and firms can become more resource-dependent during and after disruptive events. Despite some studies claiming that social capital in the forms of structural capital, relational capital and cognitive capital can be regarded as resources that can support a firm's resilience capability, the relationships between the three dimensions of social capital and organizational resilience have not been tested in a post-disaster context. Thus, this study empirically tests the relationships between the three dimensions of social capital and organizational resilience. To achieve this purpose, partial least squares structural equation modelling (PLS-SEM) was applied to analyze the survey data collected from 88 large companies that were affected by the 2008 Sichuan (Wenchuan) earthquakes, in China. The results suggest that structural capital plays an important role in building proactive organizational resilience, while relational capital plays an important role in building reactive organizational resilience. In addition, neither proactive nor reactive organizational resilience capability significantly supports business performance. These findings enrich the pool of knowledge of the relationships between social capital and organizational resilience, and provide insights into how to build organizational resilience using social capital as a resource in a post-disaster context. Managerial implications of the study are also offered. However, these results may not be general to all firms affected by the earthquake, given that data was only collected from a small number of companies in the Sichuan province of China.

Contents

Tables and Figures.....	VII
Glossary.....	VIII
Chapter 1: Introduction.....	1
1.1 Introduction.....	1
1.2 Research Rationale.....	6
1.2.1 Research Gaps.....	6
1.2.2 Research Objectives and Contributions of the Study.....	8
1.3 Methodology.....	11
1.4 Managerial Value of the Research.....	12
1.5 Thesis Structure.....	12
Chapter 2: Literature Review.....	13
2.1 Chapter Overview.....	13
2.2 Organizational Resilience.....	13
2.3 Dimensions of Organizational Resilience.....	16
2.3.1 Proactive Organizational Resilience.....	16
2.3.2 Reactive Organizational Resilience.....	18
2.4 Social Capital.....	23
2.5 Definitions of Social Capital.....	23
2.5.1 Structural Capital.....	28
2.5.2 Relational Capital.....	30
2.5.3 Cognitive Capital.....	32
2.6 Hypotheses Development.....	33
2.6.1 Relationship Across the Dimensions of Social Capital.....	33
2.6.1.1 Structural Capital and Cognitive Capital.....	33
2.6.1.2 Structural Capital and Relational Capital.....	33
2.6.1.3 Cognitive Capital and Relational Capital.....	34
2.6.2 Relationship between Social Capital and Organizational Resilience.....	35
2.6.2.1 Structural Capital and Organizational Resilience.....	35
2.6.2.2 Cognitive Capital and Organizational Resilience.....	37

2.6.2.3 Relational Capital and Organizational Resilience.....	38
2.6.3 Proactive and Reactive Organizational Resilience.....	40
2.6.4 Organizational Resilience and Business Performance.....	41
2.7 Proposed Model and Hypotheses.....	41
2.8 Research Gaps.....	42
2.9 Chapter Summary.....	42
Chapter 3: Methodology.....	44
3.1 Chapter Overview.....	44
3.2 Research Design.....	44
3.3 Survey Design.....	45
3.3.1 Screening Procedures.....	45
3.3.2 Questionnaire Development	46
3.3.2.1 Measurement Items of Social Capital	46
3.3.2.2 Measurement Items of Organizational Resilience.....	48
3.3.2.3 Measurement Items of Business Performance.....	50
3.4 Translation.....	50
3.5 Pilot Survey.....	51
3.6 Sampling and Data Collection.....	51
3.7 Ethical Considerations.....	53
3.8 Sample Size Requirement.....	53
3.9 Data Analysis.....	54
3.9.1 Exploratory vs Confirmatory Research.....	54
3.9.2 Partial Least Squares (PLS) SEM vs Covariance-Based (CB) SEM.....	55
3.9.3 Reflective Measurement Models vs Formative Measurement Models.....	56
3.10 Methodology Limitations.....	57
3.11 Chapter Summary.....	59
Chapter 4: Analysis and Results	60
4.1 Chapter Overview.....	60
4.2 Data Screening.....	60
4.2.1 Problematic Cases.....	60

4.2.2 Skewness and Kurtosis.....	60
4.3 Descriptive Statistics.....	62
4.3.1 Characteristics of Organizations.....	62
4.3.2 Demographic Composition.....	63
4.4 The Procedure of Data Analysis Using PLS-SEM.....	65
4.5 Validity and Reliability of Measurement (Outer) Model.....	65
4.5.1 Indicator Mean and Standard Deviation.....	65
4.5.2 Indicator Reliability.....	66
4.5.3 Internal Consistency Reliability.....	69
4.5.4 Convergent Validity.....	70
4.5.5 Discriminant Validity.....	70
4.6 Evaluating the Structural (Inner) Model.....	73
4.6.1 Multi-collinearity in Reflective Modelling.....	73
4.6.2 Coefficients of Determination (R^2) and Predictive Power.....	74
4.6.3 Structural Path Significance using Bootstrapping.....	76
4.6.4 Size Effects of Significant Relationships.....	80
4.6.5 Predictive Relevance using Blindfolding.....	82
4.7 Chapter Summary.....	83
Chapter 5: Discussion and Conclusion.....	84
5.1 Chapter Overview.....	84
5.2 Discussion.....	84
5.2.1 Theoretical Contributions.....	92
5.2.2 Managerial Contributions and Recommendations	93
5.2.3 Revisiting the Aims and Objectives.....	94
5.3 Research Limitations.....	96
5.4 Conclusions.....	97
References.....	99
Appendices.....	125
Appendix 1: Approval of Human Ethics Committee.....	125
Appendix 2: Screening Questions and Demographic Questions.....	126

Appendix 3: Information Sheet and Consent Form.....127

Tables and Figures

Table 1: Areas Severely Impacted by the 2008 Sichuan (Wenchuan) Earthquakes...	2
Table 2: Constructs with Definitions.....	10
Table 3: Definitions of Social Capital.....	25
Table 4. Measurement Items of Social Capital	46
Table 5. Measurement Items of Organizational Resilience	49
Table 6: Measurement Items of Business performance.....	50
Table 7: Problematic Cases and Removals.....	60
Table 8: Skewness and Kurtosis Violations.....	61
Table 9: Characteristics of Organizations.....	62
Table 10: Profile of Respondents.....	64
Table 11: Problematic Indicator Loadings.....	67
Table 12: Reliability and Validity Statistics for Measurement Model.....	68
Table 13: Cross-Loadings.....	71
Table 14: Fornell-Larcker Cross-Tabulation Matrix.....	72
Table 15: Inner VIF values.....	73
Table 16: Coefficients of Determination with Endogenous Constructs.....	75
Table 17: Hypothesis Testing Post-Bootstrapping.....	78
Table 18: Effect Sizes	81
Table 19: Construct Cross-validated Redundancy.....	83
Figure 1: Proposed Theoretical Model.....	11
Figure 2: Theoretical Paths Model with Hypotheses.....	42
Figure 3: Year of Operation	63
Figure 4: Proposed Model with Associated R ² Value and Path Coefficients.....	74

Glossary

AVE	- Average Variance Extracted
CB	- Covariance Based
CR	- Composite Reliability
HTMT	- Heterotrait-Monotrait Ratio
PLS	- Partial Least Squares
SD	- Standard Deviation
SEM	- Structural Equation Modelling

Chapter 1: Introduction

1.1 Introduction

Natural disasters are becoming increasingly frequent (Altay, 2008) and costly (Horwich, 2000). This usually has devastating consequences on people and infrastructure which can lead to significant economic losses, especially in the Asia-Pacific region due to densely populated cities (Haruyama, 2016). China is one of the countries that is frequently and severely impacted by natural disasters due to the complicated climatic and geological conditions (Shi, Xu & Wang, 2016). For example, in the 1990s, about 360 million people were affected by natural disasters each year with 172 billion Chinese Yuan annual direct economic losses (Shi et al., 2016). In the 2000s, the number of people that were affected by natural disasters each year reached about 420 million with annual direct economic losses estimated at 238 billion Chinese Yuan (Shi et al., 2016). In the past decade, earthquakes have become the most serious natural disaster in China, which caused the highest number of direct economic losses, deaths and missing people, and damage to infrastructure compared to other types of natural disasters, such as floods, tsunamis and droughts (Shi et al., 2016; Xu, Liu, Xu, Wang, Liu & Shi, 2016).

In 2008, a sequence of earthquakes struck Wenchuan County in Sichuan Province of China. The first earthquake, which measured 8.0 on the Richter scale, struck on May 12, 2008. The 2008 Sichuan (Wenchuan) earthquakes caused widespread damage across Sichuan Province, Gansu Province, and Shaanxi Province (Ministry of Civil Affairs of China, 2008), which included 417 counties (cities or districts), 4,667 towns, and 48,810 villages (Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology, 2008). The total disaster area was about 0.5 million square kilometres (Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology, 2008). Within this disaster area, an extent of 0.13 million square kilometres was identified as severely and very severely impacted areas that involved 46 counties (cities or district) across Sichuan Province, Gansu Province and Shaanxi Province

(shown in Table 1) (Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology, 2008). The 2008 Sichuan (Wenchuan) earthquakes resulted in a total death toll of 69,227 people, and 17,923 people missing (Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology, 2008). A total of 374,643 people were injured, and 4.8 million people were homeless (Ministry of Civil Affairs of China, 2008). The total direct economic losses that resulted from the 2008 Sichuan (Wenchuan) earthquakes were over 845.1 billion Chinese Yuan (Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology, 2008; Ministry of Civil Affairs of China, 2015). According to National Development and Reform Commission of China, Ministry of Industry and Information Technology of China, Ministry of Agriculture and Rural Affairs of China, Ministry of Culture and Tourism of China, Government of Sichuan Province, Government of Gansu Province, and Government of Shanxi Province (2008), the 2008 Sichuan (Wenchuan) earthquakes were the most devastating and most widespread natural disaster since China was established (1949).

Table 1: Areas Severely Impacted by the 2008 Sichuan (Wenchuan) Earthquakes

Impact	Province	County (City or District)
Very severely impacted county (city) (10)	Sichuan (10)	Wenchuan County, Beichuan County, Mianzhu City, Shifang City, Qingchuan County, Mao County, An County, Dujiangyan City, Pingwu County, and Pengzhou City
Severely impacted county (city or district)	Sichuan (26)	Li County, Jiangyou City, Lizhou District, Chaotian District, Wangcang County, Zitong County, Youxian District, Jingyang District, Xiaojin County, Fucheng District, Luojiang County, Heishui County, Chongzhou City, Jiange County, Santai County, Yanzhong City, Yanting County,

(36)		Songfan County, Cangxi County, Lushan County, Zhongjiang County, Yuanba District, Dayi County, Baoxing County, Nanjiang County, and Guanghan City
	Gansu (7)	Wen County, Wudu District, Kang County, Cheng County, Hui County, Xihe County, and Liangdang County
	Shaanxi (3)	Ningqiang County, Lueyang County, and Mian County

The 2008 Sichuan (Wenchuan) earthquakes had a significant impact on the regional economy, especially in Sichuan province (Ministry of Industry and Information Technology of China, the Government of Sichuan Province, the Government of Gansu Province and the Government of Shaanxi Province, 2008). According to the Ministry of Industry and Information Technology of China, the Government of Sichuan Province, the Government of Gansu Province and the Government of Shanxi Province (2008), local enterprises in these provinces are the backbone for the regional economy, especially in the manufacturing sector. However, in the Sichuan Province, Gansu Province and Shanxi Province, there were approximately 17,923 enterprises that were impacted by the 2008 Sichuan (Wenchuan) earthquakes, which led to about 104.87 billion Chinese Yuan economic losses that significantly impacted on the regional economy (Ministry of Industry and Information Technology of China et al., 2008). The impact on the Sichuan province's economy was the most significant. A total of 16,280 out of these 17,923 enterprises were located in the Sichuan Province that associated with economic losses of 99.78 billion Chinese Yuan (Ministry of Industry and Information Technology of China et al., 2008). A total of 10,849 of these were manufacturing enterprises (National Development and Reform Commission of China et al., 2008). Thus, to quickly rebuild and recover the productivity of these impacted enterprises, especially for large enterprises, can significantly support the recovery and development of the regional economy (Ministry of Industry and Information Technology of China et al., 2008; National Development and Reform

Commission of China et al., 2008).

Natural disasters usually create major physical damages, and disruptions of routine functioning that negatively impact on business performance (e.g. operations and finance) (Bode & Macdonald, 2016), even threaten organizations' survival (Kreps, 1984; Linnenluecke, Griffiths & Winn, 2012). Organizational resilience enables an organization to survive and restore itself from disasters, and helps an organization to recover and/or achieve a desired level of business performance (e.g. Bode & Macdonald, 2016; Lengnick-Hall, Beck, & Lengnick-Hall, 2011; Linnenluecke et al., 2012). In organizational theory, organizational resilience has been defined variously based on different views. According to Somers (2009), organizational resilience is often defined in passive terms. For instance, Lengnick-Hall et al. (2011), and Wildavsky (1988) claim that organizational resilience can be seen as an organizational capability to "bounce back" from impacts of disruptive events, or as the ability to cope with facing disruptions. Based on this perspective, resilient organizations can absorb the impacts of an external disruptive event, and restore their performance to a more favourable, or the pre-impact state (Linnenluecke et al., 2012). However, some authors argue that organizational resilience also can be defined as the ability to identify potential disruptions and take proactive actions (Longstaff, 2005; Lengnick-Hall & Beck, 2003). Based on the proactive perspective, organizational resilience can be defined as a deliberate effort that enables an organization to be able to cope with future disruptions (Lovins & Lovins, 1982). Resilient organizations are able to improve their performance by fitting in with the changes of environments (Linnenluecke et al., 2012). Linnenluecke et al. (2012) also suggest that it is important to cover both proactive and reactive organizational resilience in one organizational resilience study because it can provide an insight into how these two types of organizational resilience are related in different sectors or contexts. Thus, this study is taking both proactive and reactive perspectives of organizational resilience in order to understand how these two perspectives are complementary.

However, various tangible resources (e.g. labour, materials and machinery) and intangible resources (e.g. information, knowledge and skill) are required for achieving resilient organizations, especially after disasters (Lengnick-Hall et al., 2011; Linnenluecke et al., 2012). Organizations become more resource dependent after disasters due to damages to physical resources and infrastructure, and disruptions of operational routines (Bode & Macdonald, 2016). Earthquakes may be the most disruptive disasters for organizations, and may cause the most serious physical damage and disruptions of normal operations than any other disaster. As a result, organizations may need more external resources for implementing coping strategies while facing earthquakes. Many authors state that social capital is a source of valuable resources that enhance organizational resilience, through providing quick access to sufficient and valuable information and resources (e.g. Johnson, Elliott & Drake, 2013; Lengnick-Hall et al., 2011; McGuinness & Johnson, 2014; Prasad, Su, Altay & Tata, 2014), especially during the period of disasters (Prasad et al., 2014). Lengnick-Hall et al. (2011) also state that social capital can be the foundation of the resilience capability of organizations to respond and cope with uncertain external disruptions. Thus, social capital can be an important resource for organizational response and restoration after experiencing earthquakes.

Social capital has been defined variably based on different perspectives, such as bridging (e.g. Baker, 1990; Bourdieu, 1985; Burt, 1992) and bonding (e.g. Brehm & Rahn, 1997; Coleman, 1990; Putnam, 1995). For example, based on the perspective of bridging, social capital can be seen as “a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors” (Baker, 1990, p. 619). Based on the perspective of bonding, social capital can be seen as “the web of cooperative relationships between citizens that facilitate resolution of collective action problems.” (Brehm & Rahn, 1997, p. 999). However, the bridging view only explains the external feature of social capital, whereas the bonding view only explains the internal feature of social capital (Adler & Kwon, 2002). In recent years, the definitions of social capital are often

defined as both internal (bonding view) and external (bridging view) resources in organizational studies. And Nahapiet and Ghoshal's (1998) social capital model is the most comprehensive and widely accepted in organizational studies (e.g. Johnson et al., 2013; Prasad et al., 2014; Villena et al., 2011). Nahapiet and Ghoshal (1998) defined social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network." (p. 243). Their social capital model consists of three interrelated dimensions: structural capital, cognitive capital and relational capital (Nahapiet & Ghoshal, 1998). Structural capital refers to linkage and configuration within social networks (Nahapiet & Ghoshal, 1998). Cognitive capital refers to the resources that provide shared representations, interpretations and systems of meaning that exist between participants (Cicourel, 1973). Relational capital refers to the quality or strength of relationships between actors (Moran, 2005; Tsai & Ghoshal, 1998; Villena et al., 2011). Few authors claim that all three dimensions of social capital are associated with organizational resilience (e.g. Johnson et al., 2013; Prasad et al., 2014), but these relationships have not been empirically measured in a post-disaster context. Hence, the main objective of this study is to explore the relationships between the three dimensions of social capital and proactive and reactive organizational resilience in the context of the 2008 Sichuan (Wenchuan) earthquakes.

1.2 Research Rationale

1.2.1 Research gaps

Studies (e.g. Johnson et al., 2013; Lengnick-Hall et al., 2011; Linnenluecke et al., 2012; McGuinness & Johnson, 2014; Prasad et al., 2014) have analyzed the relationships between social capital and organizational resilience. However, only a few studies (e.g. Johnson et al., 2013; Prasad et al., 2014) have examined the relationships between the three dimensions of social capital and organizational resilience. A comprehensive literature review reveals that these relationships have not been empirically tested in a post-disaster context. It is important to test these

relationships in different contexts because firms' social capital within different contexts may have distinct social capital dimensions influencing on firms' resilience capability (Johnson et al., 2013). Thus, there is a gap in the literature about how the three dimensions of social capital influence organizational resilience in the context of post natural disasters. One of the objectives of this study is to explore the relationships between the three dimensions of social capital and organizational resilience in the context of the 2008 Sichuan (Wenchuan) earthquakes. Therefore, this study satisfies a research gap regarding the extent to which the three dimensions of social capital builds an organization's resilience capability, which contributes to understanding the role of social capital in building organizational resilience. This study integrates numerous previous studies that explore social capital, organizational resilience and business performance, and summarizes the relationships between social capital, organizational resilience and business performance into a holistic framework that explains the inputs of social capital, organizational resilience and business performance. Testing these relationships (paths) helps researchers to understand which aspects of social capital and organizational resilience have the most influence on business performance.

Although firms may enhance their social capital with the purpose of building resilience capability, this does not mean all the three dimensions of social capital always show the same level of importance for building organizational resilience in different countries and/or cultures. Cultural difference is an important aspect in managing social relations in organizational context (Hofstede, 2001; Putman, 1993). For example, business practices in inter-personal and inter-organizational networks and relationships may not be the same in different countries and/or cultures (Villena et al., 2011). These inter-personal and inter-organizational relationships could either be friendly and close, or be more non-friendly, distant and characterized by more systematized exchange under different cultures (Hofstede, 2001; Villena et al., 2011), which could influence a firm's resilience capability and performance differently (Bode & Macdonald, 2016; Prasad et al., 2014). Thus, this study outlines a structural

model that can be applied in various contexts in order to describe the relationships between social capital, organizational resilience, and business performance in various contexts. This is also one of few studies that has been conducted in a developing country, which enriches the pool of knowledge about the relationships between social capital, organizational resilience and business performance regarding developing countries (Prasad et al., 2014).

1.2.2 Research Objectives and Contributions of the Study

As mentioned, all three of the dimensions of social capital may not always show the same level of importance for building firms' resilience capability in different countries and/or cultures. Scholars are also calling for multi-culture and multi-country cases to enrich the pool of knowledge on the relationships between social capital, organizational resilience, and business performance (e.g. Prasad et al., 2014; Villena et al., 2011). Thus, an evaluation of firms in the post-disaster context of the 2008 Sichuan earthquakes is used to assess the relationships between social capital, organizational resilience, and business performance. Given that the direct effect of social capital on business performance has been extensively studied in various contexts (e.g. Mahajan & Benson, 2013; Villena et al., 2011), the focus is on organizational resilience and social capital in this study.

There are four objectives to be achieved in this study. The first objective is to empirically test the relationships between the three dimensions of social capital of Nahapiet and Ghoshal' (1998) framework of social capital in the post-disaster context of Sichuan that are a relatively different from previous studies (e.g. Carey et al., 2011; Tsai & Ghoshal, 1998). It is important to investigate how these three dimensions of social capital are related in a different context because the results may show different relationships compared to studies carried out in a weaker context or a non-disaster context (e.g. Carey et al., 2011; Karahanna & Preston, 2013; Tsai & Ghoshal, 1998). For example, studies evaluating the responsive alignment/consistency between the chief information officer and the top management team in the United States, produce

results which show that structural capital does not significantly support relational capital, but structural capital significantly supports cognitive capital, and cognitive capital significantly supports relational capital (Karahanna & Preston, 2013). In contrast, in the research for evaluating how social capital supports value creation in an electronics company, the results show that structural capital did not significantly support cognitive capital, but structural capital and cognitive capital both significantly supported relational capital (Tsai & Ghoshal, 1998). These inconsistent results in different contexts suggest that further retest is needed.

The second objective of this study is to identify and test the relationships between the three dimensions of social capital, and proactive/reactive organizational resilience in a post-disaster context based on data from large firms affected by the 2008 Sichuan earthquakes. The results of this study enrich the pool of knowledge about the relationships between social capital and organizational resilience. As mentioned, large firms and small firms react differently, and have different levels of dependence on social capital in the context of natural disasters (McGuinness & Johnson, 2014; Prasad et al., 2014). Also, the relationships between large firms' social capital and their resilience capability in the context of natural disasters are underdeveloped, especially in developing countries (Prasad et al., 2014). Therefore, this study provides insights on the relationships between large firms' social capital and their resilience capability in a post-disaster context.

The third objective of this study is to test the relationship between proactive and reactive organizational resilience. There are some studies regarding the relationship between proactive organizational resilience and reactive organizational resilience, but only a few of these studies empirically test this relationship in the context of natural disasters (e.g. Bode & Macdonald, 2016; Lengnick-Hall et al., 2011; Sawalha, 2015). Therefore, the empirical results of this study enrich our understanding of whether proactive resilience has any influence on reactive resilience, and the extent of the influence. The later explains the adaptive capacity of the firm.

The fourth and final objective of this study is to build a comprehensive structural model that describes relationships between the three dimensions of social capital, proactive and reactive organizational resilience, and business performance. This helps researchers to address the relationships between social capital and organizational resilience, and business performance.

Thus, considering these four objectives, the aim of this study is to test the role of social capital in building organizational resilience. To achieve this, a theoretical mode is developed from the literature and tested by a sample of firms from the Sichuan province of China.

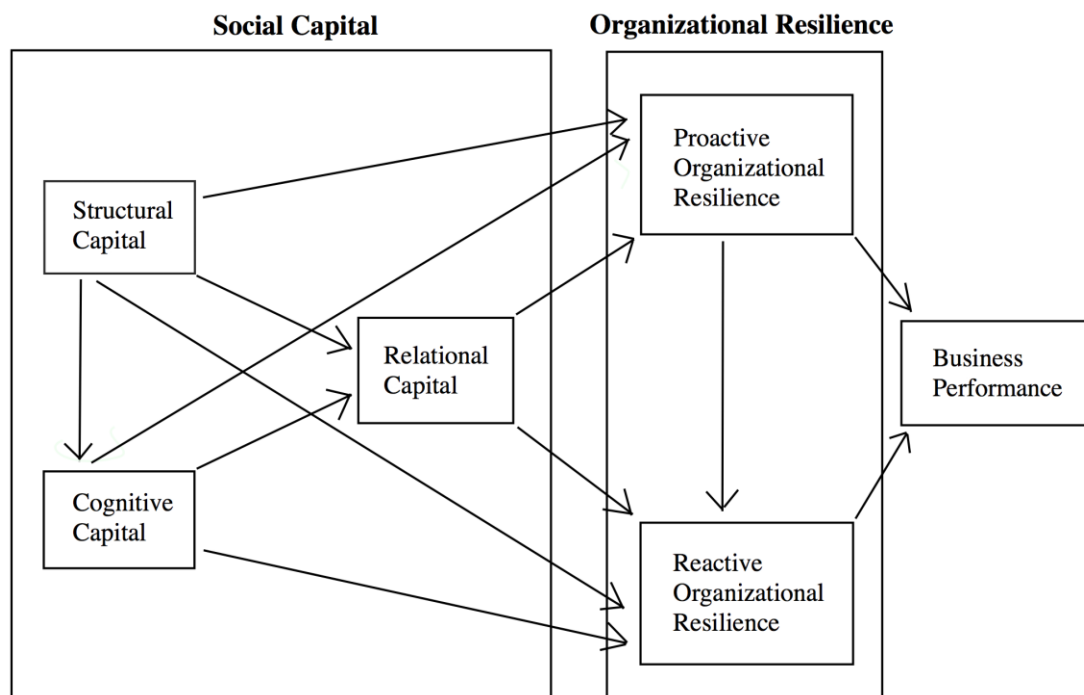
Table 2 shows the relevant variables for evaluating the role of social capital in building organizational resilience, which will be thoroughly explained in chapter 2. Figure 1 shows the proposed theoretical model with constructs and relationships, which will be discussed in more depth in chapter 2, and be tested in chapter 4. This proposed model comprehensively summarized the most common dimensions of social capital and perspectives of organizational resilience throughout social capital and organizational resilience literature.

Table 2: Constructs with Definitions

Construct	Definition
Structural Capital	The impersonal linkage and configuration within social networks (Nahapiet & Ghoshal, 1998).
Cognitive Capital	The resources that provide shared representations, interpretations and systems of meaning that exist between participants (Cicourel, 1973).
Relational Capital	The quality or strength of relationships between social actors (Villena et al., 2011).

Proactive Organizational Resilience	Deliberate efforts that make organizations better able to deal with unpredicted disruptions in the future (Lovins & Lovins, 1982).
Reactive Organizational Resilience	The capability to effectively and efficiently respond to external disruptions, and quickly recover to the pre-impact state after experiencing external extreme impacts (Lengnick-Hall et al., 2011).
Business Performance	Business performance that relates to finance and operations (Pettit, Croxton & Fiksel, 2013).

Figure 1: Proposed Theoretical Model



1.3 Methodology

The hypotheses for development in chapter 2 is based on the relationships between the three dimensions of social capital, proactive and reactive organizational resilience, and business performance (Figure 2), which will be tested by applying the Partial Least Squares Structural Equation Modelling (PLE-SEM) on the survey data that was collected from large firms in Sichuan province, China (discussed in Chapter 4). This

is in order to empirically evaluate how large firms' social capital affects their proactive/reactive resilience capabilities in the context of natural disasters, and how large firms' social capital relates to their business performance via proactive/reactive resilience capabilities. Measurement items of variables are adapted from social capital and organizational resilience literature. The size of the sample met the requirement for applying PLS-SEM, and the data met the requirements of validity and reliability, which will be discussed in Chapter 3 and 4.

1.4 Managerial Value of the Research

The empirical results provide insights into the relations of the three dimensions of firms' social capital, and general ideas on the relationships between social capital and proactive/reactive organizational resilience that help practitioners to have a deeper understanding of how social capital supports proactive and reactive organizational resilience differently in the context of natural disasters. This may be helpful for practitioners to improve firms' resilience capability through enhancing firms' social capital. On the other hand, this study also provides general ideas on the relationships between firms' proactive/reactive resilience capabilities and business performance. This may be helpful for decision-making and strategic planning with regard to the balance between building organizational resilience capability and business performance.

1.5 Thesis Structure

Chapter 2 explores current literature that associates with social capital and organizational resilience. It also develops a model of pathways based on a series of hypotheses that refer to the relationships between structural capital, relational capital, cognitive capital, proactive and reactive organizational resilience. Chapter 3 discusses the methodology that will be applied in this study, such as research design, survey design and other requirements of this study. Chapter 4 describes the data analysis and evaluation of the proposed model. The analysis results are discussed and concluded in Chapter 5.

Chapter 2: Literature Review

2.1 Chapter Overview

This chapter starts with discussing definitions of organizational resilience based on both proactive and reactive perspectives. These are followed by a discussion of social capital in the forms of structural, relational and cognitive capital. These lead to a series of hypotheses based on the relationships between social capital and organizational resilience, and the relationships between organizational resilience and business performance. This chapter also summarizes the hypotheses fitted into the proposed model and a brief statement of how this study fills research gaps in organizational resilience literature.

2.2 Organizational Resilience

Resilience has been defined in different ways in literature based on different perspectives (Sawalha, 2015) – such as personal perspective (Werner & Smith, 2001), organizational perspective (Parsons, 2010; Somers, 2009), and societal/community perspectives (Cox, 2012; Graugaard, 2012). Lee, Vargo, and Seville (2013) provide a general definition of resilience where resilience is defined as “a multi-dimensional, sociotechnical phenomenon that addresses how people, as individuals or groups, manage uncertainty” (p. 29). Individual resilience is often related to the field of psychology, which provides a starting point for defining organizational resilience (Lengnick-Hall et al., 2011). At the individual level, resilience is viewed as an ability to absorb and restore following external pressures and shocks, or even to take advantage of pressures and shocks to be stronger people (Sawalha, 2015). At the organizational level, resilience is the capability that enables organizations to maintain positive adjustment, especially under challenging conditions (Sutcliffe & Vogus, 2003). Morgeson and Hofmann (1999) state that resilient individual members of organizations underpin the achievement of organizational resilience. Societal/Community resilience relies on employment and services that are provided by organizations, which enable communities to plan for, respond to, resume following crises and emergencies, and to maintain social and economic stability (Lee et al.,

2013). If organizations are not well-prepared for responding to crises, communities are also not well-prepared for responding to crises (Lee et al., 2013). In this study, resilience is addressed at the organizational level based on the purposes that are explained in the previous chapter.

Organizational resilience is embedded in the literature of management that often relates to the high reliability organizations theory (Bierly & Spender, 1995; Bourrier, 2011), and organizations' resistance to disruptions (Annarelli & Nonino, 2016). In literature, a number of terms are used interchangeably to describe resilience at organizational level (Christopher & Peck, 2004; Sheffi & Rice, 2005) – for example, business resilience (Foster & Dye, 2005), enterprise resilience (Biggs et al., 2012), and firm resilience (Ambulkar, Blackhurst & Grawe, 2015). According to Annarelli and Nonino (2016), organizational resilience refers to the ability to return to normal state after disruptions. Organizational resilience is usually associated with management of disaster impact, strategies of mitigation, and organizational restoration in the face of environmental disruptions (Prayag & Orchiston, 2016). Hall, Prayag, and Amore (2018) recently argued that the term “organizational resilience” still does not have an agreed definition even though it has been proverbially used. This definition is expected to vary based on different perspectives (Hall et al., 2018).

From the ecological perspective, organizational resilience refers to building flexible processes and systems that enable continuity of business functions in the face of disruptions (Hall et al., 2018). Based on this perspective, organizations can improve their resilience through enhancing their ability to withstand the impacts of crises before suffering serious issues (Dalziell & McManus, 2004). From the managerial perspective, organizational resilience refers to organizational capability, process continuity, and structural resilience (Borekci, Rofcanin, & Sahin, 2014). Organizational capability is about the ability to manage variation of customer and product, and financial risk (Borekci et al., 2014). Durodie (2003) also states that organizational resilience is the ability to effectively manage and cope with disruptive

challenges, which makes organizations more stable and reliable when facing unanticipated crises (Weick & Sutcliffe, 2007). In addition, Wildavsky (1989) argues that in dynamic and complex environments, resilience is a critical capacity for organizations to deal with unanticipated risks. Mitroff (2005) defines organizational resilience as a continuously moving target that contributes to organizational performance in adverse situations. Lengnick-Hall et al. (2011) state that organizational resilience is the organizational capability of effectively and efficiently absorbing, developing specific capacities to respond to disruptions, and engage transformative actions for coping with potential disruptions. Lengnick-Hall et al.'s (2011) definition of organizational resilience is the most appropriate in the context of this study.

Organizational resilience can be differentiated between dynamic resilience and static resilience (Annarelli & Nonino, 2016). Dynamic resilience is based on dynamic capabilities that enable organizations to manage unexpected threats and risks, whereas static resilience is about strategic initiatives for resilience based on managing internal and external resources (Annarelli & Nonino, 2016). Hall et al. (2018) also argue that static resilience and dynamic resilience co-exist with the views of proactive resilience and reactive resilience. According to Somers (2009), reactive resilience refers to the organization's ability to bounce back to its normal state without incurring serious damage or loss, whereas proactive resilience refers to deliberate efforts that enhance the ability to cope with potential threats (Lovins & Lovins, 1982). Proactive resilience is required in a pre-disaster environment, whereas reactive resilience is required in a post-disaster environment (Wildavsky, 1988). According to Somers (2009), organizational resilience is often defined and associated with the perspectives of proactive and reactive, and these perspectives of organizational resilience are widely used in various studies, and are more appropriate from a practical point of view (e.g. Bode & Macdonald, 2016; Lengnick-Hall et al., 2011; Linnenluecke et al., 2012; McManus, Seville, Vargo, & Brunson, 2008; Sawalha, 2015; Seville, Brunson, Dantas, Le Masurier, Wilkinson, & Vargo, 2008). Linnenluecke et al. (2012) also

suggest that it is important to cover both perspectives of organizational resilience in one organizational resilience study because it can provide an insight into how these two types of organizational resilience are related in different sectors or contexts. In this study, organizational resilience is defined in terms of proactive organizational resilience and reactive organizational resilience.

2.3 Dimensions of Organizational Resilience

2.3.1 Proactive Organizational Resilience

Proactive organizational resilience refers to identifying potential risks and taking proactive steps in order to ensure an organization will survive and thrive in an adverse situation in the future (Longstaff, 2005; Somers, 2009). Lovins and Lovins (1982) state that proactive resilience refers to deliberate efforts that make organizations better able to deal with unpredicted disruptions in the future. Moreover, Lee, Vargo, & Seville (2013) argue that proactive resilience primarily refers to a strategic or behavioural readiness for reacting to future environmental crises. Bode and Macdonald (2016) also state that readiness is the core aspect of proactive resilience that enables organizations to effectively and efficiently cope with potential threats in the future.

Generally, readiness includes four aspects: awareness of potential disruptions, self-assessment for potential impacts of disruptions, self-improvement for prevention capabilities, and engagement of planning for preparing for emergency situations (Bode & Macdonald, 2016). According to McManus et al. (2008), situation awareness enhances understanding of factors that trigger disruptions, limitations of both internal and external resources, and the minimum requirements of operation that can enhance the efficiency and effectiveness of decision-making and performance (Endsley, Bolte, & Jones, 2003). Marcus and Nichols (1999), and Choo (2008) also argue that the ability to be aware of, and detect drifts toward failure or weak signals which precede a disaster, is crucial for organizations to enhance their resilience. In addition, Langer (1989) states that alert awareness of disruptions can help organizations to quickly

identify and effectively deal with issues.

Moreover, Bode and Macdonald (2016) argue that the processes of self-assessment and environmental assessment for potential impacts of disruptions, and self-improvement for prevention capabilities, can enhance the effectiveness and capability of response to potential disruptions as they manifest themselves. According to McManus et al. (2008), self-assessment refers to assessing organizational vulnerability that has the strongest impact on organizations in face of crises, such as disruptions of infrastructure, supply chain problems, operational difficulties, and financial difficulties prior to disruptive events (Chang & Falit-Baiamonte, 2002). Weick and Sutcliffe (2007) also argue that the ability of questioning assumptions about organizational environments, and identifying organizations' weaknesses is critical for building resilient organizations. In addition, Linnenluecke et al. (2012) argue that organizations can enhance their resilience by reducing their vulnerability. Certain resources and capabilities can reduce organizational vulnerability, and enhance resilience (Linnenluecke et al., 2012). For example, a decentralized workforce, backup facilities, and physical dispersion of assets can reduce physical disruptions in the face of natural disasters (Allenby & Roitz, 2005). Slack resources can enhance organizational flexibility and capabilities for response to crises (Meyer, 1982; Nohria & Gulati, 1996). In addition, Coutu (2002), Linnenluecke and Griffiths (2010), Woods and Wreathall (2008) further argue that resilient organizations often focus on improving themselves through developing new capabilities in order to enhance their ability to cope with potential disruptions in the future. The objective is to build resilience by maximizing organizational capacities to adapt to future adverse situations (Lengnick-Hall & Beck, 2005). Proactive organizational resilience in the form of readiness is about continuous anticipation and adjustment that enable organizations to have proper capacities before the needs become evident (Hamel & Valikangas, 2003).

Furthermore, organizations should have strategies/plans to manage organizational

vulnerabilities before they experience extreme disruptions (Lee et al., 2013; McManus et al., 2008). Effectively setting and implementing plans before experiencing disruptions is important for mitigating disruptions (Tang, 2006; Zsidisin & Smith, 2005). Organizations are able to enhance their resilience by creating plans for responding to crises, and diminishing identifiable vulnerabilities (Engemann & Henderson, 2011). In addition, organizations need to make investments and take actions before they are needed to ensure that organizations can benefit from emerging adverse situations (Lengnick-Hall et al., 2011).

Strategic and/or behavioural readiness makes organizations more agile and resourceful so that they are able to create a reservoir of options and a wide range of future responsive behaviours to ensure their intuitive, initial reactions to any uncertain situation are effective (Ferrier, Smith, & Grimm, 1999). In addition, Sawalha (2015) argues that mature organizations, such as IBM, prefer more proactive resilience than reactive resilience. IBM integrates risk management, business continuity management, market readiness, security and data protection in business strategies and practice, in order to mitigate potential risks, and to be proactively resilient (Sawalha, 2015). However, smaller organizations are less likely to be aware of the necessity of risk management, and less likely to possess adequate resources (McGuinness & Johnson, 2014). Adequate resources that help organizations to respond and cope in unpredicted external crises, and establish certain plans or strategies to manage organizational vulnerabilities (McManus, 2008; McGuinness & Johnson, 2014). Bode and Macdonald (2016) also argue that information processing is a key characteristic in the state of readiness that enhances organizations' ability to be prepared for disruptions, to provide activities to spread awareness of crises to employees, environmental assessment, decision-making, and implementation of crises mitigation plans.

2.3.2 Reactive Organizational Resilience

Organizational resilience is often defined in passive terms (Somers, 2009). This refers to actions towards adaptive approaches in order to ensure operational continuity

during crises (Somers, 2009). In the perspective of reactive resilience, organizational resilience is characterized as the organizational capacity to deal with unanticipated crises after they have become obvious (Wildavsky, 1989). In addition, reactive organizational resilience is closely related to operational losses and time of reaction and recovery (Bruneau & Reinhorn, 2007). Operational losses primarily refer to internal incidents (e.g. malfunctions, system failures, and personnel disease) and supply chain incidents (Sahebjamnia et al., 2018). Time of reaction and recovery refers to the required time for initial reactions to disruptions based on their business continuity plan, and restoration of disrupted functions through their recovery plans (Sahebjamnia et al., 2018).

Generally, reactive organizational resilience mainly covers response and recovery efforts of an organization (e.g. Kimberlin, Schwartz, & Austin, 2011; Lengnick-Hall et al., 2011; Linnenluecke et al., 2012; Seville et al., 2008). For example, Lovins and Lovins (1982), and Somers (2009) state that resilient organizations are able to return to or bounce back to their original shapes or conditions after experiencing external extreme events. This definition is relevant to the notion of recovery after crises. Seville et al. (2008) also state that reactive organizational resilience is the ability of an organization to survive and potentially even thrive in the period of crisis. This definition is relevant to notions of recovery and growth after crises (Hall et al., 2018). According to Griffiths (2010), and Lengnick-Hall et al. (2011), reactive organizational resilience is the capability to effectively and efficiently respond to external disruptions, and quickly recover to an organization's pre-impact state after experiencing external extreme impacts. In addition, Burnard and Bhamra (2011), and Linnenluecke et al. (2012) argue that studies of reactive organizational resilience are often based on notions of response and recovery. In this study, the definition of reactive organizational resilience is based on response and recovery efforts.

The reactive resilience capability refers to a series of organizations' reactive actions (Lengnick-Hall & Beck, 2003). These reactive actions are taken after external

disasters that enable organizations to survive when they suffer from negative impacts of the extreme crises (Bode & Macdonald, 2016; Linnenluecke & Griffiths, 2010; Smith, 2001), and enable organizations to bounce back and rebuild themselves in an adverse situation (Lengnick-Hall et al., 2011). These reactive actions generally refer to – quick recognition of disruptions, quick gathering and diagnosis of information about disruptions, quickly developing a set of reactions to these disruptions, and quickly implementing responses to these disruptions (Bode & Macdonald, 2016). These actions directly influence the efficiency and effectiveness of organizations' reactive strategies and actions to deal with disruptions (Burnard & Bhamra, 2011; Bode & Macdonald, 2016; Milliken, 1987; Papadakis, Kaloghirou & Iatrelli, 1999). The reactive actions to quickly organize a formal team for response to disruptions and recovery, to quickly set an effective communication strategy, to successfully cope in emerging disruptions, and to take immediate responses to mitigate the impacts of crises, despite the short-term costs are also important and tightly related to reactive organizational resilience (Pettit, Croxton & Fiksel, 2013).

According to Burnard and Bhamra (2011), Sutcliffe and Vogus (2003), resilient organizations are able to take suitable actions and make appropriate adjustments to react to issues that have been identified. Access to a variety of information is vital for an organization to be aware of, and identify both internal and external opportunities and crises that help an organization to make appropriate decisions for coping in external disasters (Burnard & Bhamra, 2011; Coiere, 2007). Hollnagel, Nemeth, and Dekker (2008) also state that the ability of flexibly monitoring what is going on is crucial for taking proper reactive actions to disruptions. Continuous environmental scanning and assessing can also reduce the time of recognition of crises, and increase the chance of noticing early warning signals (Bode & Macdonald, 2016; Melnyk, Zobel, Macdonald & Griffis, 2014). In addition, organizations should also be able to quickly collect and interpret relevant additional information, which is vital for deciding responsive actions quickly, and reducing the impact of disruptions (Bode & Macdonald, 2016). The ability of accurately diagnosing the information helps

organizations to understand overall situations, which improves the accuracy of decisions about reactions (Dubrovski, 2004; Endsley et al., 2003).

Moreover, quickly developing and implementing possible reactions can reduce the level of impact of disruptions (Bode & Macdonald, 2016). It is important to act quickly when responding to any disruptions (Galbraith, 1977), especially gathering relevant information for decision-making because delay in processing information will delay the firm's response, and it will further delay recovery activities (Bode & Macdonald, 2016). A higher level of available information can speed up the process of decision-making that reduces the impact of disruptions on organizations (Bode & Macdonald, 2016).

Reactive organizational resilience is also determined by the flexibility of organizations (Burnard & Bhamra, 2011; Johnson et al., 2013; Sheffi, 2007). Organizational flexibility enables them to react to external crises quickly and effectively (Sheffi, 2007). Hatum and Pettigrew (2006) state that decentralized decision-making, low level of formalization, and a high degree of collaboration between organizations enhance organizational flexibility. Slack resources are also vital for reactive organizational resilience (Linnenluecke et al., 2012; Meyer, 1982; Nohria & Gulati, 1996; Pettit, Fiksel & Croxton, 2010). Organizations would have a higher level of flexibility and capability to resist emergent events if they own adequate resources (Nohria & Gulati, 1996), such as financial resources, physical resources and social capital (Gittell, Cameron, Lim, & Rivas, 2006; McManus et al., 2008; Linnenluecke et al., 2012; Sawalha, 2015). After disruptions, organizations become more resource dependent on their partners who provide diversified external resources (Bode, Wagner, Petersen & Ellram, 2011). As part of the external resources, Bode et al. (2011), Carroll (1993), and Emerson (1962) suggest that high quality exchange relationships can influence organizations' reactions to disruptions by achieving both efficient information processing (Galbraith, 1977), and slack resources (Tang, 2006).

On the other hand, reactive organizational resilience capability is also influenced by organizational patterns (Hoffi-Hofstetter & Mannheim, 1999). Mechanistic patterns major on formalization and centralization that can limit employees` creativity, increase alienation of employees, and exit behaviours (Morris and Steers, 1980). Alternatively, organic patterns facilitate open communication and collaborative behaviours, enhance mutual trust, involvement, group cohesion, and quality of decisions (Gilmore & Hirschhorn, 1983). Under conditions of uncertainty, instability and threat, organic organizations are more likely to succeed in organizational restoration through a high level of employee involvement and engagement (Beer, Eisenstadt & Spector, 1990).

Hoffi-Hofstetter and Mannheim (1999), and Murphy (2008) argue that leadership which directly influences the implementation of relevant strategies, is also crucial for reactive organizational resilience. Leaders should be highly involved in organizations` actions in order to ensure employees are organizationally committed, and positively participating in organizational activities (Hoffi-Hofstetter & Mannheim, 1999; Mannheim, 1984). Leaders` positive response to every individual organizational member is crucial for reactive resilience capability (Latack & Dozier, 1986). Leaders` sensitivity to employees` needs, supportiveness (Armstrong-Stassen, 1994), and effective responses to frustrated and dissatisfied employees (Withey & Cooper, 1989) facilitate employees` positive responses to organizational coping activities. However, lack of consideration of employees` needs can cause disengagement and poor performance of employees with coping activities (Nilakant, Walker, van Heugten, Baird, & de Vries, 2014). On the other hand, self-esteem of leaders is important for managing organizational coping activities (Hoffi-Hofstetter & Mannheim, 1999). According to Ashford (1988), self-esteem is a personal disposition that has a strong influence on an individual`s coping behaviour in times of stress. Individuals with high self-esteem will present a high level of willingness to invest efforts in an organization, and strong belief in their ability to manage and improve the organization (Ashford,

1988). Leaders with a high level of self-esteem are more able to manage organizational coping activities (Hoffi-Hofstetter & Mannheim, 1999) which positively influence reactive organizational resilience.

2.4 Social Capital

As mentioned, organizations' resilience capability is constrained by several factors, such as availability of information and resources, human resources, and good exchange relationships (Bode et al., 2011). Especially after disruptions, organizations become more resource dependent on their partners as they provide diversified external resources (Bode et al., 2011). Therefore, to rapidly access valuable information and various resources is important for building and enhancing organizations' resilience capability (Bode & Macdonald, 2016; McGuinness & Johnson, 2014). Additionally, slack resources enable organizations to take a wide range of feasible actions (Judge, Fryxell & Dooley, 1997), to be flexible and capable of coping with disruptions (Linnenluecke et al., 2012).

Social capital can be the source of necessary resources that help organizations to become resilient by achieving a high level of resourcefulness, flexibility, and problem-solving capacity (Johnson et al., 2013; McGuinness & Johnson, 2014). Johnson et al. (2013) also state that social capital enhances organizations' resilience capability by strengthening buyer–supplier relationships, promoting information and knowledge transfer and resources exchange, which enables organizations to access necessary information and resources quickly. Thus, social capital is important for achieving organizational resilience.

2.5 Definitions of Social Capital

Social capital has been defined in different ways based on its emphasis on the sources, the substance, or the effects of social capital (Adler & Kwon, 2002). Such variation in defining social capital is also based on its emphasis on relations between actors, or the structure of relations between actors within a social network, or both types of

connections (Adler & Kwon, 2002). Adler and Kwon (2002) argue that these different definitions of social capital can be classified into three groups (see Table 3). The first group is known as bridging views of social capital. According to this, social capital is viewed as resources that are embedded within a social group (Adler & Kwon, 2002). Social capital is explained as an external factor that facilitates and supports individual and organizational activities by the direct and indirect connections among social actors (Adler & Kwon, 2002). According to Bourdieu (1985), social capital is the sum of the actual or potential resources that can be accessed through a network of institutionalized relationships of mutual recognition or acquaintance. Social capital consists of both the network and the resources that can be mobilized through the network (Bourdieu, 1985). In addition, Baker (1990) defined social capital as resources that can be obtained from specific social structure, and these resources can be used for achieving their interests. According to Burt (1992), this viewpoint of social capital is associated with the egocentric variant of network analysis.

The second group defines social capital from a bonding views perspective. According to this view, social capital focuses on internal features that influence the collectivity cohesiveness between actors and facilitate the pursuit of collective goals (Adler & Kwon, 2002). For example, Coleman (1990) defined social capital as a variety of different entities within the structure which have specific characteristics that facilitate certain actions. Putnam (1995) suggests that social capital is about features of social organizations that facilitate coordination and cooperation for mutual benefit, such as networks, social trust and norms. According to Sandefur and Laumann (1998), this viewpoint of social capital is associated with the sociocentric variant of network analysis.

The third group focuses on both internal and external dimensions of social capital (Adler & Kwon, 2002). Social capital definitions in this group have many advantages compared with previous two groups (Adler & Kwon, 2002). For example, social capital definitions available in this group have a broader perspective compared to both

internal and external perspective (Adler & Kwon, 2002). The most competitive and widely accepted definition in this group is provided by Nahapiet and Ghoshal (1998, p. 243). According to them, social capital is defined as the “aggregate of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (Nahapiet & Ghoshal, 1998, p. 243). A similar notion also echoed by Adler and Kwon (2002) who define social capital as the relationships or links between individuals and organizations that facilitate collaborative actions and value creation through flow of resources, influence and solidarity. Therefore, social capital is an internal and external resource for an organization. This study mainly focuses on social capital that focuses on both internal and external aspects.

Table 3.

Definitions of Social Capital

	Authors	Definitions of social capital
Bridging	Baker (1990, p. 619).	“a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors.”
	Belliveau, O’Reilly, & Wade (1996, p. 1572).	“an individual’s personal network and elite institutional affiliation.”
	Bourdieu (1985, p. 248; 1985, p. 243).	“the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition.”
		“made up of social obligations (‘connections’), which is convertible, in certain conditions, into economic capital and

		may be institutionalized in the form of a title of nobility.”
	Bourdieu & Wacquant (1992, p. 119).	“the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition.”
	Boxman, De Graaf, & Flap (1991, p. 52).	“the number of people who can be expected to provide support and the resources those people have at their disposal.”
	Burt (1992, p. 9; 1997b, p. 355).	“friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital.”
		“the brokerage opportunities in a network.”
	Knoke (1999, p. 18).	“the process by which social actors create and mobilize their network connections within and between organizations to gain access to other social actors’ resources.”
	Portes (1998, p. 6).	“the ability of actors to secure benefit by virtue of membership in social networks or other social structures.”
Bonding	Brehm & Rahn (1997, p. 999).	“the web of cooperative relationships between citizens that facilitate resolution of collective action problems.”
	Coleman (1990, p. 302).	“Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of

		individuals who are within the structure.”
	Fukuyama (1995, p. 10; 1997).	“the ability of people to work together for common purposes in groups and organizations.”
		“Social capital can be defined simply as the existence of a certain set of informal values or norms shared among members of a group that permit cooperation among them.”
	Inglehart (1997, p. 188).	“a culture of trust and tolerance, in which extensive networks of voluntary associations emerge.”
	Portes & Sensenbrenner (1993, p. 1323).	“those expectations for action within a collectivity that affect the economic goals and goal-seeking behavior of its member, even if these expectations are not oriented toward the economic sphere.”
	Putnam (1995, p. 67).	“features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.”
	Thomas (1996, p. 11).	“those voluntary means and processes developed within civil society which promote development for the collective whole.”
Both bridging and bonding	Loury (1992, p. 100).	“naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued in the marketplace...an asset which may be as significant as financial bequests in accounting for the maintenance of inequality in our society.”
	Nahapiet & Ghoshal (1998, p. 243).	“the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that

		may be mobilized through that network.”
	Pennar (1997, p. 154).	“the web of social relationships that influences individual behavior and thereby affects economic growth.”
	Schiff (1992, p. 160).	“the set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function.”
	Woolcock (1998, p. 153).	“the information, trust, and norms of reciprocity inhering in one`s social network.”

Note. Adapted from Adler and Kwon, (2002, p. 20).

The definition of social capital provided by Nahapiet and Ghoshal (1998) is widely accepted and used in many studies (e.g. Carey, Lawson, & Krause, 2011; Johnson, Elliott, & Drake, 2013; Jonsson & Lindbergh, 2013; Mahajan & Benson, 2013; Prasad, Su, Altay, & Tata, 2014; Villena, Revilla, & Choi, 2011). Nahapiet and Ghoshal (1998) categorized social capital into three distinct but interrelated dimensions: structural social capital, relational social capital, and cognitive social capital. This study uses these three dimensions to describe social capital between firms and supply chain partners. In two recent studies, Johnson et al. (2013), and Prasad et al. (2014) further argue that these three dimensions of social capital are useful for building organizational resilience. A brief description of these three dimensions of social capital is provided in the following three sections.

2.5.1 Structural Capital

Structural capital refers to the impersonal linkage and configuration within social networks (Nahapiet & Ghoshal, 1998). It focuses on social networks that provide access to network members and relevant resources (Burt, 1992; Nahapiet & Ghoshal, 1998). Access refers to gaining valuable resources, knowing who are able to use these

resources, and who are able to provide resources for members with networks (Nahapiet & Ghoshal, 1998). Structural capital in the form of social interactions facilitates social exchange (Villena, Revilla & Choi, 2011). It explains the overall pattern of connections between participants, that is, who you reach and how you reach them (Burt, 1992). It is considered to be the foundation of social capital as it provides access to network members and resources (Nahapiet & Ghoshal, 1998; Yu, 2013). Yu (2013) believes that characteristics, features, or resources endowments of structural capital are defined by the type of members within a specific network that could influence firms` capability through flow of information, knowledge and resource. Scott (1991) also mentions that who is involved in network ties is also an important aspect of the structural capital.

Firms can potentially obtain benefits from their structural capital (Chrisholm & Nielsen, 2009). Specifically, structural capital in terms of inter-firm networks, acts as channels that help firms to funnel available external information and resources into firms (Ellis, 2010). This valuable information and resources are useful to improve managerial skills, capabilities, and market knowledge (Kale, Singh, & Perlmutter, 2000). High quality structural capital influences the efficiency and effectiveness of access to resources (Burt, 1992; Tsai & Ghoshal, 1998; Villena et al., 2011), and has important implications for the success of firms (Nahapiet & Ghoshal, 1998). On the other hand, structural capital in terms of network ties between firms, helps participants to exploit unidentified opportunities (Burt, 1992; Walter, Auer, & Ritter, 2006). Nahapiet and Ghoshal (1998) mention that structural capital provides firms with an opportunity to combine and exchange resources. In addition, flow of valuable resources is not only about possibilities, but also about frequent opportunities that are associated with reputational endorsements which influence the motivation for exchanging resources (Granovetter, 1973; Putnam, 1993). However, Nahapiet and Ghoshal (1998) argue that reputational endorsement relates to the relational factor more than the structural factor.

In order to achieve and maintain high quality structural capital, firms should be able to maintain a close social relationship with their supply chain partners (Tsai & Ghoshal, 1998; Yli-Renko, Autio & Sapienza, 2001), such as maintaining frequent communications with their supply chain partner (Tsai & Ghoshal, 1998; Villena et al., 2011). Firms should also promote interactions across different levels and functions within firms and between supply chain partners (Villena et al., 2011). More frequent communications and interactions enhance the efficiency and effectiveness of resource exchange (Villena et al., 2011).

Structural capital in term of network ties that are created for one purpose, might be used for other purposes (Coleman, 1988; Putnam, 1993). According to Nahapiet and Ghoshal (1998), structural capital that developed in one situation can be transferred to another, which provides potential access to other actors and resources. It provides access to viable alternatives that are especially important in adverse situations (Johnson et al., 2013).

2.5.2 Relational Capital

Relational capital mainly focuses on the quality or strength of relationships between actors characterized by trust, respect, obligation, reciprocity and friendship (Moran, 2005; Tsai & Ghoshal, 1998; Villena et al., 2011). It is developed through previous interactions between participants (Granovetter, 1992). Within a social network, participants' behaviours are influenced by their relationships, such as friendship and respect (Nahapiet & Ghoshal, 1998). People are more willing to engage in cooperative interactions if the quality of relationship between participants is high, such as relying on each other and sharing resources (Lee, Wong, & Chong, 2005). Relational capital enhances the willingness of individuals to collaborate, and commit to relationships (Leana & Van Buren, III, 1999). It not only enhances participants' cooperative behaviours, but also reduces partners' probability of withholding potentially relevant information and resource (Villena et al., 2011).

Trust is one of the key elements of relational capital (Coleman, 1990; Inkpen & Tsang, 2005). Trust refers to a willingness to be vulnerable to other parties (Mishra, 1996) demonstrating: belief in good intention and concerns of other members (Ring & Van de Ven, 1994), confidence in their reliability (Giddens, 1990), capability and competence (Szulanski, 1996), and openness (Ouchi, 1981). Trustworthiness is built through repeated interactions within networks that may enhance the willingness to engage in more transparent behaviours and open communications (Villena et al., 2011), and being less concerned about the opportunistic behaviour of other participants (Blau, 1964).

Specifically, relational capital in term of trust facilitates the flow of information and other resources (Gulati, 1998; Johnson et al., 2013). Individuals are more willing to engage in social exchange and collaborative interactions when the level of trust is high in the relationships (Fukuyama, 1995; Misztal, 1996; Putnam, 1993). Ring and Van de Ven (1992) also mention that individual members are more willing to take risks when the level of trust is high in the relationship. For example, organizations` specific information may be shared with partners when these partners have trust towards each other (Blomqvist, Hurmelinna & Seppanen, 2005). A high level of trust increases the probability of a system which is able to cope with complexity (Luhmann, 1979).

Relational capital in the form of trustworthiness, respect, friendship and reciprocity is developed through repeated interactions that create mutual confidence and a sense of security for participants when exposing their vulnerability (Kale, Singh & Perlmutter, 2000; Villena et al., 2011). For example, cross-functional teams, and supply chain partners are more willing to share their own resources, information and experiences with others if their relationships are trustworthy, friendly, respectful, and reciprocal (Carey, Lawson & Krause, 2011). In addition, trustworthy and reciprocal relationships within and between organizations can also generate benefits for these organizations, such as lower operational costs, better new process and product design,

and a shorter time of product development cycle (Carey et al., 2011).

2.5.3 Cognitive Capital

Cognitive capital refers to the resources that provide shared representations, interpretations, and systems of meaning that exists between participants (Cicourel, 1973). Nahapiet and Ghoshal (1998) also state that the cognitive capital should be identified separately because it is significantly associated with strategy domain that is vital for any organization. The key elements of cognitive capital are shared vision, value, ambitions and goals; similar cultures and managerial style; and compatible philosophies with supply chain partners (Carey, Lawson & Krause, 2011; Inkpen & Tsang, 2005; Tsai & Ghoshal, 1998; Villane et al., 2011).

Cognitive capital provides the basis for interactions that facilitate common understanding, flow of resources, and collaboration both within and between organizations (Johnson et al., 2013). It facilitates communication and mutual understanding (Inkpen & Tsang, 2005). Deeper understanding of the reason and meaning of the existing relationship enables participants to achieve their compatible goals (Villane et al., 2011). Compatible goals refer to different parties having a common understanding and method for achieving common outcomes (Villena et al., 2011), and they are able to reduce the possibility of conflict (Jap, 1999). Such compatible goals can also guide the direction and nature of the efforts of participants (Jap & Anderson, 2003), and improve the performance of tasks by enhancing their perception of the importance of a synergistic relationship (Tsai & Ghoshal, 1998). Cognitive capital in the form of shared meaning is helpful for coordination among social networks (Handfield, Ragatz, Petersen & Monczka, 1999). In addition, cognitive capital in terms of shared cultures, enables individuals to behave in a favourable way that supports collective efforts and interests (Coleman, 1988). Shared culture is defined as behavioural norms that command relationships (Villena et al., 2011). Shared culture and congruent goals are able to provide a shared vision that enhances participants' understanding of behavioural norms within a relationship

(Villena et al., 2011). Congruent goals and values facilitate interactions that result in a self-reinforcing process of sense making and shared understanding (Wick, 1995). Congruent goals provide shared ambitions and vision among social networks that facilitate understanding of behavioural norms, and collective behaviours (Tsai & Ghoshal, 1998; Villane et al., 2011). In addition, similar business philosophies facilitate negotiation between organizations, and the establishment of common goals (Villena et al., 2011).

2.6 Hypotheses Development

2.6.1 Relationship across the dimensions of social capital

2.6.1.1 Structural capital and cognitive capital

Structural capital in the form of social interactions plays an important role in developing cognitive capital (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). In business, different parties or partners may have different goals. Social interactions and frequent communications may facilitate collective orientation that enables different actors to have enthusiasm for pursuing collective goals (Tsai & Ghoshal, 1998; Villiena et al., 2011). It also helps individuals to share their thoughts, and learn organizational values (Van Maanen & Schein, 1979). Actors also realize and adopt values, codes, practices and languages of their organizations during the process of interaction (Tsai & Ghoshal, 1998). Moreover, during the process of interaction, new visions or values may be created based on their mutual understandings and common interests (Tsai & Ghoshal, 1998). Based on the above arguments, the following hypothesis can be proposed.

Hypothesis 1: A firm`s structural capital has a positive impact on its cognitive capital.

2.6.1.2 Structural capital and relational capital

Relational capital in the form of friendship, obligations, respect and trust is built through repeated interactions (Villiena et al., 2011). For example, trustworthiness is

developed through social interactions (Gulati, 1995). Organizations build up their trustworthiness through direct experiences with their partners (Granovetter, 1985). It also can be established by interacting with partners over time (Gabarro, 1978). Particularly, Yu, Liao and Lin (2006) argue that social ties with supply chain partners (i.e. suppliers and customers) provide the access to information and resources, which ultimately provide opportunity, motivation and time to strengthen the relationship. Moreover, close and frequent social interactions and communications enable actors to know each other, to exchange information with others, and to build common viewpoints (Tsai & Ghoshal, 1998). Carey et al. (2011) also argue that network ties facilitate social interactions that enable organizations to personally assess the commitment and trustworthiness of their supply chain partners. Based on these arguments, the following hypothesis can be proposed.

Hypothesis 2: A firm's structural capital has a positive impact on its relational capital.

2.6.1.3 Cognitive capital and relational capital

Relational capital based on trustworthy relationship is started with common values and goals that bring different social actors together (Barber, 1983). Common values create harmony of interests that can reduce the chance of opportunistic behaviours during interaction (Ouchi, 1980). Particularly, Adler and Kwon (2000) mentioned that actors are not able to behave and act properly and accurately if they cannot understand each other. In this regard, Nahapiet and Ghoshal (1998) argue that shared values and beliefs, and adherence to reciprocal norms may breed trust between actors. Firms are able to understand their partners deeply if they share their values and ambitions, have similar organizational cultures and compatible philosophies, and pursue collective goals (Carey et al., 2011; Tsai & Ghoshal, 1998; Villena et al., 2011). Lack of understanding may cause misinterpretation of each other that can influence their relationships negatively (Inkpen and Tsang, 2005). The above theoretic underpinning suggests that cognitive capital supports and enhances relational capital.

Based on this the following hypothesis can be proposed.

Hypothesis 3: A firm`s cognitive capital has a positive impact on its relational capital.

2.6.2 Relationship between social capital and organizational resilience

Organizational resilience requires a variety of resources to overcome the consequence of any disruptive event (Sahebjamnia, Torabi, & Mansouri, 2018). Resilient organizations should be able to keep their critical functions in operating/active mode after disruptive events by not only using available internal resources (e.g. personnel, facilities, raw materials, information and data) (Sahebjamnia et al., 2018) but also external resources efficiently and effectively (Lengnick-Hall et al., 2011). Such effective and efficient use of resources is necessary for achieving business continuity, and implementing recovery plans successfully (Ates & Bititci, 2011; Boin & van Eeten, 2013). This study mainly focuses on external resources that play a key role in building organizational resilience. Among the key external resources, the relationship with business partners plays the most influential role in overcoming the negative consequences of any disruptive events (Prasad et al., 2014). In this regard, social capital is considered to be a valuable external resource that can help a firm to build its resilience capacity. McGuinness and Johnson (2014), Prasad et al. (2014) argue that social capital tightly relates to organizational resilience, which enables firms to access a variety of valuable resources rapidly in adverse situations. Lengnick-Hall et al. (2011) also state that social capital can be the foundation of the ability of organizations to respond and cope with uncertain external disruptions.

2.6.2.1 Structural capital and organizational resilience

Structural capital in the form of social interactions provides certain benefits to organizations, such as information and resources (Tsai & Ghoshal, 1998). In the context of a disruptive event, Prasad et al. (2014) mentioned that the flow of information and resources is usually disrupted, and has a negative impact on an

organization's normal operations. During such disruption, access to valuable information and resources is critically important for mitigating the negative consequence (Burt, 1992). Organizations are more likely to obtain such valuable information and resources if they maintain a strong structural capital (Burt, 1992; Napapiet & Ghoshal, 1998). According to Larson (1992), social interactions mature and develop over time. More frequent, deeper and wider communication and interaction strengthens the relationship between organizations, thus providing access to reliable and diversified information and resources, and understanding of key information (Capaldo, 2007; Tsai & Ghoshal, 1998; Yli-Renko, Autio & Sapienza, 2001). Organizations with strong and diversified structural capital are flexible enough to move to alternative networks that have not been disrupted by external crises, thus enabling organizations to plan and implement coping strategies (Prasad et al., 2014). This helps organizations to enhance their reactive resilience through facilitated planning of coping strategies, and activities to overcome the external crises (Prasad et al., 2014). Particularly, diversified and adequate information is especially important for firms' proactive resilience capability, which enables organizations to be aware of and detect potential disruptive situations before experiencing them. Organizations can also recognize potential opportunities and threats during crises that help them to set specific strategies for crises prevention and response (Bode & Macdonald, 2016). In addition, Prasad et al. (2014) mention that structural capital ensures good quality of information and resources that enable continuity of organizational operations, and enhance organizational resilience. Multiple connections and dense interactions at both individual level and organizational level ensure participants within social networks obtain and exchange more diversified resources and reliable information (Capaldo, 2007). Furthermore, strong and dense structural capital influences the speed of transfer of information and other resources (Bode & Macdonald, 2016; Johnson et al., 2013) that influence the effectiveness and efficiency of planning, responding and recovering activities (Kimberlin et al., 2011; Linnenluecke et al., 2012), which are crucial for enhancing firms' proactive and reactive resilience capabilities (Bode & Macdonald, 2016). Villena et al. (2011) also state that strong structural capital reflects

frequent interactions at different levels/different functions within an organization and with supply chain partners that can make the information and resources become more readily accessible and immediately available, the ability of early awareness of potential disruptions is enhanced, and strategic implementation for coping with disruptions is facilitated (Bode & Macdonald, 2016). This strengthens the firms' proactive and reactive resilience capabilities through the enhanced ability to be aware early of potential disruptions, and to facilitate strategic implementation for coping with disruptions (Bode & Macdonald, 2016). On the other hand, structural capital that is created for one purpose, might be used for other purposes and this, may enhance reactive organizational resilience through flexible and quick access to alternative information and resources in the face of disruptive events (Johnson et al., 2013). Based on these theoretical arguments, the following hypotheses are proposed.

Hypothesis 4: A firm's structural capital has a positive impact on its proactive organizational resilience capability.

Hypothesis 5: A firm's structural capital has a positive impact on its reactive organizational resilience capability.

2.6.2.2 Cognitive capital and organizational resilience

Cognitive capital has a positive influence on both proactive and reactive organizational resilience through enhancing the capability of constantly managing potential failure in different situations (Prasad et al., 2014). Cognitive capital enhances the willingness of network members to participate in activities of building and enhancing proactive and reactive organizational resilience through shared common vision, value, purpose and goals (Lengnick-Hall et al., 2011). Cognitive capital in the form of compatible goals and values between partners bring and keep them together (Barber, 1983). Such common goals and values enhance connectivity cognitively and emotionally between organizations through building strong organizational identification (Rousseau, 1998). Strong identification among network members enables a positive and constructive cognitive orientation, and gives a sense

of direction during external crises (Collins & Porras, 1994), which strengthens reactive organizational resilience through encouraging network members to take actions to move forward in the face of unfavourable situations (Dutton & Jackson, 1987). Prasad et al. (2014) also mentioned that cognitive capital can filter information to understand a phenomenon that influence a manager`s view of a situation, and directs an organization`s reactions, which are especially important for building and enhancing proactive and reactive organizational resilience (Bode & Macdonald, 2016; Pettit et al., 2013). In addition, Coutu (2002), and Sutcliffe and Vogus (2003) argue that strong core values associated with a sense of common purpose and identification, improve proactive and reactive organizational resilience capabilities through enhancing the organization`s ability to solve problems. On the other hand, cognitive capital constructs meaning of real and potential disruptions, and makes a clear sense of direction that improves both proactive and reactive organizational resilience through enabling the organization to react to current and potential disruptions accurately (Lengnick-Hall et al., 2011). Moreover, cognitive capital ensures the organization can continuously consider and improve its expectation and perspectives on current functioning that enable it to be more proactively resilient when facing disruptions (Weick & Sutcliffe, 2007). Prasad et al. (2014) also mentioned that cognitive capital enhances proactive organizational resilience by creating a high level of awareness and attentiveness to potential disruptions that enable an organization to be prepared for potential disruptions. Based on these theoretical arguments, the following hypotheses are proposed.

Hypothesis 6: A firm`s cognitive capital has a positive impact on its proactive organizational resilience capability.

Hypothesis 7: A firm`s cognitive capital has a positive impact on its reactive organizational resilience capability.

2.6.2.3 Relational capital and organizational resilience

Relational capital enables organizations to access valuable information and resources

through social networks, especially during the period of crises (Prasad et al., 2014), which is important for achieving proactive and reactive organizational resilience (Bode & Macdonald, 2016). Particularly, relational capital in the forms of mutual trust and beneficial relations that are established over years, make firms and suppliers more likely to be cooperative, especially in the period of crises (Prasad et al., 2014), which facilitates information and resource exchange (Bode & Macdonald, 2016). This can strengthen firms` both proactive and reactive resilience capabilities (Bode & Macdonald, 2016). Johnson et al. (2013) also state that strong relational capital enhances both proactive and reactive organizational resilience through building open, reliable and flexible social networks. For example, relational capital in form of mutual trust ensures the willingness, confidence and flexibility of sharing information and resources between firms and their suppliers (Johnson et al., 2013) that enables firms to obtain valuable information and resources for implementing and improving coping strategies (Bode & Macdonald, 2016). Trust also facilitates rapid access to valuable information and resources (Johnson et al., 2013) which are especially important for building firms` reactive resilience capability (Bode & Macdonald, 2016). Relational capital in the form of mutual respect also enhances proactive and reactive organizational resilience through willingness to share tactic resources and information between partners, especially in adverse situations (Lengnick-Hall et al., 2011; Villena et a., 2011). Villena et al. (2011) also mentioned that relational capital in the form of trust, respect, friendship and reciprocity all facilitate exchange of information and resources between an organization and its partners, which has a positive influence on both proactive and reactive organizational resilience (Bode & Macdonald, 2016). Based on these theoretical arguments, the following hypotheses are proposed.

Hypothesis 8: A firm`s relational capital has a positive impact on its proactive organizational resilience capability.

Hypothesis 9: A firm`s relational capital has a positive impact on its reactive organizational resilience capability.

2.6.3 Proactive and reactive organizational resilience

Proactive organizational resilience is important for how an organization faces disruptions (Ponomarov & Holcomb, 2009). It helps to reduce the potentially negative impacts of disruptions, and enhances the organization's ability to respond and recover after experiencing crises (i.e. to build reactive organizational resilience) (Bode & Macdonald, 2016; Ponomarov & Holcomb, 2009). Proactive organizational resilience in the form of readiness is an antecedent of responsive activities to deal with disruptions (Bode & Macdonald, 2016). Particularly, readiness is a core competency for coping with disruptions which enables response and recovery efforts to be well-managed (Macdonald & Corsi, 2013; Van Wassenhove, 2006). Readiness refers to the process of self-assessment and preparation for potential disruptions that enables organizations to improve themselves, and enhances organizations' capability to cope with disruptions (Bode & Macdonald, 2016). Organizations' ability to create awareness and alertness for disruptions helps them to quickly detect errors, and handle these errors effectively (Langer, 1989). McManus et al. (2008) also mention that creating awareness of potential disruptions before experiencing them may contribute to organizations' emergency response to disruptions. On the other hand, proactively resilient organizations are more likely to be aware of potential threats, and to implement appropriate strategies for improving their prevention capabilities before facing disasters (Bode & Macdonald, 2016). These preparations contribute to organizations' capability to cope in disruptive situations (McManus et al., 2008). Organizations' ability for survival, and to respond to disruptions effectively and efficiently depends on how well they are prepared for crises (McManus et al., 2008). Furthermore, as proactive organizational resilience usually engages in strategic planning for future disruptions (Bode & Macdonald, 2016), it ensures their business continuity after disruptive events (Sawalha, 2015). Based on these theoretical arguments, the following hypothesis is proposed.

Hypothesis 10: A firm's proactive organizational resilience has a positive impact on its reactive organizational resilience.

2.6.4 Organizational resilience and business performance

In markets with sudden jolts, a firm maintains good performance through its proactive and reactive resilience capabilities which enable it to accurately analyze its environmental conditions, to recombine and deploy resources in new ways, and to take the most effective strategic posture (Lengnick-Hall et al., 2011; Sutcliffe & Vogus, 2003), such as alliances with supply chain partners, product innovation, and strategic decision-making (Eisenhardt & Martin, 2000). Specifically, a firm`s reactive resilience capability makes it flexible, agile, and dynamic, thus enabling it to take proper actions and undergo transformation in reaction to unanticipated disruptions in continuously evolving environments, which ensures a firm will outperform in markets (Lengnick-Hall et al., 2011). Wildavsky (1988) also mentioned that a firm`s proactive resilience capability enables it to outperform in markets by proactively improving its overall capability. In addition, a firm`s proactive and reactive resilience capabilities enable it to be more competitive under turbulent conditions through leveraging new resources (Lengnick-Hall et al., 2011), and reconfiguring ordinary routines (Sutcliffe & Vogus, 2003), such as creative problem-solving routines (Lengnick-Hall et al., 2011). Likewise, a firm`s proactive and reactive resilience capabilities contribute to dynamic capabilities and develop change strategies that enable it to take positive adjustments in dynamic competitive markets, which enhances its overall performance (Eisenhardt & Martin, 2000; Lengnick-Hall et al., 2011). Based on these theoretical arguments, the following hypotheses are proposed.

Hypothesis 11: A firm`s proactive organizational resilience has a positive impact on its business performance.

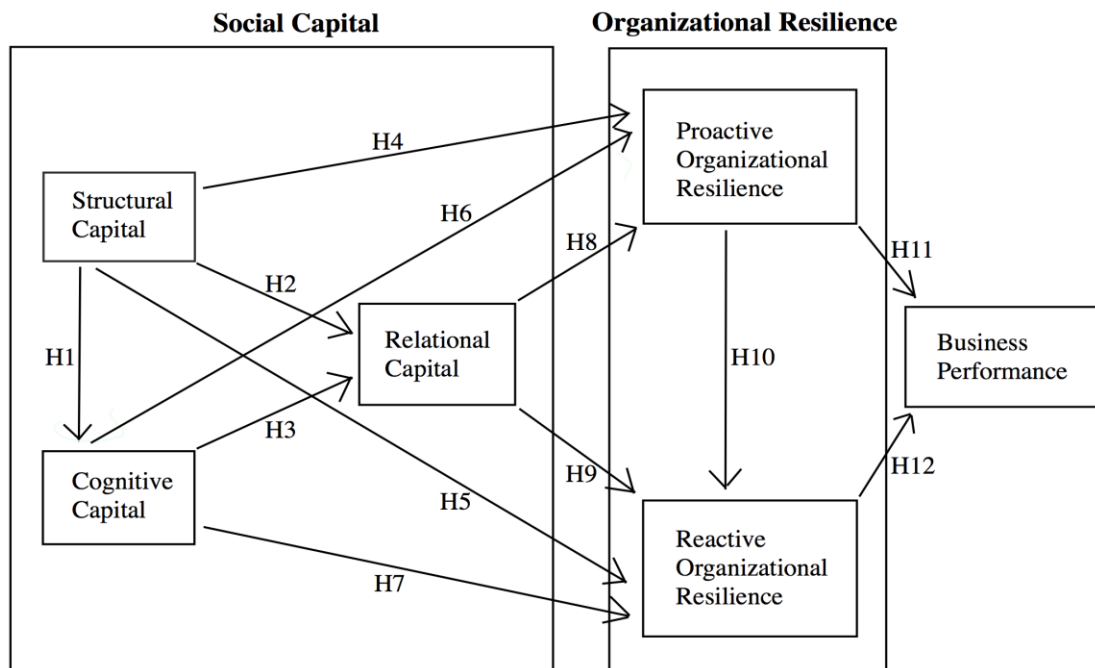
Hypothesis 12: A firm`s reactive organizational resilience has a positive impact on its business performance.

2.7 Proposed Model with Hypotheses

Bringing together the three dimensions of social capital, proactive and reactive

organizational resilience, and business performance provides a deeper perspective for exploring these three dimensions of social capital as important resources for building organizational resilience (Johnson et al., 2013). Figure 2 shows the summarized theoretical paths with the hypotheses, which provide a starting point for considering how each construct is related to others.

Figure 2: Theoretical Paths Model with Hypotheses



2.8 Research Gaps

This study satisfies three gaps in organizational resilience literature. Firstly, this study empirically measures the relationships between the three dimensions of social capital and organizational resilience in the context of post natural disasters. Then, this study formulated a holistic structural model for analyzing the relationships between social capital, organizational resilience, and business performance in various contexts.

2.9 Chapter Summary

This chapter explained organizational resilience based on both proactive and reactive perspectives, and three dimensions of social capital. It also provides insight into how

proactive and reactive organizational resilience capabilities are built, and how three dimensions of social capital, proactive and reactive resilience capabilities relate to organizations. Twelve hypotheses are developed based on the relationships between three dimensions of social capital, proactive and reactive organizational resilience, and business performance. Methodology will be explained in the next chapter that includes how data will be collected and analyzed.

Chapter 3: Methodology

3.1 Chapter Overview

This chapter starts with a justification of the quantitative research. This is followed by an outline of the survey design that gives details about the screening procedures and measurements of constructs in this study. Then the procedures of the pilot survey, sampling and data collection, and sample size requirement are summarized. This is followed by a discussion and justification of the use of an exploratory PLS-SEM, and a reflective model for data analysis. Finally, the methodology limitations are also summarized.

3.2 Research Design – Quantitative vs Qualitative Research

According to Barczak (2015), quantitative studies often use deductive approaches to identify a theory. Hypotheses are developed first based on relevant studies, then these hypotheses are tested with data (Barczak, 2015). In contrast, qualitative studies usually apply inductive approaches for advancing and building theory (Barczak, 2015). This study identifies the general relationships between three dimensions of social capital and organizational resilience, and the general relationships between organizational resilience and business performance based on previous studies. Quantitative research is usually considered as a way to analyze generalization of results that provide entire spectrums of situations (Watson, 2015). Quantitative research is tightly relevant to positivism, the philosophical concept that there is one truth or reality (Sim & Wright, 2000). Qualitative researches use narrative data to generate a theory or an understanding of a topic (Higgins & Green, 2008). This is based on interpretivism, the philosophical concept that there is not only one truth or reality (Higgins & Green, 2008). In the domain of social science, quantitative research is a way to objectively examine social phenomena or reality (Williams, 2007). The idea that a firm's social capital has influence on its resilience capability is a social phenomenon which may not be effectively generalized by using qualitative methods. Thus, this study is quantitative and deductive.

3.3 Survey Design

3.3.1 Screening Procedures

A survey was developed for collecting data and measuring constructs in the theoretical model. The theme of this study is organizational resilience, which focuses on the firm level, so participants who complete the surveys are especially important for the research. Many researchers state that participants who complete the surveys should be from organizations that have experienced disruptive incidents, in managerial positions, or the people who know the key information, as a result of being in a position of marketing, production, security, sales, procurement, risk management, or finance (e.g. Pettit et al., 2013; Voss, Tsikriktsis, & Mark, 2002). Only suitable people are able to provide the most reasonable answers based on their practical experiences. People who are in managerial positions would be the most familiar with the business and technical aspects of the survey (Mikalef & Pateli, 2017). In this study, participants need to be the people who work in a managerial position from an organization that was affected by the 2008 Sichuan (Wenchuan) earthquakes. Also, the organization needs to have survived the earthquakes, and have been operating at the time of the data collection. For these reasons, the questionnaire contains two specific types of screening questions to identify the right organizations, and right participants in the organization (Appendix 2). These screening questions are general questions that are normally asked in surveys focused on organizational behaviour. For example,

Question 1: Was this company affected by the 2008 Sichuan (Wenchuan) earthquakes?

Question 2: How many years has this business been operating?

These two questions identify whether the organization was suitable as a place for collecting data.

Question 3: How long have you been working for this organization?

Question 4: What is your current position in this organization?

These questions identify whether the participant is a suitable person for completing a

questionnaire.

3.3.2 Questionnaire Development

The measurements of variables are adapted from previous social capital and organizational resilience studies. The dimensions that comprise social capital are adapted measures of structural capital, cognitive capital, and relational capital as outlined in the literature (Carey et al., 2011; Tsai & Ghoshal, 1998; Villena et al., 2011; Yli-Renko et al., 2001). The dimensions that comprise organizational resilience are adapted measures of proactive and reactive organizational resilience from the literature (e.g. Bode & MacDonald, 2016; Pettit et al., 2013). All items were measured by applying seven-point Likert scales from 1= “Strongly Disagree” to 7= “Strongly Agree”, and this type of scale is commonly used in the domain of social capital and organizational resilience for quantitative research (e.g. Bode & MacDonald, 2016; Carey et al., 2011; Tsai & Ghoshal, 1998; Yli-Renko et al., 2001). Hair, Hult, Ringle and Sarstedt (2017, p. 9) also claim that a good Likert scale should be symmetrical for the measurement of latent variables.

3.3.2.1 Measurement Items of Social Capital

To measure social capital, scales were adapted from previous studies, which are shown in Table 4. The structural dimension is characterized by close and repeated social interactions between organizations, which was measured by six items (Tsai & Ghoshal, 1998; Villena et al., 2011; Yli-Renko et al., 2001). The cognitive dimension was measured by six items by assessing common fate and shared values (Carey et al., 2011; Tsai & Ghoshal, 1998; Villena et al., 2011). The relational dimension is characterized by mutual respect, mutual trust and reciprocity between organizations, which was measured by five items (Carey et al., 2011; Villena et al., 2011).

Table 4. Measurement Items of Social Capital

Codes	Indicators (Items)	Adapted from
Structure capital (SC)		

SC1	We spend time together in social occasions with our key supply chain partners.	(Tsai & Ghoshal, 1998)
SC2	We maintain a close social relationship with our key supply chain partners.	(Tsai & Ghoshal, 1998; Yli-Renko et al., 2001)
SC3	We know our key supply chain partners at the personal level.	(Yli-Renko et al., 2001)
SC4	We communicate frequently with our key supply chain partners outside of our working relationship.	(Villena et al., 2011)
SC5	We promote an interaction between the personnel across difference levels of our company and our key supply chain partners.	(Villena et al., 2011)
SC6	We promote an interaction across different functions (logistics and marketing) within our company and between our key supply chain partners.	(Villena et al., 2011)
Cognitive capital (CC)		
CC1	Our organization shares the same ambitions and vision with our key supply chain partners.	(Carey et al., 2011; Tsai & Ghoshal, 1998; Villena et al., 2011)
CC2	People in our organization and those of our key supply chain partners are enthusiastic about pursuing the collective goal of the whole supply chain.	(Tsai & Ghoshal, 1998)
CC3	Both this organization and our key supply chain partners share similar corporate culture /value and management style.	(Villena et al., 2011)
CC4	Both this organization and our key supply chain partners share the same business value.	(Carey et al., 2011)
CC5	Both this organization and our key supply chain	(Carey et al., 2011)

	partners agree on what is in the best interest of the relationship.	
CC6	Executives from this organization and our key supply chain partners have compatible philosophies/approaches to business dealings.	(Villena et al., 2011)
Relational capital (RC)		
RC1	Our relationship with our key supply chain partners is characterized by close personal interactions at multiple levels.	(Carey et al., 2011; Villena et al., 2011)
RC2	Our relationship with our key supply chain partners is characterized by mutual respect at multiple levels.	(Carey et al., 2011; Villena et al., 2011)
RC3	Our relationship with our key supply chain partners is characterized by mutual trust between the parties.	(Carey et al., 2011; Villena et al., 2011)
RC4	Our relationship with our key supply chain partners is characterized by personal friendship at multiple levels.	(Carey et al., 2011; Villena et al., 2011)
RC5	Our relationship with our key supply chain partners is characterized by high levels of reciprocity.	(Carey et al., 2011; Villena et al., 2011)

3.3.2.2 Measurement Items of Organizational Resilience

To measure organizational resilience, multi-items were used that were adapted from prior studies as shown in Table 5. Variables of the proactive organizational resilience were measured by a four-item reflective scale, which includes items assessing the ability of a firm to create internal awareness for disruptions, self-assessment, self-improvement, and engagement in contingency planning (Bode & MacDonald, 2016). The reactive organizational resilience was measured by using both organizational response and organizational recovery. Response (ROR 1 – 4) was measured by a four-item reflective scale, which includes items assessing the ability of a firm to recognize and diagnose threats quickly, and develop and implement responses (Bode & Macdonald, 2016). Recovery (ROR 5 – 8) was measured by a

four-item reflective scale, which includes items assessing the ability of a firm to organize a formal response team quickly, and to implement strategies of communication, dealing with issues, and mitigation (Pettit et al., 2013).

Table 5. Measurement Items of Organizational Resilience

Codes	Indicators (Items)	Adapted from
Proactive Organizational Resilience (POR)		
POR1	We created internal awareness for disruptions and made attempts to drive this awareness to our employees.	(Bode & MacDonald, 2016)
POR2	We analyzed and assessed both probability and impact of potential disruptions.	(Bode & MacDonald, 2016)
POR3	We improved our disruption prevention capabilities.	(Bode & MacDonald, 2016)
POR4	We engaged in contingency planning to prepare for potential disruptions.	(Bode & MacDonald, 2016)
Reactive Organizational Resilience (ROR)		
ROR1	We are able to quickly recognize that there is a threatening situation.	(Bode & MacDonald, 2016)
ROR2	We are able to gather and interpret information of cues to gauge the magnitude, location, and causes of the disruption.	(Bode & MacDonald, 2016)
ROR3	We are able to quickly identify, formulate, and evaluate a set of possible responses to disruption.	(Bode & MacDonald, 2016)
ROR4	We are able to quickly implement responses and restoration of the standard or desirable state.	(Bode & MacDonald, 2016)
ROR5	We can quickly organize a formal response team of key personnel, both on-site and at corporate level.	(Pettit et al., 2013)
ROR6	We have an effective strategy for communications in a variety of extraordinary situations.	(Pettit et al., 2013)

ROR7	We are very successful at dealing with crises, including addressing public relations issues.	(Pettit et al., 2013)
ROR8	We take immediate action to mitigate the effects of disruptions, despite the short-term costs.	(Pettit et al., 2013)

3.3.2.3 Measurement Items of Business Performance

To measure business performance, multi-items were adapted from prior studies, which are shown in Table 6. Variables of business performance are measured by four items that include profitability, level of debt, cash flow, and overall financial performance (Bode & Macdonald, 2016; Bode, Wagner, Petersen, & Ellram, 2011), and there are subjective measures of business performance.

Table 6: Measurement Items of Business performance

Codes	Indicators (Items)	Adapted from
Business Performance (BP)		
BP1	Profitability	(Bode & Macdonald, 2016; Bode, Wagner, Petersen, & Ellram, 2011).
BP2	Level of debt	
BP3	Cash flow	
BP4	Overall financial performance	

3.4 Translation

The original questionnaire, information sheet and consent form were designed in English, and the author of this study did the initial translation into Chinese. Then the translation of the questionnaire, information sheet and consent form were reviewed by a professional transcriber. This transcriber commented on revision of the wording, which helped the author to provide more accurate and more articulate survey questions, and information about this research to participants. The final questionnaire,

information sheet and consent form were edited based on the comments of this professional transcriber.

3.5 Pilot Survey

A pilot survey that involved 20 participants was applied in order to ensure that the questionnaire, consent form and information sheet were simple and clear for participants to understand. These 20 participants were randomly selected from 10 organizations, and they were asked to make comments about whether they could understand the questionnaire, consent form and information sheet clearly. As a result, they all claimed that the questionnaire, consent form and information sheet could be easily and clearly understood.

3.6 Sampling and Data Collection

The convenience sampling method enables a researcher to easily access a sample (Elliot, Fairweather, Olsen & Pampaka, 2016). Researchers usually choose the convenience sampling method when suffering from the limits of time and research costs (Suen, Huang & Lee 2014). Snowball sampling is considered as a form of convenience sampling (Elliot et al., 2016), whereby researchers ask the participants who meet the criteria of inclusion in the research to recommend others who meet the same criteria (Emerson, 2015; Elliot et al., 2016). These methods enable researchers to easily obtain the desirable number of respondents (Emerson, 2015). However, by using these methods the data may not be able to provide legitimately generalized results (Duignan, 2016), because all resultant respondents are generally from the same backgrounds or geographical regions (Emerson, 2015). Hence, this study aims to research the firms that were affected by the 2008 Sichuan (Wenchuan) earthquakes. The potential firms were selected from a wide geographical area, and as great a number as possible in order to have access to participants and firms that were different.

For achieving the purposes of this study, the target participants were defined as

occupying supervisory, top and/or middle management roles, and/or owners of large firms that had been affected by the 2008 Sichuan (Wenchuan) earthquakes, and were still operating at the time of data collection. The reason is that higher-level executives would be more familiar with the business, which ensures the higher quality of the data (Mikalef & Pateli, 2017). There were a total of 216 firms that were initially identified in two ways. Firstly, 48 firms were identified from the Chinese Government's reports of post-earthquake recovery that mentioned many names of firms (National Development and Reform Commission of China et al., 2008) which successfully recovered from the 2008 Sichuan (Wenchuan) earthquakes. Secondly, the remaining firms were identified from online resources, such as the yellow page website, Baidu search engine, and related website links from previously identified firms. The general contact details were obtained from online resources, such as names and locations of these firms, email address, contact phone numbers, and a contact person.

To collect the data, three individuals who live in these regions that were significantly impacted by the 2008 Sichuan (Wenchuan) earthquakes, and were known to the researcher, were included to participate in the data collection. These three individuals were familiar with the situation of Sichuan province, and already had at least one contact in some of these firms.

After the potential firms were identified, and the contact information was obtained, the researcher contacted these potential firms to obtain permissions to access their participants. People (managers or business owners) of these potential firms helped to identify potential individual participants, such as supervisors, top and/or middle managers. The three individuals who were known to the researcher also helped in the process of obtaining permission for firms to survey their employees. These three individuals were asked to sign an agreement of confidentiality before participating in this research in order to protect the confidentiality of the research participants.

After obtaining the permission from potential firms, the three individuals helped the

researcher to contact the firms` owners and/or managers who had agreed to participate in this research, and helped with the distribution of paper-based information sheets, consent forms, and questionnaires to these firms. Then these firms` owners and/or managers who had agreed to participate in this research, helped the researcher to distribute the survey to suitable supervisors, firm owners, top and/or middle manager within these firms. Once the survey was completed, it was placed in an envelope and sealed. The three individuals helped the researcher to collect these sealed envelopes at the end of data collection period. Finally, a total of 161 questionnaires were collected and returned from 88 firms.

3.7 Ethical Considerations

The final questionnaire, consent form, information sheet, and application form were submitted to the University of Canterbury Human Ethics committee (HEC) for assessment. To respond to the question that was raised by the HEC, an explanation of confidentiality was added to the consent form and information sheet that clearly explained the questionnaire is not completely anonymous, and specified the types of demographic information and firm characteristics (Appendix 3) that were being collected in the questionnaire. In addition, the information sheet also contained an explanation that participants` information would not be analyzed individually, and participants had rights to quit this research at any stage. Finally, the questionnaire, consent form, information sheet and the procedure of data distribution and collection were reviewed and approved on 20th January 2018, Ref: HEC 2017/122/LR (Appendix 1).

3.8 Sample Size Requirement

According to Henseler, Ringle and Sinkovics (2009), and Hair et al. (2017), a minimum size of data must be considered when applying PLS-SEM. The minimum sample size ensures the PLS-SEM has adequate statistical power, otherwise inadequate data can result in a Type II error (not rejecting wrong null-hypotheses) (Hair et al., 2017). In addition, the minimum sample size ensures the results are robust

and the model can be generalized (Hair et al., 2017). According to Barclay, Higgins and Thompson (1995), the “10 times rule” is often applied by researchers, which means the minimum sample size should be at least 10 times the maximum number of structural paths pointed at a latent variable in the structural model (Hair et al., 2017, p. 24). In this study, the maximum number of arrowheads pointing a latent variable is 4 in the proposed structural model (e.g. there are 4 arrowheads pointing at the variable of reactive resilience), so the minimum sample size will be 40 (4 X 10). Moreover, Hair et al. (2017, p. 26) also provide minimum sample size recommendations in PLS-SEM for a statistical power of 80% based on the theory of OLS regression (Ordinary Least Squares regression). Based on this recommendation, the minimum sample size will be 113 (Hair et al., 2017, p. 26) by using 5% significance level and minimum R² of 0.10 in the proposed structural model. Thus, the sample size of 161 (includes 138 usable responses, which will be explained in Chapter 4) has met the requirement of the minimum sample size for presenting meaningful results. The sample data was collected from 88 firms out of the total 216 identified firms, which represents a response rate of 41%.

3.9 Data Analysis

Hypotheses are examined by using partial least squares structural equation modelling (PLS-SEM). PLS-SEM is a proper approach for analyzing multiple relationships between one or more independent variables and one or more dependent variables simultaneously (Hair et al., 2011; Mikalef & Pateli, 2017). Based on the purposes of this study and the sample size, the PLS-SEM is a suitable tool for analyzing relationships (paths) between three dimensions of social capital and organizational resilience as suggested in the theoretical model (Figure 2).

3.9.1 Exploratory vs Confirmatory Research

According to Hair et al. (2017, p. 2), structural equation modelling (SEM) is a “multivariate application of statistical methods that simultaneously analyzes multiple variables”, which can be used for two types of researches: exploratory and

confirmatory researches (Hair et al., 2017). Confirmatory refers to “test the hypotheses of existing theories and concepts”, whereas exploratory refers to “search for patterns of data where there is only limited prior research about how specific variables are related to each other” (Hair et al., 2017, p. 3). In addition, exploratory and confirmatory are not clearly distinguished, and a researcher often needs to rely on prior information and knowledge which seems to be more confirmatory (Hair et al., 2017). However, relatively better predictors of dependent variables may also be explored by the same research that will seem to be more exploratory (Hair et al., 2017). In this study, testing relationships between the three dimensions of social capital and proactive and reactive resilience is relatively unexplored, even though there are some conceptual studies that have explained these relationships (e.g. Johnson et al., 2013; Prasad et al., 2014).

3.9.2 Partial Least Squares (PLS) SEM vs Covariance-Based (CB) SEM

According to Hair et al. (2017), there are two main types of SEM which are Partial Least Squares (PLS) SEM and Covariance-Based (CB) SEM. The PLS-SEM is primarily applied for developing theories in exploratory research that emphasize explaining the variance of dependent variables, whereas the CB-SEM is primarily applied for confirming or rejecting theories through determining how well a proposed theoretical model can estimate the covariance matrix based on a data set (Hair et al., 2017, p. 4). In addition, Hair et al. (2017) also state that the PLS should be considered “if the primary goal of applying SEM is for prediction and explanation of variance of target constructs” (p. 15). For this study, the PLS-SEM will be a better approach than the CB-SEM. For example, one of the objectives of this study is to explain the variance in each dimension of social capital towards proactive and reactive organizational resilience. Moreover, comparing with CB-SEM, “a major superiority of PLS-SEM is PLS-SEM always makes a single specific (determinate) score for each composite for each observation when the weights are built” (Hair et al., 2017, p. 17). These determinate scores are proxies of the concepts being measured, which enable the goal of minimizing error items (the residual variance) of endogenous constructs

by using these proxies as inputs (Hair et al., 2017). PLS-SEM estimates coefficients that maximize the R^2 values of target constructs (Hair et al., 2017). Cassel, Hackl and Westlund (1999) also state that PLS-SEM works efficiently with small sample sizes and complex models, and makes no assumptions about the underlying data. Furthermore, PLS-SEM can be widely applied in various research situations, and provides many benefit to researchers (Hair et al., 2017). For example,

1. PLS-SEM can easily handle formative and reflective models, and single-item constructs (Hair et al., 2017).
2. PLS-SEM is more efficient than CB-SEM (Hair et al., 2017).
3. PLS-SEM is more likely to explain a significant relationship in a population by analyzing a sample of the population (Hair et al., 2017).

Thus, PLS-SEM will be applied in this study, which is more beneficial than CB-SEM.

3.9.3 Reflective Measurement Models vs Formative Measurement Models

According to Hair et al. (2017), A PLS path model includes a structure model (also called the inner model) and measurement models (also called outer models). A structure model represents the constructs, and relationships (paths) between latent variables (Hair et al., 2017), such as structural capital, relational capital and reactive resilience in this study (see Figure 2), whereas measurement models show the relationships between indicators and latent variables (Hair et al., 2017). According to Hair et al. (2017, p. 11), indicators (also called items or manifest variables) are directly measured proxy variables that comprise raw data (e.g. collected from survey).

Measurement models can be defined as reflective or formative, which denote whether the indicators are influenced by constructs (Hair et al., 2017). A reflective model describes the effects of an underlying construct, whereas in a formative model, each

indicator captures a specific aspect of construct's domain (Hair et al., 2017, p. 46-47). Hair et al. (2017) also state that reflective measurement models have many advantages. For example, reflective indicators can be viewed as a representative sample of all possible items that are within the construct's domain (Nunnally & Bernstein, 1994). These individual items are interchangeable, and the meaning of the construct will not be changed (when the construct has sufficient reliability) if any individual item is deleted (Hair et al., 2017). In contrast, in a formative measurement model, the meaning of the construct is determined by indicators (Hair et al., 2017). The meaning of the construct may be changed if any indicator is omitted (Hair et al., 2017).

In this study, the reflective measurement model will be chosen. Firstly, the meaning of any construct will not be altered or changed if any individual indicator of these constructs is omitted. Any indicator might be omitted if this indicator did not meet the requirement of validity and reliability, which will be explained in chapter 4. Research objectives may not be achieved if the meaning of any construct is alerted or changed. In addition, in this study, indicators represent the consequences of the constructs (reflective), not causal influences on the constructs (formative). Thus, this study applies a reflective measurement model.

3.10 Methodology Limitations

In this study, one of the limitations is incomplete questionnaires and consent forms, which include 23 cases. The detailed information of these incomplete questionnaires and consent forms will be provided in the next chapter. Respondents were not monitored, and were not motivated while they were completing questionnaires. As a result, many questionnaires were not completed properly. According to Barge and Gehlbach (2012), unmotivated respondents are likely to skip questions. Leiner (2013) also states that meaningless data should be identified and removed before analyzing the data. Researcher should consider removing incomplete surveys, especially the surveys where key questions have not been answered (Leiner, 2013). In response,

incomplete cases were removed from the dataset, where important questions were not answered, such as whether the organization was affected by the 2008 Sichuan (Wenchuan) earthquakes, and respondent's current position in the organization. If an organization could not be identified as one that was affected by the 2008 Sichuan (Wenchuan) earthquakes, this case would be invalid. Also, if a questionnaire was not completed by a suitable person, the answer would not be eligible for the purposes of this study. On the other hand, the information sheet and consent form included important information that helped participants to understand this research. If participants completed questionnaires without reading the information sheet and consent form, they may not have really understood what they should do, which made their answers less valuable for this research. Participants would probably have signed the consent forms if they had read the information sheet and consent form carefully, and had agreed with the conditions of this research. Thus, the cases without signed consent forms were not valid for use in this research. Therefore, these types of cases were removed from the dataset. On the other hand, Hair et al. (2017, p. 26) state that the case should be removed if missing data is over 15% on a questionnaire. After removing the cases that included unfilled key questions, the rest of cases were checked for identifying missing data by using IBM SPSS. As a result, the rest of the data cases were eligible.

Straight-lining is caused when respondents provide the same answers to each item, which the data presents as a zero standard deviation (SD) against the sample mean (Leiner, 2013). This type of data may be caused by participants who want to finish the survey quickly (Leiner, 2013). Hair et al. (2017) suggest that this type of data should be identified and removed from the dataset. Thus, this type of data was identified and removed by using Microsoft Excel before being imported into the PLS-SEM.

On the other hand, Bowen, Daniel, Williams and Baird (2008), and Turnbull (2017) all state that duplicate respondents who created invalid data should be avoided in a survey-based study. This type of data is caused by individual respondents who

completed the questionnaire more than once (Turnbull, 2017). In the study, each respondent has to sign a consent form before completing the questionnaire. Each signed consent form was returned with a completed questionnaire. This signed consent form can identify whether questionnaires were completed by the same respondents.

However, process of completing a paper-based questionnaire cannot identify how long each respondent took to complete each questionnaire. According to Leiner (2013), if a respondent completed a questionnaire using an extremely shorter time than other respondents normally used, this respondent is less likely to have answered the questions after actually reading. This type of data may reduce the overall accuracy (Wang & Strong, 1996), and probably increase type II errors (Meade & Craig, 2012).

3.11 Chapter Summary

This chapter provides an overview of the methodology that is applied in this study. Screening procedures, sampling and data collection are included that ensure only eligible participants are selected in this research, and ensure confidentiality of data. PLS-SEM and reflective modelling are chosen due to the research objectives. Methodology limitations and strategies for reducing bias are summarized at the end of this chapter.

Chapter 4: Data Analysis and Results

4.1 Chapter Overview

This chapter analyzes the data from 161 survey responses. It starts with data screening and cleaning in order to ensure only eligible responses are selected. SmartPLS is applied to test the selected data with the proposed model. The data has been evaluated for reliability and validity before assessing inter-construct relationships. Finally, the results of the hypothesis test and empirical evaluation of the model's ability to explain the constructs are determined.

4.2 Data Screening

4.2.1 Problematic Cases

Table 7 shows the number of problematic cases that were removed before analyzing the data due to violations related to sampling or data requirements. Thus, all 138 remaining surveys are eligible.

Table 7: Problematic Cases and Removals

N=	Violation
18	Did not include a signed consent form
2	Did not answer key questions
2	Survey not completed by the required respondents
1	Straight lining cases (zero standard deviation)
23	Total cases removed
138	Total cases remain

4.2.2 Skewness and Kurtosis

According to Hair et al. (2014), PLS-SEM is a nonparametric statistical method that does not require the data to be normally distributed, which is different from the maximum likelihood-based CB-SEM. However, it is important to verify that the dataset contains extremely non-normal variables before data analysis can be conducted because such variables can distort the results. However, PLS-SEM is a

robust technique that accounts for the normality assumption not being met (Hair et al., 2014).

Skewness and Kurtosis are two measurements that explain normality of a dataset (Sarstedt & Mooi, 2014). Skewness tests whether a variable's distribution is symmetrical, whereas kurtosis assesses whether the distribution is too peaked (Hair et al., 2014, p. 61). Data will be considered as normally distributed if values of skewness and kurtosis are close to zero (Hair et al., 2014). In contrast, if the skewness and kurtosis value is higher than 1 or lower than -1, distributions of the data will be non-normal (Hair et al., 2014). More specifically, if the skewness value is greater than 1 or lower than -1, the data will be considered as positively or negatively skewed (distribution is non-symmetrical). This means that respondents tend to give strongly positive or negative answers to a question. In addition, distribution of the data will be too platykurtic or leptokurtic, if kurtosis value is greater than 1 or lower than -1 (Hair et al., 2014). This means that respondents tend to give neutral answers to a question, which shows no obvious trend in the data. Table 8 shows responses that are not normally distributed. However, these non-normal items (Red 1 and Res 4) may not be considered as issues because POR 1 and ROR 4 are respectively one of four items that measure reflectively the *Readiness* and *Response* construct. Therefore, these items will be retained for data analysis.

Table 8: Skewness and Kurtosis Violations

Item	Skewness	Kurtosis
POR 1	- 0.500	1.113
ROR 4	- 0.779	1.679

4.3 Descriptive Statistics

4.3.1 Characteristics of Organizations

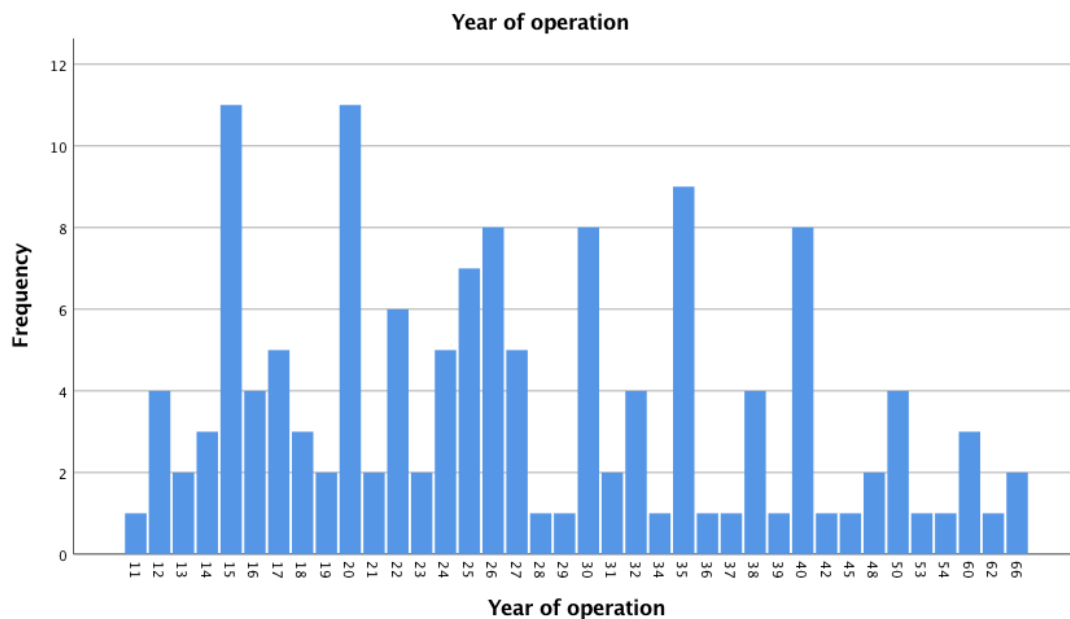
Table 9 shows characteristics of the organizations that the data was collected from. These organizations are all larger firms from various industrial sectors. A large organization usually possesses at least 250 employees, according to McGuinness and Johnson (2014). These large organizations are classified into three groups based on their number of employees: 250 to 499; 500 to 999; 1,000 or more. From table 9, it can be seen that 31.2% of the sample were organizations with at least 1000 employees or more. In addition, these organizations belong to nine different industrial sectors, and most of them are manufacturing firms. Table 9 shows that 10.9% of organizations came from the social service sector, such as public hospitals. As shown in Figure 3, all organizations had been operating for at least 11 years, that is, earlier than 2008 Sichuan (Wenchuan) earthquakes. The range of the year of operation is from 11 to 66. There is only 1 firm that has been operating for only 11 years, which is the youngest firm in this sample. There are 2 firms that have been operating for 66 years, which are the oldest in this sample.

Table 9: Characteristics of Organizations

	Frequency	%
Size of organizations		
250 to 499 employees	49	35.5
500 to 999 employees	46	33.3
1,000 or more employees	43	31.2
Industry sectors		
Manufacturing	92	66.7
Social service	15	10.9
Retail	8	5.8
Construction	8	5.8
Hospitality	6	4.3

Logistics	3	2.2
Media	2	1.4
Energy	2	1.4
Telecommunication	2	1.4

Figure 3: Year of Operation



4.3.2 Demographic Composition

Table 10 shows the demographic composition of participants. In this study, all participants are at managerial positions, and most of them are male (79%). In addition, the majority of participants have graduated from universities (62.3%) with a bachelor`s degree while at least 18.8% have graduated with a post-graduate degree. In terms of age group, 46.4% of the samples were between the ages of 45-54 while 7.2% were between the ages 55 and 64. In terms of the current positions of the respondents, the majority of them were production/operation managers (34.1%) while 2.9% of the respondents were managing directors and 4.3% of the respondents were risk managers.

Table 10: Profile of Respondents

	Frequency	Percentage (%)
Gender		
Male	109	79.0
Female	29	21.0
Age (Years)		
26 - 34	9	6.5
35 - 44	55	39.9
45 - 54	64	46.4
55 - 64	10	7.2
65 and above	0	0
Level of Education		
High school or less	2	1.4
College graduate	18	13.0
University graduate	86	62.3
University post-graduate	26	18.8
Doctor degree	5	3.6
Others	1	0.7
Current position in this company		
Supply chain manager	23	16.7
Production/Operation manager	47	34.1
Risk manager	6	4.3
Purchasing manager	33	23.9
CEO/General manager	16	11.6
Managing director	4	2.9
Others	9	6.5

4.4 The Procedure of Data Analysis Using PLS-SEM

Model estimation is based on empirical measures of the relationships between the items and the constructs (measurement models), and the relationships between the constructs (structural model) (Hair et al., 2017). The empirical measures enable the theoretically established measurement models and structural model to be compared with reality by using the sample data (Hair et al., 2017). PLS-SEM results are assessed through a systematic process in order to indicate the model's predictive capabilities (Hair et al., 2017). The assessment is initially focused on the measurement model that evaluates the reliability and validity of the construct measures, which includes internal consistency (Cronbach's alpha, and composite reliability), convergent validity (indicator reliability, and average variance extracted), and discriminant validity (Hair et al., 2017). The structural model is examined after the reliability and validity of the constructs are assessed and built, through coefficients of determination (R^2), predictive relevance (Q^2), size and significance of path coefficients, and f^2 effect sizes.

4.5 Validity and Reliability of Measurement (Outer) Model

4.5.1 Indicator Mean and Standard Deviation

Table 12 shows the means of each indicator and the grand means of each construct measured in this study based on a seven-point Likert scale. In addition, all responses are distributed within 2 standard deviations respectively, which means that respondents tend to provide similar answers to the questions on social capital and organizational resilience based on their own perspective. Overall, respondents tend to agree with the statements relevant to the questions that measure organizational resilience and social capital, such as structural capital ($M = 5.42$), and reactive organizational resilience ($M = 5.38$). In contrast, respondents tend to give neutral ($M = 4.25$) answers to the questions that are relevant to business performance.

The means of relational capital - RC1 ($M = 5.41$) and relational capital - RC3 ($M = 5.69$) represent the most dissimilar values within all inter-indicator comparisons. In

the adverse situation, respondents prefer to trust their supply chain partners (relational capital - RC3), even though their own employees and their supply chain partners have relatively lower level of close personal interactions at multiple levels (relational capital - RC1). This may indicate that people may prefer to trust their supply chain partners more in a situation of adversity. In contrast, the means of business performance - BP1 (M = 4.25), business performance - BP3 (M = 4.26), and business performance - BP4 (M = 4.27) have the highest similarity within all inter-indicator comparisons.

4.5.2 Indicator Reliability

In a reflective measurement model, outer loadings show the contribution of each item to their associated construct (Garson, 2016). According to Hair et al. (2017), outer loadings vary between 0 and 1, of which higher values of outer loadings indicate a stronger and more reliable measurement model. Generally, outer loadings should be higher than 0.708 for the indicator to be considered as reliable and therefore acceptable as representing the construct (Hair et al., 2017). Hair et al. (2017) also suggest that items should be considered for removal if their outer loadings are lower than 0.708. However, the indicators with outer loadings between 0.40 and 0.70 should only be removed if the composite reliability (CR) or the average variance extracted (AVE) associated constructs below their thresholds (Rasoolimanesh, Ringle, & Ramayah, 2017). According to Hair et al. (2017), the AVE values should be greater than 0.50, and the CR values should lie between 0.7 and 0.95. After running the PLS Algorithm, all CR values are greater than the threshold of 0.7 (see Table 12). Therefore, whether deleting an indicator with outer loading between 0.40 and 0.70 will depend on the AVE value of its associated construct, it will only be removed if deleting the indicator can increase the AVE. In addition, indicators must be removed if their outer loadings are lower than 0.40 (Bagozzi, Yi & Philipps, 1991; Hair et al., 2017).

After the first run of the PLS Algorithm, there were 11 indicators which had loadings of less than 0.7 in total in the model. Then 8 of these indicators were deleted by following the requirements of construct reliability and validity (shown in Table 11).

After deleting cognitive capital - CC4, the AVE value of the construct of cognitive capital increased from 0.451 to 0.508, which is above the threshold of 0.5 for AVE. However, the construct of cognitive capital did not meet the requirement for discriminant validity. (Fornell-Larcker criterion, will be described in the section on the discriminant validity). Hence, the cognitive capital - CC1 (0.607) was also removed from the model. Problematic indicators are revealed by using PLS-SEM Algorithm that are shown in table 11.

Table 11: Problematic Indicator Loadings

Indicators	Loadings	AVE Before Deleting	AVE After Deleting
Reactive Organizational Resilience - ROR8	0.387	0.391	0.428
Reactive Organizational Resilience - ROR6	0.541	0.428	0.458
Reactive Organizational Resilience - ROR4	0.604	0.458	0.507
Structural Capital - SC4	0.593	0.429	0.460
Structural Capital - SC3	0.605	0.460	0.519
Cognitive Capital - CC3	0.522	0.408	0.451
Cognitive Capital - CC4	0.555	0.451	0.508
Cognitive Capital - CC1	0.607	0.508	0.589

After deleting the above indicators, the outer loadings of the indicators structural capital - SC5 (0.663), relational capital - RC1 (0.664), and reactive organizational resilience - ROR7 (0.627) were still lower than the threshold of 0.708. However, the CR and AVE values of the indicators associated with these constructs were all above the recommended thresholds. Hence, these indicators were not removed from the model. All remaining indicators with their loadings, CR and AVE are shown in table 12.

Table 12: Reliability and Validity Statistics for Measurement Model

Indicators	Loadings	Mean	Grand Mean	SD	Alpha	CR	AVE
SC1	0.737	5.30	5.42	1.169	0.690	0.811	0.519
SC2	0.743	5.57		1.059			
SC5	0.663	5.30		1.180			
SC6	0.735	5.49		1.141			
CC2	0.741	5.66	5.66	1.070	0.651	0.811	0.589
CC5	0.765	5.72		1.086			
CC6	0.796	5.59		1.071			
RC1	0.664	5.41	5.61	1.106	0.794	0.859	0.549
RC2	0.764	5.68		1.120			
RC3	0.756	5.69		1.158			
RC4	0.759	5.65		1.118			
RC5	0.757	5.64		1.087			
POR1	0.745	5.17	5.33	1.036	0.712	0.822	0.535
POR2	0.757	5.33		0.991			
POR3	0.712	5.38		0.991			
POR4	0.711	5.42		1.059			
ROR1	0.720	5.33	5.38	1.063	0.755	0.837	0.507
ROR2	0.746	5.46		1.047			
ROR3	0.728	5.40		1.084			

ROR5	0.732	5.42		0.950			
ROR7	0.627	5.30		1.049			
BP1	0.721	4.25	4.25	1.404	0.879	0.909	0.716
BP2	0.832	4.20		1.430			
BP3	0.921	4.26		1.390			
BP4	0.896	4.27		1.448			

SC = Structural Capital | CC = Cognitive Capital | RC = Relational Capital

POR = Proactive Organizational Resilience | BP = Business Performance

ROR = Reactive Organizational Resilience

4.5.3 Internal Consistency Reliability

According to Hair et al. (2017), Cronbach's Alpha is a traditional criterion for measuring internal consistency, "which provides an estimate of the reliability based on the inter-correlations of the indicator variables" (p. 111). However, Cronbach's Alpha assumes all items are equally reliable, and tends to underestimate the internal consistency reliability (Hair et al., 2017). Due to these limitations, Hair et al. (2017) recommend that composite reliability (CR) is a more appropriate criterion for measuring internal consistency reliability, which "takes into account the different outer loadings of the indicator variables" (p.111) when measuring reliability.

Composite reliability (CR) varies from 0 to 1, with higher values representing higher levels of reliability (Hair et al., 2017). Generally, the Cronbach's Alpha and the composite reliability are interpreted in the same way, with values that lie between 0.60 and 0.70 considered acceptable in exploratory research, while in more advanced research, values that lie between 0.70 and 0.95 are usually regarded as satisfactory (Hair et al., 2017). However, values that are lower than 0.60 or greater than 0.95 are usually regarded as undesirable (Hair et al., 2017).

In addition, Cronbach's Alpha represents the lower limit of internal consistency reliability, whereas the composite reliability represents the upper limit of internal consistency reliability (Hair et al., 2017). Hair et al. (2017) also state that the true reliability may lie between the Cronbach's Alpha and the composite reliability. Therefore, both the Cronbach's Alpha and the composite reliability should be reported. However, due to the limitations of the Cronbach's Alpha as mentioned by Hair et al. (2017), the composite reliability will be mainly emphasized for assessing internal consistency of the constructs measured in this study. As shown in table 12 all values of composite reliability lie between 0.811 and 0.909 suggesting that constructs are reliable and internally consistent. In addition, (shown in table 12) all values of Cronbach's Alpha lie between 0.651 and 0.879 which indicates acceptable reliability, with Cronbach's Alpha of structural capital (alpha = 0.690) and cognitive capital (alpha = 0.651) lower than 0.70 but greater than 0.60.

4.5.4 Convergent Validity

Convergent validity refers to "the extent to which a measure correlates positively with alternative measures of the same construct" (Hair et al., 2017, p. 112). Convergent validity is evaluated by the average variance extracted (AVE) that represents the grand mean of squared outer loadings from a group of items of a latent variable (Hair et al., 2017). An AVE score should be equal to or higher than 0.50 suggesting that the construct represents more than half of the variance of its own items (Hair et al., 2017). As shown in table 12, all values of AVE are higher than 0.50. Thus, the requirement for convergent validity is met.

4.5.5 Discriminant Validity

Discriminant validity refers to the extent to which a construct is distinct from other constructs in the model (Chin, 2010; Hair et al., 2017, p. 115). The cross-loadings and Fornell-Larcker criterion are two traditional approaches for measuring discriminant validity. According to Hair et al. (2017), the cross-loadings should be the first approach to evaluate the discriminant validity of indicators, with each indicator's

outer loading being a higher value than any of its cross-loadings on other constructs. As shown in table 13, all indicators` outer loadings on the associated construct are the highest.

Table 13: Cross-Loadings

	Business Performan ce	Cognitiv e Capital	Proactive Organization al Resilience	Relation al Capital	Reactive Organization al Resilience	Structur al Capital
BP1	0.721	0.098	0.080	0.024	0.111	-0.011
BP2	0.832	0.080	0.000	-0.056	0.067	-0.060
BP3	0.921	0.079	-0.096	0.022	0.096	-0.095
BP4	0.896	0.024	-0.034	0.039	0.108	-0.109
CC2	0.200	0.741	0.365	0.582	0.467	0.355
CC5	0.062	0.765	0.343	0.520	0.462	0.460
CC6	-0.082	0.796	0.421	0.580	0.322	0.598
POR1	-0.148	0.335	0.745	0.286	0.353	0.388
POR2	-0.075	0.308	0.757	0.342	0.401	0.339
POR3	-0.009	0.304	0.712	0.347	0.411	0.417
POR4	0.069	0.465	0.711	0.393	0.428	0.507
RC1	-0.048	0.409	0.314	0.664	0.488	0.440
RC2	0.037	0.519	0.358	0.764	0.404	0.462
RC3	-0.010	0.607	0.274	0.756	0.434	0.419
RC4	0.050	0.519	0.388	0.759	0.486	0.503
RC5	0.026	0.632	0.404	0.757	0.516	0.575
ROR1	-0.013	0.368	0.395	0.498	0.720	0.459
ROR2	0.075	0.427	0.357	0.431	0.746	0.436
ROR3	0.210	0.404	0.379	0.455	0.728	0.360
ROR5	-0.049	0.438	0.434	0.468	0.732	0.369
ROR7	0.183	0.275	0.385	0.385	0.627	0.290

SC1	-0.277	0.396	0.401	0.469	0.353	0.737
SC2	0.015	0.506	0.440	0.495	0.375	0.743
SC5	0.010	0.399	0.365	0.430	0.351	0.663
SC6	-0.037	0.470	0.438	0.484	0.468	0.735

SC = Structural Capital | CC = Cognitive Capital | RC = Relational Capital

POR = Proactive Organizational Resilience | BP = Business Performance

ROR = Reactive Organizational Resilience

The Fornell-Larcker criterion compares the square root of the AVE with the construct correlations and the square root of each construct's AVE should be higher than its greatest correlation with other constructs (Hair et al., 2017). The logic of the Fornell-Larcker criterion is that a construct and its associated items share more variance than with other constructs (Hair et al., 2017). As shown in table 13 and table 14, all requirements of discriminant validity based on cross-loadings and Fornell-Larcker criterion are met.

Table 14: Fornell-Larcker Cross-Tabulation Matrix

	BP	CC	POR	ROR	RC	SC
BP	0.846					
CC	0.073	0.768				
POR	-0.046	0.492	0.732			
ROR	0.111	0.539	0.548	0.712		
RC	0.017	0.731	0.473	0.631	0.741	
SC	-0.096	0.618	0.573	0.540	0.653	0.720

SC = Structural Capital | CC = Cognitive Capital | RC = Relational Capital

POR = Proactive Organizational Resilience | BP = Business Performance

ROR = Reactive Organizational Resilience

4.6 Evaluating the Structural (Inner) Model

4.6.1 Multi-collinearity in Reflective Modelling

Collinearity assessment refers to whether there are critical levels of collinearity between each group of predictor variables (Hair et al., 2017). Multi-collinearity occurs when two or more variables are highly inter-correlated (Garson, 2016). According to Hair et al. (2017), all inner model variance inflation factor (VIF) values should be below the threshold of 5. As shown in table 15, all VIF values are below the threshold of 5. Thus, multi-collinearity among the predictor constructs is not a critical issue in the structural model.

Table 15: Inner VIF values

	BP	CC	POR	ROR	RC	SC
Business Performance						
Cognitive Capital			2.320	2.375	1.619	
Proactive Organizational Resilience	1.429			1.564		
Reactive Organizational Resilience	1.429					
Relational Capital			2.498	2.505		
Structural Capital		1.000	1.884	2.153	1.619	

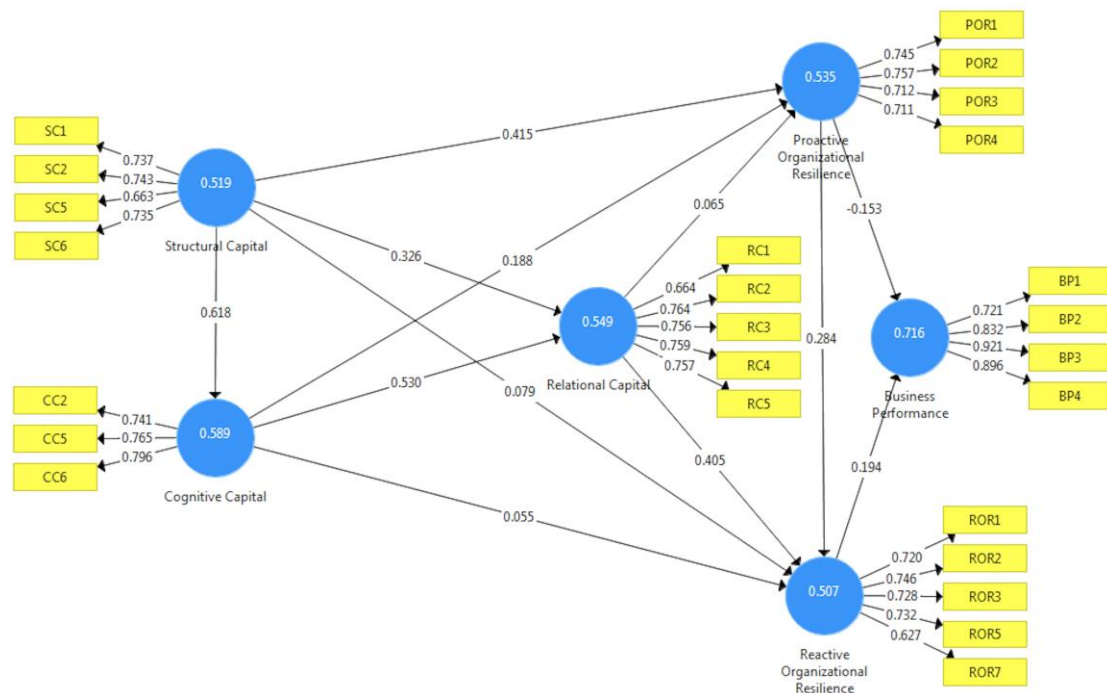
SC = Structural Capital | CC = Cognitive Capital | RC = Relational Capital

POR = Proactive Organizational Resilience | BP = Business Performance

ROR = Reactive Organizational Resilience

The proposed theoretical model (Figure 1) is analyzed by using the finalized indicators in the table (Table 12). The associated R^2 value and path coefficients are shown in figure 4. A maximum of 300 iterations were used and the model successfully converged after 7.

Figure 4: Proposed Model with Associated R^2 Value and Path Coefficients



4.6.2 Coefficient of Determination (R^2 Value) and Predictive Power

The coefficient of determination (R^2 value) is the most common measurement for assessing the structural model (Hair et al., 2017). According to Hair et al. (2017), this coefficient is to measure the predictive power of a model, which is calculated by “the squared correlation between a specific endogenous construct’s explanatory and predicted values” (p. 198). It represents the combined effects of the exogenous latent variables on the endogenous latent variable (Hair et al., 2017).

The R^2 value varies between 0 and 1, with higher values representing higher levels of predictive accuracy (Hair et al., 2017). According to Hair, Ringle and Sarstedt (2011), and Henseler, Ringle and Sinkovics (2009), R^2 values of 0.25, 0.50, and 0.75 describe influence as weak, moderate and substantial. For example, structural capital explains 58.9% of the variance in cognitive capital ($R^2 = 0.589$) (shown in table 16), which can be considered a moderate to substantial influence. In addition, the combined influence of structural capital and cognitive capital explains 54.9% of the variance in relational capital ($R^2 = 0.549$), which can be considered a moderate influence.

Moreover, the combined influence of structural capital, cognitive capital and relational capital explains 53.5% of the variance in the proactive organizational resilience ($R^2 = 0.549$), which can be considered a moderate influence. Likewise, the combined influence of structural capital, cognitive capital, relational capital and reactive organizational resilience explains 50.7% of the variance in the reactive organizational resilience ($R^2 = 0.507$), which also can be considered a moderate influence.

Furthermore, the combined influence of proactive and reactive organizational resilience explains 71.6% of the variance in the business performance ($R^2 = 0.716$), which can be considered a moderate to substantial influence. However, an issue arises between the proactive organizational resilience and the business performance due to the negative path coefficient ($\beta = -0.153$, $p = 0.418$), which will be explained in the following section.

Table 16: Coefficients of Determination with Endogenous Constructs

Predictors	Endogenous	R^2
Structural Capital	Cognitive Capital	0.589

Structural Capital	Relational Capital	0.549
Cognitive Capital		
Structural Capital	Proactive Organizational Resilience	0.535
Cognitive Capital		
Relational Capital		
Structural Capital	Reactive Organizational Resilience	0.507
Cognitive Capital		
Relational Capital		
Proactive Organizational Resilience		
Proactive Organizational Resilience	Business Performance	0.716
Reactive Organizational Resilience		

4.6.3 Structural Path Significance using Bootstrapping

The purpose of using bootstrapping is to “obtain reasonable approximation of coefficient distribution in a population” (Hair, Hult, Ringle, & Sarstedt, 2014, p.134). Bootstrapping samples using 1000 subsamples for calculating critical *t*-value and the significance of path coefficients were used to estimate the structural paths. The default settings of bootstrapping were selected, that is, a two-tailed test and 0.05 for significance level. According to Hair et al. (2011), the threshold of significant critical *t*-value for the 10% significance level is 1.65, the threshold of significant critical *t*-value for the 5% significance level is 1.96, and 2.58 for the 1% significance level.

Hypotheses 1-3 are about the relationships between three dimensions of social capital. As a result, structural capital has a positive impact on cognitive capital ($\beta = 0.618, p < 0.001$) and relational capital ($\beta = 0.326, p < 0.001$), and cognitive capital has a

positive impact on relational capital ($\beta = 0.530, p < 0.001$). These impacts are all significant with $p < 0.001$, and 0 is not covered in the confidence intervals: Structural capital \rightarrow Cognitive capital [0.512, 0.726]; Structural capital \rightarrow Relational capital [0.166, 0.522]; Cognitive capital \rightarrow Relational capital [0.326, 0.684]. Hence, hypotheses 1-3 are all supported. In addition, the strongest impact is from structural capital to cognitive capital ($\beta = 0.618, p < 0.001$) with the highest Beta value. Also, structural capital has less impact on relational capital ($\beta = 0.326, p < 0.001$) than cognitive capital does ($\beta = 0.530, p < 0.001$).

In addition, structural capital has a positive impact on both proactive organizational resilience ($\beta = 0.415, p < 0.001$) and reactive organizational resilience ($\beta = 0.079, p = 0.380$). Structural capital's impact on proactive organizational resilience is considered significant with $p < 0.001$, and 0 is not covered in the confidence interval [0.160, 0.613], whereas the impact on reactive organizational resilience is not significant with $p = 0.380$, and 0 is covered in the confidence interval [-0.115, 0.236]. As a result, hypothesis 4 is supported, whereas hypothesis 5 is rejected. Moreover, cognitive capital has a positive impact on both proactive organizational resilience ($\beta = 0.188, p = 0.157$) and reactive organizational resilience ($\beta = 0.055, p = 0.481$). However, cognitive capital's impact on proactive organizational resilience and reactive organizational resilience is not significant with $p = 0.157$, and $p = 0.481$, and 0 is covered in the confidence intervals [-0.105, 0.422], [-0.170, 0.282] respectively. Thus, hypothesis 6 and 7 are both rejected. Furthermore, relational capital has a positive impact on both proactive organizational resilience ($\beta = 0.065, p = 0.683$) and reactive organizational resilience ($\beta = 0.405, p < 0.001$). Relational capital's impact on reactive organizational resilience is considered significant with $p < 0.001$, and 0 is not covered in the confidence interval [0.253, 0.591], whereas the impact on proactive organizational resilience is not significant with $p = 0.683$, and 0 is covered in the confidence interval [-0.208, 0.399]. As a result, hypothesis 9 is supported, whereas hypothesis 8 is rejected. On the other hand, proactive organizational resilience has a

positive impact on reactive organizational resilience ($\beta = 0.284, p = 0.002$) with a significant [0.097, 0.462] relationship. Thus, hypothesis 10 is supported.

Structural capital ($\beta = 0.415, p < 0.001$) has the strongest impact on proactive organizational resilience with a higher Beta value than cognitive capital ($\beta = 0.188, p = 0.157$) and relational capital ($\beta = 0.065, p < 0.683$), and structural capital is the only predictor that significantly associates with proactive organizational resilience ([0.160, 0.613]). Furthermore, relational capital ($\beta = 0.405, p < 0.001$) has the strongest impact on reactive organizational resilience compared with cognitive capital ($\beta = 0.055, p = 0.631$) and structural capital ($\beta = 0.079, p = 0.380$), and relational capital is the only dimension of social capital that significantly associates with reactive organizational resilience ([0.253, 0.591]).

Finally, reactive organizational resilience ($\beta = 0.194, p = 0.133$) has a positive impact on business performance, whereas proactive organizational resilience ($\beta = -0.153, p = 0.418$) has a negative impact on business performance. However, neither proactive organizational resilience ([-0.493, 0.311]) nor reactive organizational resilience ([-0.165, 0.380]) significantly associates with business performance. Thus, hypotheses 11 and 12 are rejected.

Table 17: Hypothesis Testing Post-Bootstrapping

Hypothesis	Path Coefficients	t-value	p-value	Confidence Interval	Supported
H1: Structural Capital → Cognitive Capital	0.618	11.291	< 0.001	[0.512, 0.726]	Yes
H2: Structural Capital → Relational Capital	0.326	3.639	< 0.001	[0.166, 0.522]	Yes

H3: Cognitive Capital → Relational Capital	0.530	5.795	< 0.001	[0.326, 0.684]	Yes
H4: Structural Capital → Proactive Organizational Resilience	0.415	3.545	< 0.001	[0.160, 0.613]	Yes
H5: Structural Capital → Reactive Organizational Resilience	0.079	0.879	0.380	[-0.115, 0.236]	No
H6: Cognitive Capital → Proactive Organizational Resilience	0.188	1.418	0.157	[-0.105, 0.422]	No
H7: Cognitive Capital → Reactive Organizational Resilience	0.055	0.481	0.631	[-0.170, 0.282]	No
H8: Relational Capital → Proactive Organizational Resilience	0.065	0.409	0.683	[-0.208, 0.399]	No
H9: Relational	0.405	4.708	< 0.001	[0.253, 0.591]	Yes

Capital → Reactive Organizational Resilience					
H10: Proactive Organizational Resilience → Reactive Organizational Resilience	0.284	3.127	0.002	[0.097, 0.462]	Yes
H11: Proactive Organizational Resilience → Business Performance	-0.153	0.809	0.418	[-0.493, 0.311]	No
H12: Reactive Organizational Resilience → Business Performance	0.194	1.503	0.133	[-0.165, 0.380]	No

4.6.4 Size Effects of Significant Relationships

Measurement of size effects is to assess whether omitting any construct can create a substantial impact on the endogenous constructs, which refers to the f^2 effect size (Hair et al., 2017). According to Cohen (1988), f^2 values of 0.35, 0.15 and 0.02 represent large, medium and small effects respectively. In addition, there is no effect when the f^2 values are below 0.02. The f^2 values are shown in table 16 for all combinations of endogenous constructs and corresponding exogenous constructs.

As shown in table 18, structural capital has a higher effect on cognitive capital ($f^2 = 0.619$) than on relational capital ($f^2 = 0.164$). In contrast, structural capital has a lower effect on relational capital ($f^2 = 0.164$) than cognitive capital on relational capital ($f^2 = 0.433$).

Moreover, structural capital has a small to moderate influence on proactive organizational resilience ($f^2 = 0.143$), whereas structural capital has no effect on reactive organizational resilience ($f^2 = 0.006$), with the f^2 value lower than the threshold of 0.02. In contrast, relational capital has no effect on proactive organizational resilience with a f^2 value of 0.003, but it has a small to moderate effect on reactive organizational resilience with a f^2 value of 0.127. However, cognitive capital has no effect on reactive organizational resilience ($f^2 = 0.002$), and only a small effect on proactive organizational resilience ($f^2 = 0.024$), despite being very close to the threshold of 0.02.

Furthermore, proactive organization resilience has a small effect on reactive organizational resilience ($f^2 = 0.100$). In addition, proactive organizational resilience has no effect on business performance ($f^2 = 0.017$), whereas reactive organizational resilience has a small effect on business performance ($f^2 = 0.027$).

Table 18: Effect Sizes

Hypotheses	Pathways	f^2	Effect Sizes
H1:	Structural Capital → Cognitive Capital	0.619	Large
H2:	Structural Capital → Relational Capital	0.164	Moderate
H3:	Cognitive Capital → Relational Capital	0.433	Large
H4:	Structural Capital → Proactive Organizational Resilience	0.143	Small to moderate
H5:	Structural Capital → Reactive	0.006	No effect

	Organizational Resilience		
H6:	Cognitive Capital → Proactive Organizational Resilience	0.024	Small
H7:	Cognitive Capital → Reactive Organizational Resilience	0.002	No effect
H8:	Relational Capital → Proactive Organizational Resilience	0.003	No effect
H9:	Relational Capital → Reactive Organizational Resilience	0.127	Small to moderate
H10:	Proactive Organizational Resilience → Reactive Organizational Resilience	0.100	Small
H11:	Proactive Organizational Resilience → Business Performance	0.017	No effect
H12:	Reactive Organizational Resilience → Business Performance	0.027	Small

4.6.5 Predicted Relevance using Blindfolding

According to Geisser (1974), and Stone (1974), Stone-Geisser's Q^2 value should also be used for evaluating predictive accuracy, which is "an indicator of the model's out-of-sample predictive power or predictive relevance" (Hair et al., 2017, p. 202). For a reflective endogenous construct, Q^2 values greater than zero indicate the path model's predictive relevance (Hair et al., 2017). In addition, Q^2 values are calculated by using blindfolding for a specified omission distance D (Hair et al., 2017). The omission distance D must be determined before running the blindfolding procedure (Hair et al., 2017), which should be from 5 to 10 (Apel & Wold, 1982; Hair, Sarstedt, Ringle, Mena, 2012), and the D must be when the number of samples divided by D is not an integer. Number 7 is chosen as the D in this study; with $138/7 = 19.71$ it is not an integer. The Q^2 values are shown in table 17 by running a blindfolding procedure. According to Hair et al. (2017), the Q^2 values can be measured by using the

cross-validated redundancy, and all Q^2 values should be above the threshold of zero. As shown in table 19, all Q^2 values are greater than zero, which supports the predictive relevance of the model regarding the endogenous latent variables. In addition, relational capital ($Q^2 = 0.295$) possesses the highest predictive accuracy, whereas business performance ($Q^2 = 0.008$) possesses the lowest predictive accuracy. Proactive organizational resilience ($Q^2 = 0.164$) possesses a relatively lower predictive accuracy compared to reactive organizational resilience ($Q^2 = 0.220$), but proactive organizational resilience still plays a significant role towards the reactive organizational resilience.

Table 19: Construct Cross-validated Redundancy

	Q^2 values
Cognitive capital	0.210
Relational capital	0.295
Proactive organizational resilience	0.164
Reactive organizational resilience	0.220
Business performance	0.008

4.7 Chapter Summary

Descriptive statistics reveal that 66.7% of the data was collected from manufacturing firms. Of all respondents, 79% are male, and 62.3% have graduated from universities with a bachelor's degree. After deleting problematic indicators, the proposed model meets the requirements of reliability and validity. Six of the hypotheses are supported as a significant level. In addition, effective sizes and predictive relevance are evaluated, which shows structural capital and relational capital are important antecedents towards organizational resilience.

Chapter 5: Discussion and Conclusion

5.1 Chapter Overview

This chapter begins with a discussion of the results in relation to the current literature. It also outlines the theoretical and managerial contributions of the study, and revisits the research objectives in light of the results. In addition, some limitations and recommendations of this study are provided for researchers.

5.2 Discussion

According to the objectives of the study, the relationships between the three dimensions of social capital were assessed, and some of the hypotheses have been supported by empirical results. The results of this study provided strong support for Hypothesis 1, indicating that a firm's structural capital has a positive impact on its cognitive capital. Consistent with previous studies (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998), these results provide support for the theory that structural capital in the form of social interactions plays an important role in developing cognitive capital. This would explain why structural capital has a positive impact on cognitive capital ($\beta = 0.618, p < 0.001$), with a large size effect ($f^2 = 0.619$). Specifically, structural capital in terms of social interactions, informs a shared vision and values (Tsai & Ghoshal, 1998). Frequent social interactions and communications with supply chain partners can influence collective orientation that enables them to have enthusiasm for pursuing collective goals (Tsai & Ghoshal, 1998; Villiena et al., 2011). Frequent social interactions and communications with supply chain partners can also positively influence mutual understandings and common interests during the process of interaction (Tsai & Ghoshal, 1998). Villiena et al. (2011) also claim that interactions across different levels and functions (logistics and marketing) between a firm and its supply chain partners is important for maintaining a high quality of structural capital. Thus, as suggested by the results of this study, maintaining frequent social interactions and communications across different levels and functions (logistics and marketing) between a firm and its supply chain partners in a post-disaster context, facilitates pursuing collective goals between a firm and its supply chain partners. After

an earthquake, shared interactions between a firm and supply chain partners can be linked to how the firm interacts and communicates with external stakeholders.

Similarly, the results for Hypothesis 2 indicate that a firm's structural capital has a positive impact on its relational capital. Consistent with previous studies (Villiena et al., 2011), these results provide support for the idea that relational capital in the form of friendship, obligations, respect and trust is built through repeated interactions. This would explain why structural capital has a positive impact on relational capital ($\beta = 0.326$, $p < 0.001$), with a moderate size effect ($f^2 = 0.164$). Specifically, trustworthiness is developed through social interactions (Gulati, 1995). Organizations build up their trustworthiness through direct experiences with their partners (Granovetter, 1985). Carey et al. (2011) also argue that structural capital in terms of social interactions, enables organizations to personally assess the commitment and trustworthiness of their supply chain partners. Thus, the results of this study suggest that maintaining frequent social interactions and communications across different levels and functions (logistics and marketing) between a firm and its supply chain partners improves their relationships in terms of enhanced mutual trust and mutual respect, personal friendship and a high level of reciprocity. In addition, based on the results for Hypotheses 1 and 2, these results also provide support for the idea that structural capital is the foundation of social capital that supports both cognitive and relational capitals (Nahapiet & Ghoshal, 1998).

On the other hand, the results for Hypothesis 3 indicate that a firm's cognitive capital has a positive impact on its relational capital. Consistent with previous studies (Barber, 1983; Nahapiet & Ghoshal, 1998), these results provide support for the idea that relational capital based on trustworthy relationships is started, and fostered by common values and goals that bring different social actors together. This would explain why cognitive capital has a positive impact on relational capital ($\beta = 0.530$, $p < 0.001$), with a large size effect ($f^2 = 0.433$). Nahapiet and Ghoshal (1998) also claim that shared values and beliefs, and adherence to reciprocal norms may breed trust

between actors. Common values create harmony of interests that can reduce the chance of opportunistic behaviours during interaction (Ouchi, 1980), which positively influence buyer-supplier relationships (Carey et al., 2011). Thus, these results suggest that a firm's relationships with its supply chain partners be improved in terms of enhanced mutual trust and respect, personal friendship and a high level of reciprocity if this firm shares the same ambitions and values, pursues collective goals, has compatible philosophies and approaches to business dealings, or agrees on the best interests of the relationship with its supply chain partners.

The primary purpose of this study is to assess the relationships between social capital and organizational resilience based on the situation of the 2008 Sichuan (Wenchuan) earthquakes. The analysis provided support for Hypothesis 4, indicating that a firm's structural capital has a positive impact on its proactive organizational resilience capability. Consistent with previous studies (Prasad et al., 2014), these results provide support for the idea that structural capital works as the access to valuable information and resources that are important for building organizational resilience. This valuable information and resources enhance organizational resilience through enabling a firm to detect and prepare for potential disruptions (Bode & Macdonald, 2016). This would explain why a firm's structural capital has a positive impact on its proactive organizational resilience capability ($\beta = 0.415, p < 0.001$), with a small to moderate size effect ($f^2 = 0.143$). Bode and Macdonald (2016) also state that adequate information and resources enable a firm to assess itself and its operational environment, and to improve itself before facing disruptions. Frequent interactions and communications at different levels and different functions within organizations, and with supply chain partners, enable the information and resources to become more readily accessible and immediately available (Villena et al., 2011). Thus, the results of this study suggest that maintaining frequent social interactions and communications at different levels and different functions within a firm and with its supply chain partners, improves a firm's proactive resilience through enhanced ability to assess itself and its environment, and to prepare for potential disruptions.

In addition, the analysis did not provide support for Hypotheses 6 and 8, that firm`s cognitive capital ($\beta = 0.188, p = 0.157$) and relational capital ($\beta = 0.065, p < 0.683$) are positively associated with its proactive organizational resilience capability given that these relationships were found to be statistically significant. This may imply that a firm`s cognitive capital and relational capital may not be necessary for building a firm`s proactive resilience. Generally, the relationships between a firm and its suppliers are contractual and enable a firm to obtain information, resources and/or services based on their agreements (Borekci et al., 2014). In a normal situation without disasters, a firm usually does not suffer from shortage of supply. It can get adequate resources from its suppliers. This would explain why only a firm`s structural capital significantly supports its proactive resilience capability, even though a firm`s structural capital, cognitive capital and relational capital are all positively associated with its proactive resilience capability. However, in a post-disaster situation, a firm`s structural capital is the only aspect of social capital that improves its proactive resilience capability.

The analysis also provided support for Hypothesis 9, indicating that a firm`s relational capital has a positive impact on its reactive organizational resilience capability. Consistent with previous studies (Johnson et al., 2013; Prasad et al., 2014), these results provide support for the idea that during disruptions, strong relational capital ensures a firm has committed and trustworthy relationships with its supply chain partners, which enables a firm to obtain valuable information and resources for coping during disruptions. This would explain why a firm`s relational capital has a positive impact on its reactive organizational resilience capability ($\beta = 0.405, p < 0.001$), with a small to moderate size effect ($f^2 = 0.127$). Johnson et al. (2013) also claim that adequate information and resources enable a firm to respond to and recover from disruptions through quickly recognizing them, and immediately formulating and implementing reactions. In post-disaster situations, a firm is able to build up its ability for response to and recovery from disruptions if it has good relationships with its

supply chain partners.

However, the analysis did not provide support for Hypothesis 5, that a firm's structural capital has a positive relationship with its reactive organizational resilience capability, given that the results were statistically insignificant ($\beta = 0.079$, $p = 0.380$). This may imply that a firm's structural capital is not directly related to its reactive organizational resilience capability. After disruptions, organizations become more resource dependent on their partners (Bode et al., 2011). A firm finds it more difficult to design and implement strategies for response and recovery if it is highly dependent on partners (Bode & Macdonald, 2016). Flow of information and resources is also negatively impacted after disasters, such as delivery reliability and communication (Bode et al., 2011; Bode & Macdonald, 2016). A firm's partners (suppliers) may suffer from the same issues within the affected region. Buyers may face shortage of supplies when suppliers only have limited inventory. Prasad et al. (2014) argue that relational capital enables organizations to obtain valuable information and resources through social networks, especially during a period of crisis. Suppliers and buyers are more likely to work collectively in a period of crisis because of the good relationships (mutual trust and beneficial relations) that have been established over years (Prasad et al., 2014). This may help to explain why relational capital is really important and necessary for a firm to maintain the functionality of its supply chain networks during disasters. Such relationships enable the firm to obtain valuable resources for implementing disaster response and recovery strategies. During and after a disaster, a firm may not be able to obtain enough resources for implementing response and recovery strategies if it does not maintain a high quality of relationship with its supply chain partners, and specific resources are scarce in the local market. This may explain why structural capital did not directly impact reactive organizational resilience, but structural capital indirectly impacted reactive organizational resilience through relational capital.

Similarly, the analysis did not provide support for Hypothesis 7, that a firm's

cognitive capital has a positive relationship with its reactive organizational resilience capability, given that the results were statistically insignificant ($\beta = 0.055$, $p = 0.631$). This may imply a firm's cognitive capital is not directly related to its reactive organizational resilience capability. Cognitive capital helps organizations to make a clear sense of direction of disaster response that enables them to react to disruptions accurately (Lengnick-Hall et al., 2011). Cognitive capital also enhances mutual understanding (Tsai & Ghoshal, 1998) that may help a firm to interpret important information from its partners (Inkpen and Tsang, 2005), which enables the firm to respond to disruptions accurately through precise interpretation of external information (Bode & Macdonald, 2016). Villena et al. (2011) argue that relational capital (e.g. mutual trust and respect, high level of reciprocity, and personal friendship) enhances the willingness of engaging in open communication and information sharing, and behavioural transparency, especially during disasters (Lengnick-Hall et al., 2011). This may help explain why relational capital is important and necessary for a firm and its partners to share a common understanding, and to achieve common goals during disasters. High quality of relationships enables a firm and its partners to share important information and communicate openly, facilitating the firm and its partners to share values, visions, approaches and goals of disaster response and recovery. Carey et al. (2011) also argue that trust is required while sharing more tactic and organization-specific information between a firm and its partners. Thus, a firm's cognitive capital enhances its reactive organizational resilience capability only through its high quality relational capital based on trustworthiness. This would explain why cognitive capital did not directly impact the reactive organizational resilience, but cognitive capital indirectly impacted reactive organizational resilience through relational capital.

On the other hand, the analysis also supported Hypothesis 10, indicating a firm's proactive organizational resilience has a positive impact on its reactive organizational resilience. Consistent with previous studies (Bode & Macdonald, 2016), these results provide support for the idea that strategic or behavioural readiness for disruptions is

an important antecedent for coping during them. This would explain why a firm's relational capital has a positive impact on its reactive organizational resilience capability ($\beta = 0.284$, $p = 0.002$), with a small size effect ($f^2 = 0.100$). Thus, a firm would have a higher chance to respond successfully to disruptions and recover itself from them if this firm is well-prepared before the disruptive event happens.

However, a firm's proactive and reactive organizational resilience did not support its business performance based on the results of this study (Hypothesis 11 and 12). The results indicate that firm's proactive resilience capability negatively influence its business performance ($\beta = -0.153$, $p = 0.418$), but this relationship was not statistically significant. Building proactive organizational resilience in terms of readiness requires self-assessment and self-improvement before experiencing disruptive events (Bode & Macdonald, 2016), which implies that a firm needs to set strategies for coping with future disruptions (Mitroff & Alpaslan, 2003), to train and rehearse for future disruptions (Sniezek, Wilkins, Wadlington & Baumann, 2002), to choose proper strategies (Tang, 2006), and to implement strategies (Zsidisin & Smith, 2005). Chen (2016) states that implementing these adjustment strategies leads to costs, and a firm may face higher costs when it is more inflexible. This may negatively influence overall financial performance. In addition, organizational resilience is developed through a set of organizational capabilities, processes, practices and routine (Lengnick-Hall & Beck, 2005). As a result, a firm's original operational processes, routines, and practices may be disturbed when this firm improves or develops its proactive resilience capability. Given that the firms in this study are surveyed 10 years after the disruptive event, the participants may not be totally aware of how the earthquakes impacted business performance. This can possibly explain why proactive organizational resilience has an insignificant impact on business performance.

On the other hand, the analysis results indicate that firm's reactive organizational resilience has a positive influence on its business performance ($\beta = 0.194$, $p = 0.133$), but this influence was not statistically significant. Pettit et al. (2013) state that

successfully dealing with various crises is an important element of reactive organizational resilience, which includes public relations issues. The government is the most important stakeholder for firms operating in a transitional economy, such as China, which plays a fundamental role in allocating crucial corporate resources, especially for large firms (Jia & Zhang, 2013; Ma & Parish, 2006). In China, a firm may obtain preferential treatment for easy access to limited resources or information if this firm maintains good relationships with the government or public officials (Gao, 2011). A firm's prior corporate social performance helps it to maintain and build up its public perceptions of goodwill (Barnett & Salomon, 2006), which enhances a firm's relationships with its stakeholder through its reciprocal and trust behaviours (Frooman, 1999; Wang, Choi & Li, 2008), especially with the government, investors and customers (Jia & Zhang, 2013). Specifically, philanthropic donations after a natural disaster can significantly enhance a firm's relationships with stakeholders and its long-term corporate value (Muller & Whiteman, 2009). On the other hand, the 2008 Sichuan (Wenchuan) earthquake was too hard for the government to handle alone (Jia & Zhang, 2013). The government needed firms to join in relief efforts and work together to deal with the disaster (Zhang, Rezaee & Zhu, 2009). In addition, other stakeholders can also express strong demands for firms to participate in disaster relief, such as investors, customers and media (Muller & Kraussl, 2011). Based on the situation of the 2008 Sichuan (Wenchuan) earthquakes, larger firms received greater attention from the government, the public and the media, which fuelled their incentive to increase their reputation through donations (Gao, 2011). However, this attention from the government, the public and the media produced pressures on firms (Gao, 2011). Also, firms' good social performance can negatively influence firms' financial performance (Jia & Zhang, 2013). Luo (2006) also argues that corporate social performance can be seen as a waste of resources in the short-term. On the other hand, firms have to face a higher level of operational costs in a post-disaster situation, such as high costs for resource transportation, and post-disaster reconstruction (Chang, Wilkinson, Potangaroa & Seville, 2012). These unplanned increased costs also negatively influenced on firms' overall financial performance, no matter how resilient

they are. As a result, the overall business performance improvement might be partly offset by the increased social performance, and increased costs of transportation and post-disaster reconstruction, even though many authors claim that organizational resilience supports business performance (e.g. Lengnick-Hall et al., 2011; Linnenluecke et al., 2012). This may be the reason that when the level of organizational resilience increases, the overall business performance may not be increased significantly. This may possibly explain why reactive organizational resilience has a statistically insignificant influence on firm`s business performance in this study.

5.2.1 Theoretical Contributions

The first theoretical contribution of this study is that a theoretical model is tested, which confirms the relationships between the three dimensions of social capital and organizational resilience based on the perspective of proactive and reactive organizational resilience. This model is assessed in the context of the effect of the 2008 Sichuan (Wenchuan) earthquakes in China on large firms. In this study, only a firm`s structural capital has a statistically direct and significant relationship with its proactive resilience capability, whereas only a firm`s relational capital has a statistically direct and significant relationship with its reactive resilience capability. Some studies argue that all three dimensions of social capital are important for building both proactive and reactive organizational resilience (Johnson et al., 2013; Prasad et al., 2014). In addition, the three dimensions of social capital have relationships within themselves (Johnson et al., 2013; Nahapiet & Ghoshal, 1998). Thus, a theoretical contribution of this study is demonstrating that the three dimensions of social capital have different influences on building organizational resilience in a post disaster context. In addition, all dimensions of social capital should be considered in building organizational resilience, even though they have different relationships with organizational resilience.

Secondly, after the 2008 Sichuan (Wenchuan) earthquakes, local large firms might not

only have focused on organizational response and recovery, but also on building long-term corporate value and public relations through corporate social performance. Larger firms might also have faced institutional pressures from the government, the public and media which made them focus on corporate social performance (Jia & Zhang, 2013). The institutional pressures may be different in different countries and cultures (Chang et al., 2012), especially in developing countries (Prasad et al., 2014). These institutional factors may weaken the capability of reactive organizational resilience to contribute to short-term business performance, especially in developing countries, such as China. Hence, this study contributes to the disaster management literature by showing that business performance does not necessarily depend on the resilience of the organization in the long term. Organizational resilience may matter only in rebuilding or sustaining the financial performance of an organization in the first few years post-disaster.

5.2.2 Managerial Contributions and Recommendations

These results of this study may provide general guidance for practitioners towards building firms' resilience capability through investments in building social capital. If firms want to be proactive in building resilience, they should deliberately build up social capital, especially the structural aspect of social capital. For example, firms should primarily establish stable and diversified social networks in order to build proactive organizational resilience through enhancing structural capital. Johnson et al. (2013) claim that social capital can be nurtured deliberately. For example, a firm's personnel should spend time together in social occasions and maintain a close social relationship with its key supply chain partners (Tsai & Ghoshal, 1998). A firm's formal efforts to enhance network communications are also important for strengthening structural capital (Johnson et al., 2013), such as frequently communicating with key supply chain partners, promoting interactions across different functions/levels within firms and between key supply chain partners (Villena et al., 2011). From a reactive resilience perspective, firms should focus more on enhancing relational capital in order to strengthen reactive organizational resilience.

For example, firms should maintain high quality relationships with key supply chain partners, which are characterized by mutual trust and respect, high levels of reciprocity, and personal friendship in such relationships (Carey et al., 2011; Villane et al., 2011).

In addition, this study also illustrates the significant impact of a firm's proactive resilience capability on their reactive resilience capability. Thus, this suggests that managers should focus on building a firm's proactive resilience capability before facing disruptions in order to enhance its reactive resilience capability for coping with disruptions. This also implies that managers should build a strong social capital before experiencing disruptive events. This can help a firm to respond and recover itself successfully from disruptions in a post-disaster situation. For example, firms should create internal awareness of disruptions, analyze and assess both probability and influence of potential disruptions, improve their prevention capabilities, and plan for potential disruptive events (Bode & Macdonald, 2016). These actions enable firms to recognize a threatening situation quickly, and immediately formulate and implement a set of possible reactions to disruptions in a post-disaster situation (Bode & Macdonald, 2016).

5.2.3 Revisiting the Aims and Objectives

Despite few studies having revealed that the three dimensions of social capital have positive relationships with organizational resilience (e.g. Johnson et al., 2013; Prasad et al., 2014), these relationships have not been empirically tested in a post-disaster context. In addition, some studies (Bode & Macdonald, 2016; Linnenluecke et al., 2012) claim that organizational resilience consists of proactive and reactive resilience capabilities, and proactive and reactive resilience capabilities are able to enhance business performance. These antecedents were adopted and adapted into a holistic model (Figure 1) that explains the relationships between the three dimensions of social capital, proactive and reactive organizational resilience, and business performance. Assessing these relationships between the three dimensions of social

capital, proactive and reactive organizational resilience, and business performance in the context of the 2008 Sichuan (Wenchuan) earthquakes, provides a more detailed explanation of how a firm`s social capital supports its resilience capability in a post-disaster context. Thus, this study fills the research gap regarding the relationships between the three dimensions of social capital and organizational resilience in a post-disaster context.

The first objective was to measure the relationships between the three dimensions of social capital. Results from the analysis show structural capital significantly supports both relational and cognitive capitals, and cognitive capital also significantly supports relational capital. Thus, it can be concluded that a firm`s structural capital is the foundation of its social capital, and the firm`s structural and cognitive capitals significantly support its relational capital.

The second objective was to empirically identify and test the relationships between the three dimensions of social capital and proactive and reactive organizational resilience in a post-disaster context. The results show that only structural capital significantly supports proactive organizational resilience, whereas only relational capital significantly supports reactive organizational resilience. In addition, structural and cognitive capitals indirectly support reactive organizational resilience through relational capital. Thus, these results reveal that structural capital is the key aspect of a firm`s social capital in building its proactive resilience capability, while relational capital is the key aspect of a firm`s social capital in building its reactive resilience capability.

The third objective was to test the relationship between proactive and reactive organizational resilience in a post-disaster context. The results show that proactive organizational resilience significantly supports reactive organizational resilience. Thus, a firm`s reactive resilience capability can be enhanced if it has proactively prepared for unpredicted disruptions (Bode & Macdonald, 2016).

The fourth objective was to create a replicable framework that helps scholars to test the relationships between the three dimensions of social capital and proactive/reactive organizational resilience in various contexts. The proposed model represents a reasonable predictive power whilst meeting requirements of reliability, validity and multicollinearity. All indicators possess strong relevance with their associated constructs, but not all coefficient pathways are significantly supported. Thus, the proposed model needs to be tested in other cases for measuring the relationships between the three dimensions of social capital and proactive/reactive organizational resilience. The coefficient pathways may be different in different cases.

The aim of this study was to evaluate the role of social capital in building organizational resilience in a post-disaster context based on the proposed model. Research objectives have accomplished this aim based on the proposed model.

5.3 Research Limitations

There are some limitations in this study that need to be considered in future research on this topic or the method used. Firstly, the data was only collected from a small region in Sichuan province, so the analysis results may not be able to explain the overall relationships between social capital and organizational resilience generally based on the situation of 2008 Sichuan (Wenchuan) earthquakes. Emerson (2015), and Turnbull (2017) claim that the ability to generalize the results can be limited if the data is collected from the same geographical area. Consequently, the results can only explain a subgroup of firms in a specific region of Sichuan province. In addition, this method might overlook many firms in other regions in Sichuan province that performed and reacted differently in the situation of the 2008 Sichuan (Wenchuan) earthquakes. In order to reduce or overcome this, respondents should be widely selected. Researchers should consider this limitation when replicating this study or applying the same approach.

Secondly, it is difficult to get an objective measurement of actual behaviours, when the data is based on respondents' personal opinions. Also, as the 2008 Sichuan (Wenchuan) earthquakes happened a long time ago, respondents may not have a clear memory of that event. Therefore, this study can only provide approximate results for actual relationships between social capital and organizational resilience and business performance.

5.4 Conclusions

Social capital is an important resource that helps a firm to cope with disruptions in adverse situations through improving its resilience capability. After analyzing the data that was collected from Sichuan province in China, the results indicate that the three dimensions of social capital have different level of significance on building proactive and reactive organizational resilience. Structural capital is the only dimension of social capital that significantly supports proactive organizational resilience, whereas relational capital is the only dimension of social capital that significantly supports reactive organizational resilience. Thus, these results may suggest that managers need to focus more on structural capital in building proactive organizational resilience capability, whereas they should focus more on relational capital in building reactive organizational resilience.

However, based on the analysis results, neither proactive organizational resilience nor reactive organizational resilience significantly supports a firm's business performance. The possible reasons would be that adjusting and improving a firm's capabilities for coping during potential disruptions may temporarily disrupt or interrupt its original operational activities, processes and routines, and negatively influence business performance. In the post-disaster situations, larger firms are not only focused on disaster response and recovery, but also on improving long-term corporate value and public relations through corporate social performance, such as donations, which may weaken business performance in the short-term. On the other hand, managers may also focus on building and enhancing dynamic capability that may support a firm's

resilience capability and business performance.

Finally, because of the limitations, these analysis results may only provide an approximate consequence for the actual situation. However, these may provide useful information or hints for researchers and practitioners for their researches or practices.

References

- Armstrong-Stassen, M. (1994). Coping with transition: A study of layoff survivors. *Journal of Organizational Behavior, 15*(7), 597-621.
- Altay, N. (2008). Issues in disaster-relief logistics. In M. Gad-el-Hak (ed.), *Large-scale disasters: Prediction, control and mitigation* (pp. 120-146). Cambridge: Cambridge University Press.
- Ashford, S. (1988). Individual strategies for coping with stress during organizational transition. *Journal of Applied Behavioral Science, 24*(1), 9-36.
- Ambulkar, S., Blackhurst, J., & Grawe, S. (2015). Firm's resilience to supply chain disruptions: Scale development and empirical examination. *Journal of Operations Management, 33*, 111-122.
- Anderson, C. R., Hellriegel, D., & Slocum, J. (1977). Managerial responses to environmentally induced stress. *Academy of Management Journal, 20*(2), 260-272.
- Adler, P. S., Kwon, S. W. (2000). Social capital: the good, the bad, and the ugly. In E. L. Lesser (Ed.), *Knowledge and Social Capital: Foundations and Applications*. Woburn: Butterworth-Heinemann.
- Adler, P. S. and Kwon, S. W. (2002). Social capital: prospects for a new concept. *Academy of Management Review, 27*(1), 17-24.
- Annarelli, A., & Nonino, F. (2016). Strategic and operational management of organizational resilience: Current state of research and future directions. *Omega, 62*(7), 1-18.
- Allenby, B., & Roitz, J. (2005). Building the resilient firm: the new challenge to EHS organizations. *Environmental Quality Management, 15*(2), 27-36.

- Apel, H. & Wold, H. O. A. (1982). Soft modeling with latent variables in two or more dimensions: PLS estimation and testing for predictive relevance. In K. J. Joreskog & H. Wold (Eds.), *Systems under indirect observa Part II* (pp. 209-247). Amsterdam: North-Holland.
- Barber, B. (1983). *The logic and limits of trust*. Rutgers University Press: Brunswick, NJ.
- Barczak, G. (2015). Publishing qualitative versus quantitative research. *Journal of Product Innovation Management*, 32(5), 658-659.
- Bourrier, M. (2011). The legacy of the high reliability organization project. *Journal of Contingencies Crisis Management*, 19(1), 9-13.
- Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.
- Bourdieu, P. (1985). The forms of capital. In J.G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). New York: Greenwood.
- Burt, R. S. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Baker, W. (1990). Market networks and corporate behavior. *American Journal of Sociology*, 96(3), 589-625.
- Burnard, K., & Bhamra, R. (2011). Organizational resilience: Development of a conceptual framework for organizational response. *International Journal of Production Research*, 49(18), 5581-5599.
- Bowen, A. M., Daniel, C. M., Williams, M. L., & Baird, G. L. (2008). Identifying Multiple Submissions in Internet Research: Preserving Data Integrity. *AIDS and Behavior*, 12(6), 964-973.

- Beer, M., Eisenstadt, R., & Spector, B. (1990). *The critical path to corporate renewal*. Cambridge, MA: Harvard Business School Press.
- Barge, S., & Gehlbach, H. (2012). Using the theory of satisficing to evaluate the quality of survey data. *Research in Higher Education*, 53(2), 182–200.
- Blomqvist, K., Hurmelinna, P., & Seppanen, R. (2005). Playing the collaboration game right-balancing trust and contracting. *Technovation*, 25(5), 497–504.
- Barclay, D. W., Higgins, C. A., & Thompson, R. (1995). The partial least squares approach to causal modeling: Personal computer adoption and use as illustration. *Technology Studies*, 2(3), 285-309.
- Bonner, J., Kim, D., & Cavusgil, S. (2005). Self-perceived strategic network identity and its effects on market performance in alliance relationships. *Journal of Business Research*, 58(10), 1371-1380.
- Batjargal, B., & Liu, M. (2004). Entrepreneurs' access to private equity in China: The role of social capital. *Organization Science*, 15(2), 159-172.
- Bode, C., & Macdonald, J. R. (2016). Stages of supply chain disruption response: Direct, constraining, and mediating factors for impact mitigation. *Decision Sciences*, 48(5), 836-874.
- Borekci, D., Rofcanin, Y., & Sahin, M. (2014). Effects of organizational culture and organizational resilience over subcontractor riskiness: A multi-method study in longitudinal time setting. *European Business Review*, 26(1), 2-22.
- Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, 27(11), 1101–1122.
- Bierly, P. E., & Spender, J. C. (1995). Culture and high reliability organisations: The case of the nuclear submarine. *Journal of management*, 21(4), 639-650.

- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal*, 45(2), 875-893.
- Biggs, R., Schluter, M., Biggs, D., Bohensky, E. L., BurnSilver, S., Cundill, G.,...West, P. C. (2012). Toward principles for enhancing the resilience of ecosystem services. *Annual Review of Environment and Resources*, 37(1), 421-448.
- Bode, C., Wagner, S. M., Petersen, K. J., & Ellram, L. M. (2011). Understanding responses to supply chain disruptions: Insights from information processing and resource dependence perspectives. *Academy of management journal*, 54(4), 833-856.
- Bagozzi, R. P., Yi, Y., & Philipps, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36(3), 421-458.
- Capaldo, A. (2007). Network structure and innovation: the leveraging of a dual network as a distinctive relational capability. *Strategic Management Journal*, 28 (6), 585–608.
- Cicourel, A. V. (1973). *Cognitive sociology*. Harmondsworth, England: Penguin Books.
- Clark, B. R. (1972). The organizational saga in higher education. *Administrative Science Quarterly*, 17(2), 178-184.
- Choo, C. W. (2008). Organizational disasters: Why they happen and how they may be prevented. *Management Decision*, 46(1), 32–45.
- Coutu, D. L. (2002). How resilience works. *Harvard Business Review*, 80(5), 46–55.
- Coiera, E. (2007). Putting the technical back into socio-technical systems research. *International Journal of Medical Informatics*, 76(1), 98–103.

- Carroll, G. R. (1993). A sociological view on why firms differ. *Strategic Management Journal*, 14(4), 237-249.
- Cohen, J. (1988). *Statistical power analysis for the behavioral science*. Mahwah, NJ: Lawrence Erlbaum.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, 95-120.
- Coleman, J. S. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.
- Carroll, J. S. (1998). Organisational learning activities in high-hazard industries: The logics underlying self-analysis. *Journal of Management Studies*, 35(6), 699–717.
- Cox, L. (2012). Community resilience and decision theory challenges for catastrophic events. *Risk Analysis*, 32(11), 1919-1934.
- Chen, S. H. (2016). Construction of an early risk warning model of organizational resilience: An empirical study based on samples of R&D teams. *Discrete Dynamics in Nature and Society*, 2016, 1-9.
- Chin, W. (2010). How to write up and report PLS analyses. In V. Vinzi, W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: Concepts, methods and applications* (pp. 655-690). Heidelberg, Germany: Springer.
- Chen, X. P., & Chen, C. C. (2004). On the intricacies of the Chinese guanxi: A process model of guanxi development. *Asia Pacific Journal of Management*, 21(3), 305-324.
- Carmona-Lavado, A., Cuevas-Rodriguez, G., & Cabello-Medina, C. (2010). Social and organizational capital: Building the context for innovation. *Industrial Marketing Management*, 39(4), 681-690.

- Chang, S., & Falit-Baiamonte, A. (2002). Disaster vulnerability of businesses in the 2001 Nisqually earthquake. *Environmental Hazards*, 4(2), 59-71.
- Cassel, C., Hackl, P., & Westlund, A. H. (1999). Robustness of partial least squares method for estimating latent variable quality structures. *Journal of Applied Statistics*, 26(4), 435-446.
- Carey, S., Lawson, B., & Krause, D. R. (2011). Social capital configuration, legal bonds and performance in buyer-supplier relationships. *Journal of Operations Management*, 29(4), 277-288.
- Chrisholm, A., & Nielsen, K. (2009). Social capital and the resource-based view of the firm. *International Studies of Management and Organisation*, 39(2), 7-32.
- Collins, J. C., & Porras, J. I. (1994). *Built to last: Successful habits of visionary companies*. New York: HarperCollins.
- Christopher, M., & Peck, H. (2004). Building the resilient supply chain. *The International Journal of Logistics Management*, 15(2), 1-14.
- Child, J., & Rodrigues, S. (1996). The role of social identity in the international transfer of knowledge through joint ventures. In S. R. Clegg, & G. Palmer (Eds.), *The politics of management knowledge* (pp. 46-68). London: Sage.
- Chang, Y., Wilkinson, S., Potangaroa, R., & Seville, E. (2012). Managing resources in disaster recovery projects. *Engineering, Construction and Architectural Management*, 19(5), 557-580.
- Durodie, B. (2003). Is real resilience attainable? *The Monitor*, 2(6), 15-19.
- Dubrovski, D. (2004). Peculiarities of managing a company in crisis. *Total Quality Management and Business Excellence*, 15(9-10), 1199-1207.
- Duignan, J. (2016). Convenience sampling. In a dictionary of business research methods. Oxford University Press. Retrieved 15 Jul. 2018, from

<http://www.oxfordreference.com.ezproxy.canterbury.ac.nz/view/10.1093/acref/9780191792236.001.0001/acref-9780191792236-e-123>

Dutton, J. E., & Jackson, S. E. (1987). Categorizing strategic issues: links to organizational action. *Academy of Management Review*, 12(1), 76–90.

Dalziell, E. P., & McManus, S. T. (2004). Resilience, vulnerability, and adaptive capacity: Implications for system performance. Presented at the International Forum for Engineering Decision Making: Stoos, Switzerland.

Druskat, V. U., & Pescosolido, A. T. (2002). The content of effective teamwork mental models in self-managing teams: Ownership, learning and heedful interrelating. *Human Relations*, 55(3), 283-314.

Earthquake Relief Experts Group of National Committee for Disaster Reduction and Ministry of Science and Technology. (2008). *Comprehensive analysis and assessment of the Wenchuan Earthquake*. Beijing: Science Press. (in Chinese).

Ellis, P. (2010). Social ties and international entrepreneurship: Opportunities and constraints affecting firm internationalization. *Journal of International Business Studies*, 41(1), 99-127.

Emerson, R. M. (1962). Power-dependence relations. *American Sociological Review*, 27(5), 31-41.

Emerson, R. W. (2015). Convenience sampling, random sampling, and snowball sampling: How does sampling affect the validity of research? *Journal of Visual Impairment & Blindness (Online)*, 109(2), 164-168.

Endsley, M. R., Bolté, B., & Jones, D. G. (2003). *Designing for situation awareness: An approach to user-centered design*. London: Taylor and Francis.

Elliot, M., Fairweather, I., Olsen, W., & Pampaka, M. (2016). Convenience sampling. In a dictionary of social research methods. Oxford University Press. Retrieved

15 Jul. 2018, from

<http://www.oxfordreference.com.ezproxy.canterbury.ac.nz/view/10.1093/acref/9780191816826.001.0001/acref-9780191816826-e-0080>.

Engemann, K., & Henderson, D. (2011). *Business Continuity and Risk Management: Essentials of Organizational Resilience*. Rothstein Associates, CT.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10/11), 1105-1121.

Fukuyama, F. (1995). *Trust: Social virtues and the creation of prosperity*. London: Hamish Hamilton.

Fairlough, G. (1994). *Creative compartments: A design for future organization*. London: Adamantine Press.

Frooman, J. (1999). Stakeholder influence strategies. *Academy of Management Review*, 24(2), 191–206.

Fiksel, J. (2006). Sustainability and resilience: Toward a systems approach. *Sustainability: Science Practice and Policy*, 2(2), 14–21.

Foster, S. P., & Dye, K. (2005). Building continuity into strategy. *Journal of Corporate Real Estate*, 7(2), 105-119.

Ferrier, W. J., Smith, K. G., & Grimm, C. M. (1999). The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers. *Academy of Management Journal*, 42(4), 372–388.

Giddens, A. (1990). *The consequences of modernity*. Cambridge, England: Polity Press.

Garson, D. G. (2016). *Partial Least Squares: Regression and Structural Equation Models*. Asheboro: Statistical Associates Publishing. Retrieved June 13, 2018, from https://www.smartpls.com/resources/ebook_on_pls-sem.pdf

- Graugaard, J. (2012). A tool for building community resilience? A case study of the Lewes pound. *Local Environment*, 17(2), 243-260.
- Gabarro, J. J. (1978). The development of trust, influence, and expectations. In A. G. Athos, & J. J. Gabarro (Eds.), *Interpersonal behaviors: Communication and understanding in relationships* (pp. 290-303). Englewood Cliffs, NJ: Prentice-Hall.
- Galbraith, J. R. (1977). *Organization design*. Reading, MA: Addison-Wesley.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- Granovetter, M. S. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3), 481-510.
- Granovetter, M. S. (1992). Problems of explanation in economic sociology. In N. Nohria & R. Eccles (Eds.), *Networks and organizations: Structure, form and action* (pp. 25-56). Boston: Harvard Business School Press.
- Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, 19(4), 293-317.
- Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal*, 38(1), 85-112.
- Geisser, S. (1974). A predictive approach to the random effects model. *Biometrika*, 61(1), 101-107.
- Gao, Y. Q. (2011). Philanthropic disaster relief giving as a response to institutional pressure: Evidence from China. *Journal of Business Research*, 64(12), 1377-1382.
- Gittell, J. H., Cameron, K., Lim, S., & Rivas, V. (2006). Relationships, layoffs, and

- organizational resilience: Airline industry responses to September 11. *The Journal of Applied Behavioral Science*, 42(3), 300-329.
- Gilmore, T. N., & Hirschhorn, L. (1983). Management challenges under conditions of retrenchment. *Human Resource Management*, 22(4), 342-357.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
- Horwich, G. (2000). Economic lessons of the Kobe earthquake. *Economic Development and Cultural Change*, 48(3), 521–542.
- Haruyama, S. (2016). Introduction—Overview of natural disasters and coastal landforms. In S. Haruyama, & T. Sugai (Eds.), *Natural disaster and coastal geomorphology* (pp. 1-13). Cham: Springer.
- Hair, J. F., Hult, G. M., Ringle, C. M., & Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM). Los Angeles: SAGE Publications.
- Hair, J. F., Hult, T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Los Angeles, California: Sage Publishing.
- Hoffi-Hofstetter, H., & Mannheim, B. (1999). Managers' coping resources, perceived organizational patterns, and responses during organizational recovery from decline. *Journal of Organizational behavior*, 20(5), 665-685.
- Hollnagel, E., Nemeth, C. P., & Dekker, S. (Eds.). (2008). Remaining sensitive to the possibility of failure. Cornwall, U.K: Ashgate.
- Hatum, A., & Pettigrew, A. M. (2005). Determinants of organizational flexibility: A study in an emerging economy. *British Journal of Management*, 17 (2), 115–137.

- Hatun, A., & Pettigrew, A. M. (2006). Determinants of organizational flexibility: A study in an emerging economy. *British Journal of Management*, 17(2), 115–137.
- Handfield, R. B., Ragatz, G. L., Petersen, K. J., & Monczka, R. M. (1999). Involving suppliers in new product development. *California Management Review*, 42(1), 59–82.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20(3), 277-320.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-151.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40(3), 414-433.
- Hamel, G., & Valikangas, L. (2003). The quest for resilience. *Harvard Business Review*, 81(9), 52-63.
- Inkpen, A. C., & Tsang, W. K. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review*, 30(1), 146-165.
- Johnson, J. A. (2005). Ascertaining the validity of individual protocols from Web-based personality inventories. *Journal of Research in Personality*, 39(1), 103–129.

- Jap, S. D., & Anderson, E. (2003). Safeguarding interorganizational performance and continuity under ex post opportunism. *Management Science*, 49(12), 1684–1701.
- Johnson, N., Elliott, D., & Drake, P. (2013). Exploring the role of social capital in facilitating supply chain resilience. *Supply Chain Management: An International Journal*, 18(3), 324-336.
- Judge, W. Q., Fryxell, G. E., & Dooley, R. S. (1997). The new task for R&D management: Creating goal-directed communities for innovation. *California Management Review*, 39(3), 72–86.
- Jonsson, S., & Lindbergh, J. (2013). The development of social capital and financial of entrepreneurial firms: From financial bootstrapping to bank funding. *Entrepreneurship Theory and Practice*, 37(4), 661-686.
- Jia, M., & Zhang, Z. (2013). Managerial ownership and corporate social performance: Evidence from privately owned Chinese firms' response to the Sichuan earthquake. *Corporate, Social Responsibility and Environmental Management*, 20(5), 257-274.
- Krackhardt, D. (1989). Graph theoretical dimensions of informal organization. *Paper presented at the annual meeting of the Academy of Management*. Washington, DC.
- Krackhardt, D. (1992). The strength of strong ties. In N. Nohria, & R. G. Eccles (Eds.), *Networks and organizations: Structure, form and action* (pp. 216-239). Boston: Harvard Business School Press.
- Kreps, G. A. (1984). Sociological inquiry and disaster research. *Annual Review of Sociology*, 10(1), 309-330.
- Kramer, R. M., Brewer, M. B., & Hanna, B. A. (1996). Collective trust and collective action: The decision to trust as a social decision. In R. M. Kramer, & T. R.

- Tyler (Eds.), *Trust in organizations. Frontiers of theory and research* (pp. 357-389). London: Sage.
- Knez, M., & Camerer, C. (1994). Creating expectational assets in the laboratory: Coordination in “weakest link” games. *Strategic Management Journal*, 15(1), 101-119.
- Karahanna, E., & Preston, D. S. (2013). The effect of social capital of the relationship between the CIO and top management team on firm performance. *Journal of Management Information Systems*, 30(1), 15-55.
- Kimberlin, S. E., Schwartz, S. L., & Austin, M. J. (2011). Growth and resilience of pioneering nonprofit human service organizations: A cross-case analysis of organizational histories. *Journal of Evidence-Based Social Work*, 8(1), 4-28.
- Kale, P., Singh, H., & Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal*, 21(3), 217–237.
- Larson, A. (1992). Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. *Administrative Science Quarterly*, 37(1), 76-104.
- Leiner, D. J. (2013). *Too fast, too straight, too weird: Post-hoc identification of meaningless data in internet surveys*. Retrieved May 25, 2018, from Research Gate:
https://www.researchgate.net/publication/258997762_Too_Fast_Too_Straight_Too_Weird_Post_Hoc_Identification_of_Meaningless_Data_in_Internet_Surveys
- Leonard-Barton, D. (1995). *Wellsprings of knowledge: Building and sustaining the source of innovation*. Boston: Harvard Business School Press.
- Langer, E. J. (1989). *Mindfulness*. Reading, MA: Addison-Wesley.

- Luhmann, N. (1979). *Trust and power*. Chichester, England: Wiley.
- Longstaff, P. (2005). *Security, resilience, and communication in unpredictable environments such as terrorism, natural disasters and complex technology*. Cambridge, MA, USA: Harvard University.
- Lindenberg, S. (1996). Constitutionalism versus relationalism: Two views of rational choice of sociology. In J. Clark (Ed.), *James S. Coleman* (pp. 229-322). London: Falmer Press.
- Luo, Y. (1997). Guanxi and performance of foreign-invested enterprises in China: An empirical study. *Management International Review*, 37(1), 51–70.
- Luo, Y. (2003). Industrial dynamics and managerial networking in an emerging market: The case of China. *Strategic Management Journal*, 24(13), 1315-1327.
- Luo, Y. (2006). Political behavior, social responsibility, and perceived corruption: A structuration perspective. *Journal of International Business Studies*, 37(6), 747–766.
- Lengnick-Hall, C. A., & Beck, T. E. (2003). Beyond bouncing back: The concept of organizational resilience. Paper presented at the Academy of Management, Seattle, WA, 1–6 August.
- Lengnick-Hall, C. A., & Beck, T. E. (2005). Adaptive fit versus robust transformation: How organizations respond to environmental change. *Journal of Management*, 31(5), 738–757.
- Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, 21(3), 243-255.
- Latack, J. C., & Dozier, J. B. (1986). Coping with stress: Measure and future directions for scale development. *Journal of Applied Psychology*, 71(3), 337-385.

- Linnenluecke, M. K., & Griffiths, A. (2010). Beyond adaptation: resilience for business in light of climate change and weather extremes. *Business & Society*, 49(3), 477–511.
- Linnenluecke, M. K., Griffiths, A., & Winn, M. (2012). Extreme weather events and the critical importance of anticipatory adaptation and organizational resilience in responding to impacts. *Business Strategy and the Environment*, 21(1), 17-32.
- Lovins, A. B., & Lovins, L. H. (1982). *Brittle power: Energy strategy for national security*. Andover, MA: Brick House Publishing CO.
- Lorenzoni, G., & Lipparini, A. (1999). The leveraging of interfirm relationships as a distinctive organizational capability: A longitudinal study. *Strategic Management Journal*, 20(4), 317–318.
- Li, D. Y., & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, 67(1), 2793-2799.
- Leana, C. R., & Van Buren, III, H. J. (1999). Organizational social capital and employment practices. *Academy of Management Review*. 24(3), 538–555.
- Lee, A. V., Vargo, J., & Seville, E. (2013). Developing a tool to measure and compare organizations' resilience. *Natural Hazards Review*, 14(1), 29-41.
- Lee, S., Wong, P., & Chong, C. (2005). Human and social capital explanations for R&D outcomes. *IEEE Transactions on Engineering Management*, 52(1), 59-68.
- Lawler, E. J., & Yoon, J. (1996). Commitment in exchange relations: Test of a theory of relational cohesion. *American Sociological Review*, 61(1), 89-108.
- Ministry of Civil Affairs of China. (2008). Retrieved from <http://www.mca.gov.cn/> (In Chinese).
- Ministry of Civil Affairs of China. (2015). *China civil affairs' statistical yearbook 2015*. Beijing: China Statistics Press (in Chinese).

- Meyer, A. D. (1982). Adapting to environmental jolts. *Administrative Science Quarterly*, 27(4), 515–537.
- Mishra, A. K. (1996). Organisational responses to crisis: The centrality of trust. In R. M. Kramer, & T. M. Tyler (Eds.), *Trust in Organizations* (pp. 261-287). London: Sage.
- Misztal, B. (1996). *Trust in modern societies*. Cambridge, England: Polity Press.
- Mannheim, B. (1984). Managerial orientations and workers` job responses in labor and private industrial plants in Israel. *Organization Studies*, 5(1), 23-42.
- Milliken, F. J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management Review*, 12(1), 133–143.
- Ministry of Industry and Information Technology of China, Government of Sichuan Province, Government of Gansu Province, and Government of Shanxi Province. (2008). A programme of manufacturing recovery and restoration of Wenchuan earthquake region. (In Chinese).
- Mitroff, I. I. (2005). From my perspective: Lessons from 9/11: Are companies better prepared today? *Technological Forecasting and Social Change*, 72(3), 375–376.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organizational Science*, 2(1), 71–87.
- Murphy, J. (2008). The place of leadership in turnaround schools: Insight from organizational recovery in the public and private sectors. *Journal of Educational Administrative*, 46(1), 74-98.
- Moran, P. (2005). Structural vs. relational embeddedness: Social capital and managerial performance. *Strategic Management Journal*, 26(12), 1129-1151.

- Merton, R. K. (1968). *Social theory and social structure*. New York: Free Press.
- McManus, S. (2008). *Organisational resilience in New Zealand*. Ph.D. thesis, Univ. of Canterbury, Christchurch, New Zealand.
- Mitroff, I. I., & Alpaslan, M. C. (2003). Preparing for evil. *Harvard Business Review*, 81(4), 109–115.
- Mahajan, A., & Benson, P. (2013). Organizational justice climate, social capital and firm performance. *Journal of Management Development*, 32(7), 721-736.
- Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437–455.
- Macdonald, J. R., & Corsi, T. M. (2013). Supply chain disruption management: Severe events, recovery, and performance. *Journal of Business Logistics*, 34(4), 270–288.
- Morgeson, F. P., & Hofmann, D. A. (1999). The structure and function of collective constructs: Implications for multilevel research and theory development. *Academy of Management Review*, 24(2), 249–265.
- McGuinness, M., & Johnson, N. (2014). Exploiting social capital and path-dependent resources for organizational resilience: Preliminary findings from a study on flooding. *Procedia Economics and Finance*, 18(14), 447-455.
- Muller, A., & Kräussl, R. (2011). Doing good deeds in times of need: A strategic perspective on corporate disaster donations. *Strategic Management Journal*, 32(9), 911–929.
- Marcus, A. A., & Nichols, M. L. (1999). On the edge: Heeding the warnings of unusual events. *Organization Science*, 10(4), 482–499.
- Mikalef, P., & Pateli, A. (2017). Information technology-enabled dynamic capabilities and their indirect effect on competitive performance: Findings from PLS-SEM and fsQCA. *Journal of Business Research*, 70, 1-16.

- Ma, D., & Parish, W. L. (2006). Tocquevillian moments: Charitable contributions by Chinese private entrepreneurs. *Social Forces*, 85(2), 943–964.
- Morris, J. H., & Steer, R. M. (1980). Structural influence on organizational commitment. *Journal of Vocational Behavior*, 17(1), 50-57.
- McManus, S., Seville, E., Vargo, J., & Brunsdon, D. (2008). Facilitated process for improving organizational resilience. *Natural Hazards Review*, 9(2), 81-90.
- Muller, A., & Whiteman, G. (2009). Exploring the geography of corporate philanthropic disaster response of fortune global 500 firms. *Journal of Business Ethics*, 84(4), 589–603.
- Melnyk, S. A., Zobel, C. W., Macdonald, J. R., & Griffis, S. E. (2014). Making sense of transient responses in simulation studies. *International Journal of Production Research*, 52(3), 617–632.
- Nunnally, J. C., & Bernstein, I. (1994). *Psychometric theory*. New York: McGraw-Hill.
- Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, 39(5), 1245–1264.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *The Academy of Management Review*, 23(2), 242-266.
- National Development and Reform Commission of China, Ministry of Industry and Information Technology of China, Ministry of Agriculture and Rural Affairs of China, Ministry of Culture and Tourism of China, Government of Sichuan Province, Government of Gansu Province, and Government of Shanxi Province. (2008). A special programme of post-disaster productivity rearrangement and industrial adjustment. (In Chinese).

- Nilakant, V., Walker, B., van Heugten, K., Baird, R., & De Vries, H. (2014). Conceptualising adaptive resilience using grounded theory. *New Zealand Journal of Employment Relations*, 39(1), 79-86.
- Orr, J. (1990). Sharing knowledge, celebrating identity: Community memory in a service culture. In D. Middleton & D. Edwards (Eds.), *Collective remembering* (pp. 169-189). London: Sage.
- Ouchi, W. G. (1980). Markets, bureaucracies, and clans. *Administrative Science Quarterly*, 25(1), 129–141.
- Ouchi, W. G. (1981). *Theory Z: How American business can meet the Japanese challenge*. Reading, MA: Addison-Wesley.
- Olshansky, R., & Chang, S. (2009). Planning for disaster recovery: Emerging research needs and challenges. *Progress in Planning*, 72(4), 200–209.
- Parsons, D. (2010). Organizational resilience. *Australian Journal of Emergency Management*, 25(2), 18-20.
- Putnam, R. D. (1993). The prosperous community: Social capital and public life. *American Prospect*, 4(13), 35-42.
- Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65-78.
- Pettit, T. J., Croxton, K. L., & Fiksel, J. (2013). Ensuring supply chain resilience: development and implementation of an assessment tool. *Journal of Business Logistics*, 34(1), 46-76.
- Protogerou, A., Caloghirou, Y., & Lioukas, S. (2012). Dynamic capabilities and their indirect impact on firm performance. *Industrial and Corporate Change*, 21(3), 615–647.

- Pettit, T. J., Fiksel, J., & Croxton, K. L. (2010). Ensuring supply chain resilience: development of a conceptual framework. *Journal of Business Logistics*, 31(1), 1–21.
- Ponomarov, S. Y., & Holcomb, M. C. (2009). Understanding the concept of supply chain resilience. *International Journal of Logistics Management*, 20(1), 124–143.
- Papadakis, V. M., Kaloghirou, Y., & Iatrelli, M. (1999). Strategic decision making: From crisis to opportunity. *Business Strategy Review*, 10(1), 29–37.
- Park, S. H., & Luo, Y. (2001). Guanxi and organizational dynamics: Organizational networking in Chinese firm. *Strategic Management Journal*, 22(5), 455–477.
- Peng, M. W., & Luo, Y. (2000). Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. *Academy of Management Journal*, 43(3), 486–501.
- Pondy, L. R., & Mitroff, I. I. (1979). Beyond open systems models of organizations. In B. M. Staw (Ed.), *Research in organization behavior* (pp. 3–39). Greenwich, CT: JAL Press.
- Prayag, P., & Orchiston, C. (2016). *Earthquake impacts, mitigation, and organizational resilience of business sector in Canterbury*. Abingdon, Oxon, UK: Routledge.
- Prasad, S., Su, H. C., Altay, N., & Tata, J. (2014). Building disaster-resilience micro enterprises in developing world. *Disasters*, 39(3), 447–466.
- Rousseau, D. M. (1998). Why workers still identify with organizations. *Journal of Organizational Behavior*, 19(3), 217–233.

- Rasoolimanesh, S. M., Ringle, C. M., Jaafar, M., & Ramayah, T. (2017). Urban vs. rural destinations: Residents' perceptions, community participation and support for tourism development. *Tourism Management*, 60, 147-158.
- Ring, P. S., & Van de Ven, A. H. (1992). Structuring cooperative relationships between organizations. *Strategic Management Journal*, 13(7), 483-498.
- Ring, P. S., & Van de Ven, A. H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review*, 19(1), 90-118.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17(2), 27-44.
- Sawalha, I. H. S. (2015). Managing adversity: understanding some dimensions of organizational resilience. *Management Research Review*, 38(4), 346-366.
- Scott, J. (1970). *Social network analysis: A handbook*. London: Sage.
- Smith, K. (2001). *Environmental Hazards: Assessing Risk and Reducing Disaster* (3rd ed.). London; New York: Routledge.
- Stone, M. (1974). Cross-validity choice and assessment of statistical predictions. *Journal of the Royal Statistical Society*, 36(2), 111-147.
- Somers, S. (2009). Measuring resilience potential: An adaptive strategy for organizational crisis planning. *Journal of Contingencies and Crisis Management*, 17(1), 12-23.
- Starbuck, W. H. (1992). Learning by knowledge intensive firms. *Journal of Management Studies*, 29(6), 713-740.
- Sheffi, Y. (2007). *The resilient enterprise: Overcoming vulnerability for competitive advantage*. Boston, MA: The MIT Press.

- Sullivan-Taylor, B., & Branicki, L. (2011). Creating resilient SMEs: Why one size might not fit all. *International Journal of Production Research*, 49(18), 5565-5579.
- Seville, E., Brunsdon, D., Dantas, A., Le Masurier, J., Wilkinson, S., & Vargo, J. (2008). Organizational resilience: Researching the reality of New Zealand organizations. *Journal of Business Continuity and Emergency Management*, 2(2), 258-266.
- Simon, L., & Davies, G. (1996). A contextual approach to management learning. *Organization Studies*, 17(2), 269-289.
- Suen, L. W., Huang, H., & Lee, H. (2014). A comparison of convenience sampling and purposive sampling. *Hu Li Za Zhi*, 61(3), 105-11. Retrieved from <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/1537381331?accountid=14499>
- Sandefur, R. L., & Laumann, E. O. (1998). A paradigm for social capital. *Rationality and Society*, 10(4), 481-501.
- Sarstedt, M., & Mooi, E. A. (2014). *A concise guide to market research. The process, data, and methods using IBM SPSS statistics* (2nd ed.). Berlin: Springer.
- Sheffi, Y., & Rice, J. B. (2005). A supply chain view of the resilient enterprise. *MIT Sloan Management Review*, 47(1), 41-94.
- Staber, U., & Sydow, J. (2002). Organizational adaptive capacity: A structuration perspective. *Journal of Management Inquiry*, 11(4), 408-424.
- Sahebjamnia, N., Torabi, S. A., & Mansouri, S. A. (2015). Integrated business continuity and disaster recovery planning: Towards organizational resilience. *European Journal of Operational Research*, 242(1), 261-273.

- Sahebjamnia, N., Torabi, S. A., & Mansouri, S. A. (2018). Building organizational resilience in the face of multiple disruptions. *International Journal of Production Economics*, 197, 63-83.
- Sutcliffe, K. M., & Vogus, T. J. (2003). Organizing for resilience. In Cameron, K., Dutton, J.E., & Quinn, R.E. (Eds.), *Positive Organizational Scholarship* (pp. 94-110). San Francisco: Berrett-Koehler.
- Stephenson, A., Vargo, J., & Seville, E. (2010). Measuring and comparing organizational resilience in Auckland. *The Australian Journal of Emergency Management*, 25(2), 27-32.
- Sim, J., & Wright, C. (2000). *Research in health care: Concepts, designs and methods*. Cengage Learning: Andover.
- Snizek, J. A., Wilkins, D. C., Wadlington, P. L., & Baumann, M. R. (2002). Training for crisis decision-making: Psychological issues and computer- based solutions. *Journal of Management Information Systems*, 18(4), 147– 168.
- Shi, P., Xu, W., & Wang, J. (2016). Natural disaster system in China. In P. Shi (ed.), *Natural disasters in China* (pp. 1-36). Berlin, Heidelberg: Springer.
- Tang, C. S. (2006). Perspectives in supply chain risk management. *International Journal of Production Economics*, 103(2), 451-488.
- Tang, C. S. (2006). Robust strategies for mitigating supply chain disruptions. *International Journal of Logistics: Research & Applications*, 9(1), 33–45.
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319-1350.
- Turnbull, I. R. (2017). Limitations of survey-based research on burnout: In reply to Drolet. *Journal of the American College of Surgeons*, 224(2), 217-218.

- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: the role of intrafirm networks. *Academy of management journal*, 41(4), 464-476.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Uzzi, B. (1997). Social structure and competition in inter-firm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 42(1), 35–67.
- Van Wassenhove, L. N. (2006). Humanitarian aid logistics: Supply chain management in high gear. *Journal of the Operational Research Society*, 57(5), 475–489.
- Villena, V. H., Revilla, E., & Choi, T. Y. (2011). The dark side of buyer-supplier relationships: A social capital perspective. *Journal of Operations Management*, 29(6), 562-576.
- Van Maanen, J., & Schein, E. H. (1979). Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research in organizational behavior* (pp. 209-264). Greenwich, CT: JAI Press.
- Vogus, T. J., & Sutcliffe, K. M. (2008). Organizational resilience: Towards a theory and research agenda. *IEEE International Conference on Systems, Man and Cybernetics*. Montreal, Canada.
- Voss, C., Tsikriktsis, N., & Mark, F. (2002). Case research in operations management. *International Journal of Operations and Production Management*, 22(5), 3-14.
- Vanpoucke, E., Vereecke, A., & Wetzels, M. (2014). Developing supplier integration capabilities for sustainable competitive advantage: A dynamic capabilities approach. *Journal of Operations Management*, 32(7), 446–461.
- Wildavsky, A. (1988). *Searching for Safety*. New Brunswick, CT: Transaction Books.

- Wildavsky, A. (1989). Searching for Safety. *Journal of Policy Analysis and Management*, 8(3), 525-527.
- Williams, C. (2007). Research Methods. *Journal of Business & Economic Research*, 5(3), 65- 72.
- Weick, K. E. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly*, 38(4), 628–652. [SEP]
- Weick, K. E. (1995). *Sensemaking in Organizations*. London: Sage.
- Watson, R. (2015). Quantitative research. *Nursing Standard (2014+)*, 29(31), 44.
- Walter, A., Auer, M., & Ritter, T. (2006). The impact of network capabilities and entrepreneurial orientation on university spin-off performance. *Journal of Business Venturing*, 21(4), 541–567.
- Withey, M. J., & Cooper, W. H. (1989). Predicting exit, voice, loyalty and neglect. *Administrative Science Quarterly*, 34(4), 521-539.
- Wang, H., Choi, J., & Li, J. (2008). Too little or too much? Untangling the relationship between corporate philanthropy and firm financial performance. *Organization Science*, 19(1), 143–159.
- Wang, R. Y., & Strong, D. M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems*, 12(4), 5–34.
- Werner, E. E., & Smith, R. S. (2001). *Journeys from childhood to midlife: Risk, resilience, and recovery*. Ithaca, NY: Cornell University Press.
- Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty* (2nd ed.). San Francisco: Jossey-Bass.

- Woods, D. D., & Wreathall, J. (2008). Stress-strain plots as a basis for assessing system resilience. In E. Hollnagel, et al. (Eds.), *Remaining sensitive to the possibility of failure* (pp. 143–158). U.K: Ashgate, Surrey.
- Xu, W., Liu, J., Xu, G., Wang, Y., Liu, L., & Shi, P. (2016). Earthquake disasters in China. In P. Shi (ed.), *Natural disasters in China* (pp. 37-72). Berlin, Heidelberg: Springer.
- Yu, S. H. (2013). Social capital, absorptive capability, and firm innovation. *Technological Forecasting & Social Change*, 80(7), 1261-1270.
- Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587-613.
- Yu, C. M. J., Liao, T. J., & Lin, Z. D. (2006). Formal governance mechanisms, relational governance mechanisms, and transaction-specific investments in supplier-manufacturer relationships. *Industrial Marketing Management*, 35(2), 128-139.
- Zacharia, Z. G., Nix, N. W., & Lusch, R. F. (2009). An analysis of supply chain collaborations and their effect on performance outcomes. *Journal of Business Logistics*, 30(2), 101-123.
- Zhang, R., Rezaee, Z., & Zhu, J. (2009). Corporate philanthropic disaster response and ownership type: Evidence from Chinese firms' response to the Sichuan earthquake. *Journal of Business Ethics*, 91(1), 51–63.
- Zsidisin, G. A., & Smith, M. E. (2005). Managing supply risk with early supplier involvement: A case study and research propositions. *Journal of Supply Chain Management*, 41(4), 44–57.

Appendices

Appendix 1: Approval of Human Ethics Committee



Ref: HEC 2017/122/LR

12 January 2018

Xin Jia
Management, Marketing and Entrepreneurship
UNIVERSITY OF CANTERBURY

Dear Xin

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled “The Role of Social Capital in Building Organizational Resilience”.

I am pleased to advise that this application has been reviewed and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 8th January 2018.

With best wishes for your project.

Yours sincerely

R. Robinson
pp.

Professor Jane Maidment
Chair, Human Ethics Committee

Appendix 2: Screening Questions and Demographic Questions

The role of social capital in building organisational resilience



Part 1 Company Profile

1. Industry sector: _____
2. Was this company affected by the 2008 Sichuan (Wenchuan) earthquakes?
 Yes No
3. How many full time, part time and seasonal employees does your business have?
 Less than 20 20 to 49 50 to 99 100 to 249 250 to 499 500 to 999 1,000 or more
4. How many years has your business been operating? _____ Years
5. How long have you been working for this organisation? _____ Years

--	--	--

What is your current position in this company?

- Supply Chain Manager Production/Operations Manager Risk Manager Purchasing Manager
 CEO/General Manager Managing director Other, please specify _____

Your Gender

- Male Female Other, please specify _____

Age

- 18-25 years old 26-34 years old 35-44 years old 45-54 years old
 55-64 years old 65 and above

Education Level

- High school or less College graduate University graduate University post-graduate
 Doctor degree Others, please specify _____

Appendix 3: Information Sheet and Consent Form

Information Sheet



Department of Management, Marketing and Entrepreneurship
Telephone: +64 021 023 68835
Email: xji34@uclive.ac.nz
29/11/2017

The role of social capital in building organisational resilience. Information Sheet for Businesses and Participants

My name is Xin Jia, a Masters of Commerce student at the University of Canterbury, currently carrying out research for a management thesis. The purpose of this research is to understand the role of social capital in building organisational resilience that enable organisations to take actions in terms of preparedness, response, recovery, and growth following disasters such as Earthquakes. This research aims to identify the relationships between social capital, firm capability, and organisational resilience.

If you choose to take part in this study, your involvement in this project will be to complete a questionnaire that will take approximately 30 minutes to complete.

Participation is voluntary and you have the right to withdraw at any stage without penalty. The questionnaire is not completely anonymous because the questionnaire involves basic demographic information, such as age, gender, education level, your position in the organisation, and firm related characteristics, such as firm size, industry sector etc. The focus of the survey is on firm characteristics rather than individual characteristics, and your information will not be analysed individually. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts in February 2018, it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. Only aggregate results will be reported. To ensure anonymity and confidentiality, only I and my two supervisors will have access to the information that you will provide. All paper-based data (questionnaires, consent forms) will be destroyed at the end of the project. All the data set (only numerical answers of questions, not including any personal information) will be kept in my password-protected computer for five year, and destroyed after five years. A thesis is a public document and will be available through the UCLibrary.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for course or degree by Xin Jia under the supervision of Associate Professor Girish Prayag and Dr Mesbahuddin Chowdhury, who can be contacted at girish.prayag@canterbury.ac.nz and mesbahuddin.chowdhury@canterbury.ac.nz. They will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Xin Jia

If you agree to participate in the study, you are asked to complete the consent form and return it to me before completing the questionnaire. **If you refuse to participant, you don't need to proceed further.**

Consent Form



Department of Management, Marketing and Entrepreneurship
Telephone: +64 021 023 68835
Email: xji34@uclive.ac.nz

The role of social capital in building organisational resilience. Consent Form for Participants

Include a statement regarding each of the following:

- I have been given a full explanation of this project and have had the opportunity to ask questions.
- I understand what is required of me if I agree to take part in the research.
- I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- I understand that any information or opinions I provide will be kept confidential to the researcher, only Xin Jia and his two supervisors will have access to the information that you will provide, and any published or reported results will not identify the participants and their companies. I understand that a thesis is a public document and will be available through the UC Library.
- I understand that the questionnaire is not completely anonymous and that basic demographic information such as age, gender etc and firm related characteristics are collected as part of the survey. However, I understand that my personal information will not be analysed individually.
- I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after five years.
- I understand the risks associated with taking part and how they will be managed.
- I understand that I can contact the researcher Xin Jia xji34@uclive.ac.nz or his supervisors Associate Professor Girish Prayag girish.prayag@canterbury.ac.nz and Dr Mesbahuddin Chowdhury mesbahuddin.chowdhury@canterbury.ac.nz for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- I understand that I need to put the questionnaire into the closed sealed envelope after completing the questionnaire.
- I would like a summary of the results of the project.
- By signing below, I agree to participate in this research project.

Name: _____ Signed: _____ Date: _____

Email address (for report of findings, if applicable): _____

After completing this consent form, please put it into the sealed envelope with the questionnaire, and return the sealed envelope that contains this consent form and the completed questionnaire back to the person who provides them to you, such as your colleague or manager, or my assistant.

Xin Jia