

UNIVERSITI TEKNOLOGI MARA

**A CONSTRUCTION SECTOR
CRISIS MANAGEMENT PLAN
(CSCMP) FRAMEWORK FOR
ENHANCING CRISIS
PREPAREDNESS AND RESILIENCE
IN MALAYSIAN CONSTRUCTION
ORGANISATIONS**

ANIS MARDHIAH MUKHTAR

PhD

June 2026

UNIVERSITI TEKNOLOGI MARA

**A CONSTRUCTION SECTOR
CRISIS MANAGEMENT PLAN
(CSCMP) FRAMEWORK FOR
ENHANCING CRISIS
PREPAREDNESS AND RESILIENCE
IN MALAYSIAN CONSTRUCTION
ORGANISATIONS**

ANIS MARDHIAH MUKHTAR

Thesis submitted in fulfilment
of the requirements for the degree of
**Doctor of Philosophy
(Built Environment)**

Faculty of Built Environment

June 2026

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 15 April 2026 to conduct the final examination of Anis Mardhiah Mukhtar on her Doctors of Philosophy thesis entitled “A Construction Sector Crisis Management Plan (CSCMP) Framework for Enhancing Crisis Preparedness and Resilience in Malaysian Construction Organisations” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

Marlyana Azyyati Marzukhi, PhD
Associate Professor
Faculty of Built Environment
Universiti Teknologi MARA
(Chairman)

Rohana Mahbub, PhD
Associate Professor
Faculty of Built Environment
Universiti Teknologi MARA
(Internal Examiner)

Md Asrul Nasid Masrom, PhD
Associate Professor
Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia
(External Examiner)

**PROFESSOR DR HJH ZURAEDA
IBRAHIM**

Dean
Institute of Postgraduates Studies
Universiti Teknologi MARA
Date: 26 June 2026

AUTHOR’S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Anis Mardhiah Mukhtar
Student ID. No.	:	2020832076
Programme	:	Doctor of Philosophy (Built Environment) – AP991
Faculty	:	Built Environment
Thesis Title	:	A Construction Sector Crisis Management Plan (CSCMP) Framework for Enhancing Crisis Preparedness and Resilience in Malaysian Construction Organisations
Signature of Student	:	
Date	:	June 2026

ABSTRACT

The construction sector is a key driver of national economic growth but remains highly vulnerable to external shocks such as financial crises, geopolitical disruptions, and public health emergencies, notably the COVID-19 pandemic. These crises exposed significant weaknesses in the preparedness, response capability, and business continuity of Malaysian construction organisations, resulting in widespread project delays, operational disruptions, and financial instability. Despite repeated exposure to crises, many organisations continue to rely on reactive approaches and lack a structured Crisis Management Plan (CMP) to guide systematic preparedness, coordinated response, and resilient recovery. This study aims to strengthen organisational resilience by developing and validating a Construction Sector Crisis Management Plan (CSCMP) tailored to the Malaysian construction industry. To achieve this aim, the study seeks to identify crisis-induced vulnerabilities, examine existing crisis management practices, develop and validate a structured CSCMP framework, and evaluate its contribution to business continuity. A mixed-methods sequential exploratory design was adopted, integrating qualitative and quantitative approaches. The qualitative phase involved semi-structured interviews and document analysis with key experts from construction authorities and resilient non-construction organisations to explore crisis experiences, vulnerabilities, and best practices. The quantitative phase comprised a questionnaire survey administered to CIDB G7 contractors and construction consultants in the Klang Valley, yielding 133 valid responses. Data were analysed using thematic analysis and statistical techniques, including descriptive and inferential analysis. Findings from the qualitative phase identified a structured five-phase crisis management process namely Prepare, Prevent, Respond, Recover, and Redesign, as critical for enhancing organisational resilience. Quantitative results further validated these findings, demonstrating significant relationships between crisis management practices and business continuity outcomes. The study also reveals that while vulnerabilities are sector-wide, existing strategies remain largely reactive and insufficiently integrated with long-term resilience planning. The research culminates in a validated CSCMP framework that integrates vulnerable areas, structured crisis management strategies, and business continuity outcomes into a comprehensive and practical model. This framework provides construction organisations with a systematic approach to enhance crisis preparedness, improve response coordination, and strengthen long-term resilience. This study contributes theoretically by extending crisis management and organisational resilience concepts into the construction domain through a validated, sector-specific framework. Methodologically, it demonstrates the value of mixed-methods triangulation for framework development and validation. Practically, the CSCMP offers an actionable tool for industry stakeholders to transition from reactive crisis responses to proactive and structured resilience strategies.

Keywords: Crisis, Vulnerable Areas, Crisis Management Plan, Business Continuity, Construction Sector.

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful.

Alhamdulillah, all praise and gratitude are due to Allah SWT for His countless blessings, strength, mercy, and guidance throughout this PhD journey. The completion of this research would not have been possible without the support, encouragement, prayers, and contributions of many individuals and organisations. My deepest appreciation goes to my supervisor, Ir. Ts. Assoc. Prof. Dr. Rumaizah Mohd Nordin, for her invaluable guidance, patience, wisdom, and unwavering support throughout this research. I also extend my sincere gratitude to my co-supervisors, Assoc. Prof. Dr. Norfashiha Hashim and Ir. Dr. Abdul Aziz Abas, for their insightful feedback, encouragement, and meaningful contributions to this study. I am profoundly indebted to my beloved father, Mukhtar Ismail, for his sacrifices, steadfast support, and continuous prayers throughout my life. This achievement is also lovingly dedicated to my late mother, , who returned to Allah SWT when I was only eleven years old. Although she is not here to witness this milestone, her love, sacrifices, and prayers remain deeply embedded in my heart and continue to guide me in every step of life. Not a day passes without remembering the values, strength, and kindness she instilled in me. This accomplishment is a reflection of the foundation she built and the dreams she nurtured for her children. May Allah SWT forgive her shortcomings, shower His endless mercy upon her, and grant her the highest place in Jannatul Firdaus. To my beloved husband, Muhamad Fahmi Ahmad, thank you for your unwavering love, patience, understanding, and sacrifices throughout this demanding journey. Your constant support gave me the strength to persevere through every challenge. To my precious children, Izz Aqil and Izzeya Adni, thank you for being my greatest source of joy, strength, and motivation. Your love, patience, and understanding gave meaning to every sacrifice made along this journey. My heartfelt appreciation also goes to my beloved family and siblings, Ir. Hanizan, Suriati, Siti Hajar, Muhammad Suhaimi, Asuat, and Muhammad Ridzuan, for their steadfast support, understanding, and prayers throughout this journey. Their love, encouragement, and belief in me have been a constant source of strength and inspiration. A special note of gratitude is extended to my dearest friends, Nood Nadia Mohd Radzi and Nur Hidayah Anuar, whose friendship has been a constant source of strength, encouragement, and comfort throughout this journey. Thank you for always being there through the challenges and milestones, and for your unwavering belief in me when I needed it most. I also extend my sincere appreciation to Jasteena, Fazmelia, Faisal, Maahad, all friends and colleagues who supported, inspired, and encouraged me throughout this journey. Every act of kindness, encouragement, and assistance, no matter how small, contributed meaningfully to the completion of this research. I would also like to acknowledge the invaluable cooperation and contributions from JKR, CIDB, RISM, Petronas, EPF, together with all industry experts and respondents whose insights, experiences, and support greatly enriched this research. Finally, to everyone who contributed directly or indirectly to this journey through their prayers, encouragement, and support, I extend my sincere gratitude. May Allah SWT reward your kindness abundantly. This achievement belongs not only to me but also to every person who walked beside me, believed in me, and supported me throughout this remarkable journey.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR’S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xii
LIST OF FIGURES	xiv
LIST OF SYMBOLS	xv
LIST OF ABBREVIATIONS	xvi
CHAPTER 1 INTRODUCTION	1
1.1 Introduction	1
1.2 Research Background	1
1.3 Problem Statements	5
1.4 Research Questions	9
1.5 Research Aim & Objectives	9
1.6 Scope and Delimitation of the Research	13
1.6.1 Unit of Analysis and Target Group	13
1.6.2 Sectoral and Geographical Scope	13
1.6.3 Scope of Crisis	14
1.6.4 Conceptual Scope and Delimitation of Framework Application	14
1.7 Significance of the Research	14
1.8 Organisation of the Research	16
1.9 Summary of Chapter	18
CHAPTER 2 READINESS AND STRATEGIES OF THE MALAYSIAN CONSTRUCTION ORGANISATION DURING PLIGHT	19
2.1 Introduction	19
2.2 Malaysian Construction Outlook	19

2.2.1	Construction as an Economic Activity	22
2.3	Malaysia and the External Global Crises	24
2.3.1	Asian Financial Crisis 1997/98	25
2.3.2	Global Financial Crisis (GFC) 2008/09	27
2.3.3	Global Economic and Health Crisis of Pandemic Covid-19 2019/20	29
2.3.4	Post-Pandemic and Emerging Polycrisis Conditions	31
2.4	Impact of Crisis towards Vulnerable Areas of Construction Industry	32
2.5	Existing Strategies in Managing Crisis	42
2.5.1	Current Construction Sector Plans	45
2.6	Action Plan, Impact and Response: A Comparative Study (Macro)	46
2.6.1	Asian Financial Crisis (1997-98) - Comparative Impact, Action Plan and Lessons Between Countries	47
2.6.2	Global Financial Crisis (2008-09) - Comparative Impact, Action Plan and Lessons Between Countries	49
2.6.3	Global Economic and Health Crisis of Pandemic Covid-19 2019/20 - Comparative Impact, Action Plan and Lessons Between Countries	51
2.6.4	Emerging Polycrisis, Sector Responses and Remaining Gaps (2021 – 2026)	53
2.7	Challenges in Managing Crisis	55
2.8	Summary of Chapter	57
CHAPTER 3 CRISIS MANAGEMENT PLAN AND BUSINESS CONTINUITY		59
3.1	Introduction	59
3.2	Concept of Crisis	59
3.2.1	Defining Crisis	60
3.2.2	Characteristic of Crisis	62
3.2.3	Type of Crisis	64
3.2.4	New Nature of Crisis	66
3.3	Organisation	67
3.4	Crisis Management Plan (CMP)	68
3.5	Strategy	69

3.6	Crisis Management Model (CMM) – Theoretical Underpinning	69
3.6.1	Petak’s Model	70
3.6.2	Fink’s Model	71
3.6.3	Mitroff’s Model	72
3.6.4	Moore’s Model	73
3.6.5	Boin, ’t Hart, Stern and Sundelius Model	73
3.6.6	Coombs’ Three Staged Model	75
3.6.7	Organizational Resilience Theory	76
3.6.8	Evaluation of the Models	76
3.6.9	Previous Studies, Limitations of Existing Frameworks and Research Gaps	80
3.7	Development of Framework for Construction Sector Crisis Management Plan (CSCMP)	82
3.7.1	CMP Phase 1 - Prepare	87
3.7.2	CMP Phase 2 - Prevent	88
3.7.3	CMP Phase 3 - Response	91
3.7.4	CMP Phase 4 - Recovery	93
3.7.5	CMP Phase 5 - Redesign	95
3.8	Resilience	97
3.9	Business Performance and Continuity	98
3.10	Evolution from Proposed Conceptual Framework to Final CSCMP	100
3.11	Summary of Chapter	101
	CHAPTER 4 RESEARCH METHODOLOGY	102
4.1	Introduction	102
4.2	The Research Philosophy	102
4.2.1	Philosophical Stance	105
4.2.2	Research Approach to Theory Development	110
4.2.3	Methodological Choice of the Research	111
4.2.4	Research Purpose and Strategy	113
4.2.5	Time Horizon	113
4.2.6	Techniques and Procedures	114
4.3	Empirical Research Design & Methodological Approach	116
4.3.1	Population and Sample Size	118

4.3.2	Data Collection Procedures	124
4.3.3	Data Collection and Data Analysis Procedures	134
4.4	Research Ethics	138
4.5	Instrument Development	138
4.6	Summary of Chapter	140
CHAPTER 5 QUALITATIVE ANALYSIS: EXPLORATORY INTERVIEWS AND DOCUMENT ANALYSIS		142
5.1	Introduction	142
5.2	Findings of the Exploratory Interview	142
5.2.1	Respondents' Background	143
5.2.2	Historical Crisis Experiences: Economic Crises 1998 and 2008	145
5.2.3	Experience during Covid-19 Crisis	147
5.2.4	Proposed Steps for CMP and Business Continuity	155
5.3	Findings from Document Analysis	158
5.3.1	Vulnerable Areas Identified	158
5.3.2	Organizational and Government Responses	160
5.3.3	Key Patterns and Insights	161
5.3.4	Link to CSCMP Development	162
5.4	Discussion of Findings for Preliminary Study - Exploratory Interview	162
5.5	Summary of Chapter	166
CHAPTER 6 QUANTITATIVE ANALYSIS: QUESTIONNAIRE SURVEY AND CSCMP FRAMEWORK VALIDATION		168
6.1	Introduction	168
6.2	Respondent Profile and Data Overview	168
6.2.1	Response Rate	169
6.2.2	Demographic Profile of Respondents (N = 133)	169
6.2.3	Data Analysis Method and Flow	171
6.3	Instrument Validation and Pilot Study Results	173
6.3.1	Reliability and Validity of the Instrument	173
6.3.2	Pilot Survey Results and Instrument Reliability	174
6.4	Descriptive Analysis	178
6.4.1	Vulnerable Areas in the Malaysian Construction Industry (N = 133) (RO1)	179

6.4.2	Existing Strategies by the Government (Macro) (N = 133) (RO2)	180
6.4.3	Existing Strategies by Construction Organizations (N = 133) (RO2)	186
6.4.4	Proposing a Construction Sector Crisis Management Plan (CSCMP) (N = 133) (RO3)	190
6.4.5	Ensuring Business Continuity (RO4)	202
6.5	Inferential Analysis	204
6.5.1	Independent Sample T-test (Contractor vs Consultant)	204
6.5.2	Correlation	206
6.6	Research Output: Development of a Construction Sector Crisis Management Plan (CSCMP) for the Malaysian Construction Industry	217
6.6.1	CSCMP Directly Addresses the Vulnerable Areas	223
6.6.2	Benefit of the Framework	226
6.7	CSCMP Framework Validation	226
6.7.1	Validation Result and Discussion	228
6.7.2	The Validated CSCMP Framework	237
6.8	Achievement of the Study	241
6.9	Summary of Chapter	243

CHAPTER 7 CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH 245

7.1	Introduction	245
7.2	Recapitulation of the Research	245
7.3	Conclusion	247
7.3.1	Research Objective 1: To Identify Crisis-Induced Vulnerabilities Affecting Malaysian Construction Organisations During A Crisis	247
7.3.2	Research Objective 2: To Examine Crisis Management Practices Adopted by Construction Organisations in Managing Crises	248
7.3.3	Research Objective 3: To Develop and Validate A Construction Sector Crisis Management Plan (CSCMP) Informed by Crisis Management and Organisational Resilience Foundations	248
7.3.4	Research Objective 4: To Evaluate the Contribution of CSCMP Towards Strengthening Business Continuity	249

7.4	Final Research Output – Validated CSCMP	250
7.5	Research Contributions	253
7.5.1	Theoretical Contributions	254
7.5.2	Methodological Contributions	254
7.5.3	Practical Contributions	254
7.6	Limitation of the Study	255
7.7	Recommendations for Future Research	255
	REFERENCES	257
	APPENDICES	270
	AUTHOR’S PROFILE	310

LIST OF TABLES

Tables	Title	Page
Table 1.1	Summary of Issues, Problems Statement, Research Questions and Research Objectives	11
Table 2.1	Malaysia Quarterly GDP and Construction since 2019	20
Table 2.2	Vulnerable Areas in Construction Sector during Crises	34
Table 2.3	Asian Financial Crisis (1997-98): A Comparative Study	48
Table 2.4	Global Financial Crisis (2008-09): A Comparative Study	50
Table 2.5	Global Health of Pandemic Covid-19 and Economic Crisis (2019-20): A Comparative Study	52
Table 2.6	Emerging Polycrisis, Sector Responses and Remaining Gaps in the Malaysian Construction Industry (2021–2026)	54
Table 2.7	Fiscal and Monetary Measures as Government’s Responses During the Crises	55
Table 3.1	Summary of Various Crisis Definitions	61
Table 3.2	Characteristics of Crisis	63
Table 3.3	Category of Crisis	65
Table 3.4	Characteristics of Crisis	70
Table 3.5	Similarities and Differences Between Four Different Models	77
Table 3.6	Components Synthesised into Proposed CSCMP Framework	80
Table 3.7	Previous Studies on Crisis Management Framework	81
Table 4.1	Comparison of Five Research Philosophical Position (Saunders et al., 2019)	107
Table 4.2	Research Questions and the Adopted Philosophical Position	109
Table 4.3	Reason for Using A Mixed Methods Research Design	115
Table 4.4	Previous Research With Similar Research Approach	117
Table 5.1	Segment A – Construction Authorities: Experts’ Profile	144
Table 5.2	Segment B – Resilient Non-Construction Organizations: Experts’ Profile	145
Table 5.3	Section A – Thematic Summary of Historical Crisis Preparedness	147

Table 5.4	Challenges and Vulnerable Areas in the Malaysian Construction Sector Compared to Resilient Organizations	149
Table 5.5	Comparative Analysis of Interview Responses on Existence CMP or Strategies	152
Table 5.6	Summary of Crisis Strategies Mapped to CSCMP Phases	153
Table 5.7	Experts Views on CSCMP and Business Continuity	155
Table 5.8	Document Analysis Findings to CSCMP Phases	162
Table 5.9	Mapping Experts' Findings to CSCMP Phases	165
Table 6.1	Response Rate	169
Table 6.2	Demographic Profile of Respondents (N = 133)	169
Table 6.3	Pilot Survey – Questionnaire Distribution	175
Table 6.4	Cronbach Alpha	176
Table 6.5	Summary of Normality Assessment	177
Table 6.6	Impact Towards Construction Industry During Crisis	179
Table 6.7	Macro - Fiscal Policy	181
Table 6.8	Macro - Action Plan	183
Table 6.9	Macro - Monetary Policy	184
Table 6.10	Segment i: Pre Crisis Preparedness	187
Table 6.11	Segment ii: Response During and Post-Crisis	188
Table 6.12	Segment iii: Efficacy of Strategies	189
Table 6.13	Step 1: Prepare Organisational (Pre-Crisis)	191
Table 6.14	Prepare Through Organizational Policies (Pre-Crisis)	193
Table 6.15	Prevent (Pre-Crisis)	195
Table 6.16	Step 3: Responds (During Crisis)	197
Table 6.17	Step 4: Recover (Post-Crisis)	199
Table 6.18	Step 5: Redesign	200
Table 6.19	Ensuring Business Continuity	202
Table 6.20	T-test Result	205
Table 6.21	Correlation Between the Four Constructs	207
Table 6.22	Profile of Experts	227
Table 6.23	Results of Framework Validation for Construction Sector Crisis Management Plan (CSCMP) for the Malaysian Construction Industry	229

LIST OF FIGURES

Figures	Title	Page
Figure 2.1	Economy Contributing Sectors	23
Figure 2.2	Timeline of Major External Global Crises Affecting Malaysia	24
Figure 2.3	Malaysian Annual Growth Rates of GDP and Construction, 1965-2003	26
Figure 2.4	Annual Growth Rates of GDP and Construction and Manufacturing	28
Figure 2.5	Malaysia's Real GDP Growth (1990-2020)	29
Figure 2.6	Malaysia's Real GDP by Economic Sectors	30
Figure 2.7	Real GDP Growth of Few Countries 2019-2025	47
Figure 3.1	Different Forms of Crisis-Triggering Events	65
Figure 3.2	Crisis Leadership Model	74
Figure 3.3	Variables and Relationships in the SCCT Theory	75
Figure 3.4	Conceptual Framework for the Development of the Construction Sector Crisis Management Plan (CSCMP)	84
Figure 4.1	Reflection of Beliefs, Philosophies and Research Design	103
Figure 4.2	The Saunders Research Onion, 2023	105
Figure 4.3	Methodological Choice by Saunders et al (2023)	112
Figure 4.4	Sampling Technique by Saunders et al (2023)	123
Figure 4.5	Research Flow	125
Figure 6.1	Data Analysis Flow and Selection of Statistical Methods	172
Figure 6.2	Spearman Correlation – Result of SPSS Analysis	214
Figure 6.3	Spearman Correlation Between Overall Items – Result of SPSS Analysis	216
Figure 6.4	Proposed Construction Sector Crisis Management Plan (CSMP)	220
Figure 6.5	Validated Construction Sector Crisis Management Plan (CSMP) Framework	238
Figure 7.1	Final Research Output - Validated Construction Sector Crisis Management Plan (CSMP) Framework	251

LIST OF SYMBOLS

Symbols

ρ	Spearman rho Correlation Coefficient
p	Statistic Significant

LIST OF ABBREVIATIONS

Abbreviations

CMM	Crisis Management Model
CMP	Crisis Management Plan
CSCMP	Construction Sector Crisis Management Plan

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overview of the study, including the research background and the challenges faced during times of plight, from which research gaps are identified. The problem statements and research questions are highlighted to clarify the research gaps. The aim and objectives of the research are outlined as a guide for the entire study. The scope and limitations are then discussed, followed by definitions of key terms used throughout the research to establish a preliminary understanding of the area of concern. A summary of the research methodology is also provided. The chapter concludes with an outline of the thesis structure.

1.2 Research Background

The construction industry is a diverse and complex sector, comprising multiple interdependent stakeholders, including clients, developers, professionals, contractors, suppliers, and designers, who collaborate across various project phases such as planning, design, construction, operation, and maintenance. These phases rely on a wide range of resources, technologies, materials, and work methods (Lafhaj & Rebai, 2024). Due to these interconnections, construction projects are often exposed to uncertainties and are frequently carried out under conditions that are relatively uncontrolled. Furthermore, recent studies continue to show that construction organisations remain highly vulnerable to compound disruptions arising from economic volatility, supply chain shocks, inflationary pressures and geopolitical uncertainty, reinforcing that crisis preparedness remains a current rather than historical concern (Yahaya & Othman, 2023; Kum & Yap, 2024; Zainon et al., 2025).

Although construction activities can be extensively planned, they remain vulnerable to unexpected events or crises that may disrupt schedules and affect project delivery and organizational performance (Kum & Yap, 2024; Kassem & Radzi, 2022). If unmanaged, such crises can severely damage or even destroy construction organizations (Panteli et al., 2023; Fraser & White, 2024). In today's interconnected

environment, disruptive events are becoming more frequent, systemic and cascading in nature, affecting construction operations gradually or suddenly through economic, geopolitical, climate-related or health-related shocks (Ansell & Sorensen, 2021; Broekema & Graaf, 2024). Such crises are increasingly recognised as inevitable organisational conditions requiring adaptive crisis management rather than purely reactive responses (Crandall, 2013; Ulmer, Sellnow, & Seeger, 2021).

With this broader context, the Covid-19 pandemic serves as a critical case for reflection. Since emerging in late December 2019, Covid-19 has been globally recognized as a crisis (WHO, 2020; Yahaya, 2023), triggering significant economic, social, environmental, and health disruptions (WHO, 2020; DOSM, 2020; World Bank, 2020). Both globally and in Malaysia, the construction industry were severely affected, with projects delayed or halted, businesses shut down, and the sector struggling to remain operational (CIDB, 2020; Esa, 2020; Gamil & Alhagar, 2020).

The Covid-19 pandemic, as a major plight, underscored the urgent need for construction organizations to strengthen their crisis response mechanisms. According to the United Nations, the year was expected to show strong economic progress before global disruptions reversed trends. In Malaysia, the government implemented Movement Control Order (MCO) in March 2020 to contain the virus (PMO, 2020). This immediate action affected social systems and economic activities, contributing to a sharp national economic contraction during the Covid-19 crisis, with GDP declining by 17.1% in Q2 2020, the worst drop in two decades (Bank Negara Malaysia, 2020). More broadly, Figure 1.1 illustrates Malaysia's GDP growth trend from 1990 to 2025, highlighting major crisis episodes, including the Asian Financial Crisis, Global Financial Crisis and Covid-19 pandemic, together with subsequent recovery trajectories. The recurrence of these disruptions demonstrates the economy's continued exposure to external shocks and reinforces the relevance of resilience-oriented crisis preparedness (World Bank, 2025).

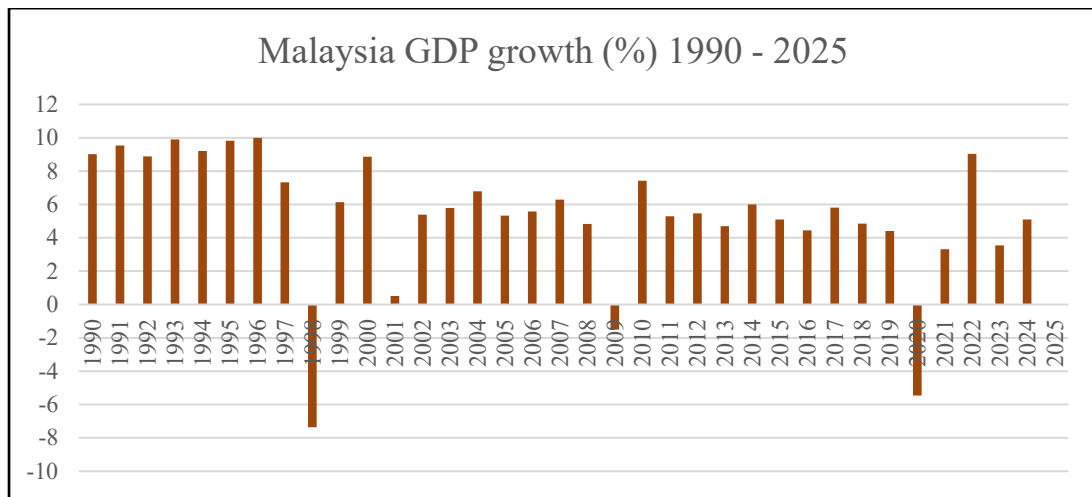


Figure 1.1 Malaysia GDP since 1998 - 2025

Source: World Bank, 2025

Although the pandemic has passed its peak, it exerted immense pressure on global systems. In Malaysia, the MCO resulted in the shutdown of most construction activities, contributing to a sharp industry contraction of -7.9%, the lowest since 1999 (DOSM, 2020). These disruptions revealed widespread unpreparedness for crises of such magnitude (World Bank, 2020; United Nations, 2020; Newman, 2020; Shammi, 2020). As Biörck et al. (2020) emphasize, organizations must take strategic actions now to enhance resilience, as a rapid return to pre-crisis conditions unlikely. Governments and organizations worldwide have begun reassessing their crisis management capabilities (Amankwah-Amoah et al., 2020), recognizing that many were insufficiently prepared when the pandemic unfolded (CIDB, 2020).

While Covid-19 served as a critical trigger for this research, the relevance of crisis preparedness has intensified post-pandemic as construction organisations continue facing cascading disruptions from supply chain instability, climate risks, labour shortages and digital vulnerabilities, requiring resilience-oriented approaches beyond emergency response (Fraser & White, 2024; CIDB, 2025).

As highlighted earlier, crises as sudden and unexpected events that can severely disrupt both human lives and business operations (William, 2020; Bundy, 2021). Consequently, they create financial and reputational risks that cannot be addressed through normal operating processes (Srinivasan & Nandhini, 2015). While the importance of crisis management in the construction sector is increasingly recognized, no universal theory or standard model has been widely accepted (Anthopoulos et al., 2013; Raoufi & Fayek, 2020).

According to Sfakianaki et al. (2015), research on crisis management specific to construction remains limited. This is due to several factors, including the industry's high complexity and fragmented (Chowdhury, 2022), the involvement of multiple stakeholders and the influence of uncertain and dynamic external conditions. Most existing crisis theories are developed for more uniform industries and do not adequately reflect the project based, highly variable and context dependent nature of construction (Iqbal et al., 2021). Additionally, construction firms still rely heavily on reactive approaches rather than proactive crisis frameworks (Shishehgarkhaneh & Moehler, 2024). Recent studies similarly note that there remains limited consensus on how crises should be systematically managed within the construction context, particularly regarding sector-specific frameworks and adaptive response mechanisms (Iqbal et al., 2021).

At policy level, initiatives such as the Construction 4.0 Strategic Plan (2021–2025), aligned with the Twelfth Malaysia Plan and Shared Prosperity Vision 2030, have emphasized digitalisation, productivity, sustainability and resilience. However, these initiatives do not yet provide an integrated crisis management framework specifically addressing business continuity at organisational level (CIDB, 2020).

The need for a construction specific crisis theory or framework arises from industry's scale, economic significant, and high exposure to disruptions (Chowdhury, 2022). Recent Covid-19 studies show how the pandemic affected construction, caused severe financial losses and disrupted project scheduling, risks that generic crisis models may not fully capture in a construction project environment (Kassem & Radzi, 2022). Although Babu & Sudhakar (2016) report growing attention to crisis management within the field, recent literature still identifies a gap in determining the most effective practices and processes (Mukhtar et al., 2022).

As evidenced in the earlier discussion, the Covid-19 crisis exposed significant instability in the construction sector, affecting both economic and social dimensions (Raoufi & Fayek, 2020). Therefore, it is essential to investigate how crisis management can be enhanced for construction organizations. Doing so will help identify current practices, address existing gaps and establish a structured framework to strengthen resilience, not only for the construction industry but also for other sectors facing future disruptions.

1.3 Problem Statements

Building on the issues highlighted in the introduction, particularly the construction sector's exposure to external shocks, fragmented structure and disruptions experienced during Covid-19, the problem extends beyond a single crisis event to a broader and continuing polycrisis environment characterised by interacting economic, geopolitical, climate-related and technological disruptions. These conditions continue to expose vulnerabilities in project delivery, organisational resilience and business continuity, thereby demonstrating the need for a Construction Sector Crisis Management Plan (CSCMP) for Malaysian construction organisations.

Over the years, the construction industry has repeatedly faced crises and periods of plight such as economic downturns, political instability, trade disruptions, and natural disasters, all of which have disrupted operations and weakened long-term resilience (Ofori, 2015). The Covid-19 pandemic further amplified these vulnerabilities, having one of the most severe and widespread impacts on the construction sector, particularly across Asia. In Malaysia, the construction industry experienced a contraction of - 7.9%, the lowest since Q2 1999 (DOSM, 2020) and faced extensive operational, financial, labour, organizational and supply chain disruptions, project delays and contractual issues (ILO, 2020; United Nations, 2020; CIDB, 2020).

The Movement Control Order (MCO) required the shutdown of all construction sites, resulting in unemployment increases from 3.5% to 4.5%, a 42% reduction in material usage (equivalent to RM4.6 billion in losses), and RM18.5 billion in losses during the early phase (CIDB, 2020; Harun & Razak, 2020). By Q1 2020, the sector had lost RM11.6 billion, experienced a 30% workforce reduction, and faced severe cash-flow instability. Thousands (4,965) of sites remained closed, and many (272) were shut down due to non-compliance with new health protocols (JKR, 2020; Sinar, 2020).

Supply chain disruptions, particularly delays in materials, machinery, and expertise imported from China has further contributed to cost overruns, time delays, and contractual disputes (CIDB, 2020; World Bank, 2020; DOSM, 2020; Mohamed, 2020). Knowledge-intensive projects were especially affected due to their reliance on specialized equipment and sequential processes (Gamir and Alhagar, 2020; Salim, 2020).

The construction sector's interdependence with other industries further magnified its impact. For example, 201 manufacturing projects (5.3%) were suspended,

while the real estate sector suffered significantly, especially in housing and retail. Likewise, slowdowns in tourism, aviation, and oil and gas further affected construction progress (MIDA, 2020).

Moreover, the transition to remote work created new challenges. While necessary for health and safety, it was not suitable for many roles in construction. It hindered staff monitoring, reduced productivity, and negatively affected workers' mental well-being (CIDB, 2020; Salim, 2020).

Even after Covid-19 subsided, its effects revealed underlying structural vulnerabilities that remain relevant. These exposures demonstrate the urgent need for systematic approaches to identify, manage, and mitigate crisis-induced disruptions in the construction sector. Beyond vulnerabilities exposed by Covid-19, current disruptions associated with supply chain volatility, inflationary pressures, geopolitical uncertainty, climate shocks and emerging digital risks further suggest that crisis exposure in the construction sector remains ongoing rather than episodic

The construction industry's historical vulnerable to financial recessions, political unrest, natural disasters and supply chain crises has consistently revealed weaknesses in organizational preparedness and resilience (Ofori, 2015; Ansell & Sorensen, 2024). The Covid-19 pandemic, as a recent and severe crisis, reinforced these gaps, with organizations relying heavily on reactive short-term strategies rather than structured crisis management systems (PMO, 2020; WHO, 2020).

Although the Malaysian government implemented the MCO, introduced health measures, and launched stimulus packages (e.g., Prihatin) to support economic stability, these actions indicated that many organizations were ill-equipped to manage unexpected disruptions (MKN, 2020; PMO, 2020; Lim, 2020). The challenges faced during this period revealed significant gaps in organisational preparedness, coordination, and resilience, underscoring the need for a more comprehensive and sector-specific crisis management approach (PMO, 2020).

The issuance of revised SOPs by CIDB in June 2020 further revealed challenges in compliance, resource constraints, and organizational confusion, resulting in many sites remaining closed (CIDB, 2020).

Despite WHO's long standing emphasis on localized, evidence based preparedness (WHO, 2009), Malaysia's pandemic readiness remains underdeveloped. A notable 23% of construction sites remained inactive despite being allowed to operate, reflecting organisational uncertainty and limited adaptive capacity (The Star, 2020).

National surveys further revealed that although 70% of Malaysian organizations have a Crisis Management Plan (CMP), only 17% are confident in its effectiveness, 70% report the need for improvement, and 13% acknowledge inadequacy (Bernama, 2020).

These findings suggest that existing strategies are fragmented, inconsistent, and insufficiently aligned with sector-specific risks, highlighting the need for comprehensive crisis management mechanisms within construction organisations.

This concern remains significant despite policy initiatives aimed at strengthening current practices in the Malaysian construction sector. National initiatives such as the Construction Industry Development Board Strategic Plan 2021–2025, Construction 4.0 Strategic Plan, the Twelfth Malaysia Plan (12MP) and the National Construction Policy 2030 emphasise productivity, digitalisation, sustainability and sector competitiveness. While these initiatives improve current practices, limited attention is given to integrated crisis preparedness and business continuity mechanisms at organisational level, thereby leaving a gap in structured crisis management guidance for compounded disruptions (CIDB, 2025).

Although crises in construction require adaptive and context-sensitive strategies (Kum & Yap, 2024), Malaysian construction practitioners exhibit low awareness and preparedness regarding crisis response, reflecting a critical gap in crisis management capability (Yahaya & Othman, 2023). Furthermore, research shows that Malaysian construction companies lack systematic crisis management frameworks, which contributed to severe operational and financial consequences during Covid-19 (Radzi & Rahman, 2022).

In many developing countries, including Malaysia, the absence of structured crisis plans resulted in delays, cost escalations, prolonged downtime, and operational fragmentation (Sospeter & Rwelamila, 2022). Without structured crisis plans, organizations struggled with delays, cost overruns, and operational disruptions (Kaushal, 2021).

Besides, the lack of a validated Crisis Management Plan (CMP) leaves the industry vulnerable to future shocks. Radzi and Rahman (2022) further emphasized that effective crisis response requires specific strategies such as financial aid coordination, supply chain restructuring, digitalisation, shared economy models, and regulatory clarity. Globally, the absence of unified crisis management approaches has hindered effective pandemic response, reinforcing the need for sector-specific frameworks (Husein & Borisovich, 2021). By analysing Covid-19 as a case study, construction

organizations that deal with crises in a one-off, reactive crisis responses experience severe delays, higher costs, and systemic disruption, especially when no structured plan or system is in place. These gaps highlight the need for a validated, flexible CSCMP tailored to the Malaysian construction context, the one that supports proactive, adaptive, and resilient responses to diverse crisis types because plans are predefined, may minimize cost and operational impact and maintain continuity.

Sudden crises, such as pandemics and economic shocks, disrupt business operations and may lead to organisational collapse; yet current research does not sufficiently explain how such events undermine preparedness (Amoah et al., 2020). While proactive crisis management is essential for survival (Sfakianaki et al., 2015), most construction firms lack standardised crisis protocols and clear mechanisms to safeguard business continuity (Amankwah-Amoah et al., 2020). To ensure resilience, organizations must adapt resources, policies, and finances to evolving threats (Wenzel et al., 2020).

While Covid-19 exposed vulnerabilities in competitiveness and operations (Wenzel et al., 2020), Covid-19 further exposed weaknesses in operational resilience, competitiveness, and crisis readiness, with many firms unable to adapt effectively (ILO, 2020; CIDB, 2020), most organizations still lack frameworks to anticipate crisis-driven failures (Walsh, 2020). Unlike countries such as Singapore mitigated impacts through proactive measures (WHO, 2020; Kuguyo et al., 2020), Malaysian organisations suffered significant disruptions due to the absence of standardized crisis procedures (Ramli, 2020; Deloitte, 2020). Business continuity in construction depends on effective cash-flow management, strategic project selection, and the adoption of technology and skilled local labour (McKinsey, 2020). However, the industry's low digital maturity and absence of a cross-cutting CSCMP weaken resilience efforts (CIDB, 2020). Accordingly, this study addresses these gaps by developing a CSCMP, aimed at strengthening organizational resilience and safeguarding construction firms against future crises, informed by lessons from pandemic experiences (UNDP, 2017; CIDB, 2020).

Despite the gaps are being exposed, Malaysia still lacks a unified CSCMP to ensure sector-wide business continuity during future disruptions (Salim, 2020). Such a framework, aligning with UNDP (2017) principles, would coordinate preparedness, resource allocation, and recovery strategies, safeguarding construction firms from collapse when crises strike. Traditional methods of ensuring business continuity were

likely insufficient, thus, an improved understanding of business continuity through crisis is needed for both business and community well-being (Fraser & White, 2024).

From above discussion, many organizations lacked formal crisis management plans and relied on reactive measures. These issues reveal three distinct gaps:

- i. Conceptual gap - No integrated framework linking vulnerable areas, CMP, and business continuity in the construction sector.
- ii. Empirical gap - Limited evidence on how Malaysian construction organizations implement CMPs and their effectiveness.
- iii. Methodological gap - Previous studies used single-method approaches without validating frameworks through mixed methods. this study addresses this through a sequential exploratory approach to develop and validate a CSCMP.

Therefore, it is imperative to recognise the importance of the Construction Sector Crisis Management Plan (CSCMP) to be developed in enhancing the resilience of Malaysian construction organisations during challenging situations.

1.4 Research Questions

1. What crisis-induced vulnerabilities affect Malaysian construction organisations during a crisis?
2. What crisis management practices are adopted by construction organizations in managing a crisis?
3. How can a Construction Sector Crisis Management Plan (CSCMP) be developed and validated?
4. How does the implementation of a CSCMP contribute to business continuity in construction organizations?

1.5 Research Aim & Objectives

The aim of this research is to strengthen organisational resilience in Malaysian construction organisations through the development of validated Construction Sector Crisis Management Plan (CSCMP) that supports business continuity.

To achieve the aim, the following research objectives are established.

1. To identify crisis-induced vulnerabilities affecting Malaysian construction organisations during a crisis.
2. To examine crisis management practices adopted by construction organisations in managing crises.
3. To develop and validate a Construction Sector Crisis Management Plan (CSCMP) informed by crisis management and organizational resilience foundations.
4. To evaluate the contribution of CSCMP towards strengthening business continuity.

While the research aim provides the overarching purpose of strengthening organisational resilience and business continuity through CSCMP, the research objectives represent the sequential stages undertaken to achieve that aim. In summary to the above, issues, problem statements, research questions and research objectives are tabulated in Table 1.1.

Table 1.1

Summary of Issues, Problems Statement, Research Questions and Research Objectives

ISSUES	PROBLEMS STATEMENT	RESEARCH QUESTIONS	RESEARCH OBJECTIVES
Disruptive impacts on vulnerable areas due to a crisis	Crisis induced adverse impact on vulnerable areas in construction organisations - Covid-19 crisis has pushed the construction sector to contract to the greatest extent (-7.9 percent) the lowest growth since Q2 1999 (-7.9%) (DOSM, 2020). - Labour, finance and economy, organization, material, equipment, supply chain, contract, time, technical and planning, communication and other industries (ILO, 2020), (United Nations, 2020).	What crisis-induced vulnerabilities affect Malaysian construction organisations during a crisis?	To identify crisis-induced vulnerabilities affecting Malaysian construction organisations during a crisis.
Efficacy of existing response strategies in combating and managing crisis	Uncertainty and inadequacy of strategies adopted by organisations in managing crises - Enforcement of MCO, quarantine measures and health protection measures (face mask, hand sanitise, temperature checks & physical distancing) (PMO, 2020; Lim, 2020). - Produced a revised new normal Standard Operating of Procedure (SOP) which includes mandatory Covid-19 testing for all foreign and local workers in Kuala Lumpur, Putrajaya and Selangor (CIDB,2020). - Research and practices about crisis management in Malaysia are still untested and underexplored. It has been devoted primarily to crisis response and recovery rather than crisis prevention and preparedness (The Star,2020). - 23% of construction sites in the country were still not operating after the Government allowed for operation (CIDB,2020). - Employees pivoting themselves toward crisis response while also transitioning to “Work From Home” (WFH). Faced with disruptions to work plans and work habits, employees had to quickly adopt (Tan,2020). - 70% of organisations do have a CMP. 62% had implemented their plans, while 21% admitted their organisations did not have any contingency plan. Of those with a CMP, only 17% demonstrated confidence in its effectiveness, while 70% acknowledged that their plans have areas for improvement. The remaining 13% felt that their current plans are inadequate (Bernama,2020).	What crisis management practices are adopted by construction organizations in managing a crisis?	To examine crisis management practices adopted by construction organisations in managing crises.

ISSUES	PROBLEMS STATEMENT	RESEARCH QUESTIONS	RESEARCH OBJECTIVES
Absence of validated CSCMP to prepare and response effectively	Absence of a validated and specific Construction Sector Crisis Management Plan (CSCMP) limits the ability of construction organizations to respond effectively - Covid-19 exposed critical gaps in crisis response strategies, especially in developing countries, leading to severe operational disruptions (Sospeter & Rwelamila, 2022). - Lack of structured crisis plans resulted in project delays, cost overruns, and business instability (Kaushal, 2021) - Malaysian construction firms showed ineptitude in crisis response due to poor awareness and weak crisis management frameworks (Yahaya & Othman, 2023). - No validated Crisis Management Plan (CMP) exists, leaving the industry vulnerable to future shocks (Radzi & Rahman, 2022) - Most of organisations lack a systematic understanding of how the pandemic can create situations leading to business failure (Walsh, 2020)	How can a Construction Sector Crisis Management Plan (CSCMP) be developed and validated?	To develop and validate a Construction Sector Crisis Management Plan (CSCMP) informed by crisis management and organizational resilience foundations.
Absence of standardised CSCMP has compromises business continuity	Absence of a standardized CSCMP in construction organizations compromises business continuity during crises - Many organisations are under pressure and trying hard to survive as well as the workforces (CIDB, 2020) - Malaysia is still expecting for more forthcoming initiatives to be proposed and implemented (Salim, 2020) - There are still more gaps need to be explored to improved global collaboration to face incoming threats (WHO,2020) - Most of organisations lack a systematic understanding of how the pandemic can create situations leading to business failure (Walsh, 2020) - Covid-19 crisis exposed severe gaps in crisis preparedness across the construction industry, with many firms struggling to adapt (ILO, 2020; CIDB, 2020).	How does the implementation of a CSCMP contribute to business continuity in construction organizations?	To evaluate the contribution of CSCMP towards strengthening business continuity.

1.6 Scope and Delimitation of the Research

This research is delimited in terms of unit of analysis, target population, geographical boundary, crisis focus and framework application. These delimitations establish the scope within which the study investigates crisis management and organisational resilience in the Malaysian construction sector.

1.6.1 Unit of Analysis and Target Group

The unit of analysis for this research is construction organisations, specifically organisations involved in managing and responding to crises, rather than individual projects or project-level events. The focus is placed on organisational preparedness, crisis management practices and business continuity capabilities.

The study adopts a sequential exploratory mixed-methods approach involving three rounds of inquiry. In the exploratory phase (Round 1), semi-structured interviews were conducted with selected stakeholders representing key actors in the Malaysian construction sector, namely Construction Industry Development Board, Public Works Department Malaysia and Royal Institution of Surveyors Malaysia to identify the most relevant target group and understand sector vulnerabilities. Additional interviews were conducted with Petronas and Employees Provident Fund as benchmark organisations recognised for strong crisis management practices (Menon, 2021). Findings from this phase informed the sampling frame for the questionnaire survey (Round 2), which was designed to address RQ1 to RQ4. Subsequently, expert focus group discussions (Round 3) involving management-level practitioners were undertaken to support development and validation of the Construction Sector Crisis Management Plan (CSCMP).

1.6.2 Sectoral and Geographical Scope

The empirical scope of the research is confined to Malaysian construction organisations comprising CIDB G7 contractors with 4-star and 5-star ratings, as well as registered professional consultants including engineers, architects and quantity surveyors. The study is geographically limited to the Klang Valley, selected due to its concentration of major construction activities and accessibility to relevant respondents.

This delimitation narrows the research to organisations considered capable of providing informed perspectives on crisis preparedness and business continuity, while recognising that findings may not be directly generalisable to smaller contractors or organisations outside the study area.

1.6.3 Scope of Crisis

This study focuses specifically on external crises, defined as disruptive events arising from forces beyond organisational control, including economic recessions, pandemics, geopolitical instability and systemic shocks. Such crises place non-routine demands on rapid response, adaptation and critical decision-making under uncertainty.

Internal crises such as project-level failures, internal misconduct or routine operational risks are outside the scope of this study. By emphasizing externally generated crises, the research seeks to understand how construction organisations prepare for and respond to disruptions beyond their direct control.

1.6.4 Conceptual Scope and Delimitation of Framework Application

The study is conceptually delimited to examining relationships among crisis-induced vulnerabilities, crisis management practices, business continuity and organisational resilience, culminating in the development of the CSCMP framework. The proposed CSCMP is intended as a sector-specific organisational framework to strengthen preparedness, response, recovery and redesign capabilities.

While the framework is validated through expert review, this study does not extend to live implementation testing of CSCMP in active projects, which remains an area for future research.

1.7 Significance of the Research

This research aims to develop a Construction Sector Crisis Management Plan (CSCMP) specifically for the construction industry, with the goal of strengthening organizational preparedness and ensuring business continuity during and after crises or times of plight. The CSCMP will serve as a structured guideline for responding

effectively to unexpected disruptions that may negatively impact an organization's operations, reputation, or financial standing.

The purpose of the CSCMP is not necessarily to prevent all crises, but to minimize their negative effects, enable timely and coordinated responses, and support long-term resilience. It will provide organizations with tools to assess the severity of a crisis, identify suitable response strategies, and establish crisis management capabilities that promote rapid recovery and continuity in operations. Most importantly, it prepares organizations to respond to future crises in a more organized and informed manner.

In the construction industry, where projects often involve large initial investments and long-term commitments, the risks posed by crises can result in significant financial losses. Therefore, having a robust CSCMP is essential to protect an organization's time, costs, and reputation. An effective CSCMP can also guide construction firms to adapt operations, improve cost-efficiency, and manage vendor relationships during uncertain times.

The findings of this research may also be beneficial to other sectors, as the CSCMP framework developed can be adapted across industries to enhance organizational resilience. A well implemented CSCMP can help organizations respond to emergencies in a systematic way, allowing them to continue operations or recover more efficiently, thus protecting their long-term sustainability.

Furthermore, the importance of this initiative is underscored by the close relationship between the construction industry and Malaysia's economic development. Studies by Khan et al. (2014) highlight the sector's contribution to employment, revenue generation, and national GDP. According to MIDA (2020), the construction industry also drives the growth of related sectors such as transportation, manufacturing, and professional services. The World Bank (1984) has similarly acknowledged the construction sector as a key driver of economic stimulus.

Given the industry's critical role in the national economy, it is imperative for construction organizations to adopt a deliberate, well-structured CSCMP. Doing so will not only help them withstand current and future disruptions but will also contribute to maintaining overall economic stability and resilience.

1.8 Organisation of the Research

This research was structured and presented in seven chapters. The flow and contents of the seven chapters are discussing as follows:

Chapter One: Introduction

Chapter One provides an overview of the research works. In addition, it presents an introduction that explains the background to the problem statement, aim, objectives, scope, limitation, significant of the research, and overview of the research design as well as the methods to be applied. At the end of the chapter, the research contribution is highlighted to justify the important of the research.

Chapter Two: Literature Review - Readiness and Strategies of the Malaysian Construction Industry during Plight

This chapter examines the Malaysian construction industry's vulnerability to crises and its response strategies. It reviews past external shocks (Asian Financial Crisis, Global Financial Crisis, Covid-19) and their impacts on critical areas such as finance, labour, supply chain, contracts, and operations. Existing crisis management practices and government interventions are analyzed to identify gaps in preparedness. Lessons from global responses highlight the need for a structured Construction Sector Crisis Management Plan (CSCMP) to strengthen resilience and ensure business continuity.

Chapter Three: Literature Review - Crisis Management Plan and Business Continuity

Chapter 3 defines the concept, types, and characteristics of crises and reviews theoretical crisis management models. It critically evaluates existing frameworks and synthesizes them into a five phase Crisis Management Plan (CMP): Prepare, Prevent, Response, Recovery, and Redesign. The chapter highlights how CMP strengthens organizational resilience and ensures business continuity in the construction sector. It also establishes the conceptual framework for developing CSCMP and links crisis management practices to improved performance and sustainability.

Chapter Four: Research Methodology

This chapter explains the research philosophy, approach, and design adopted to achieve the study's objectives. It outlines the use of a pragmatic stance with mixed methods (qualitative and quantitative) under a sequential exploratory design. The methodology includes four main phases: literature review, preliminary interviews, questionnaire survey, and expert validation of the proposed CSCMP framework. Sampling strategies, data collection procedures, and analysis techniques using SPSS are detailed, along with justification for cross-sectional time horizon and triangulation for reliability. The chapter concludes with the structured process for reporting findings to ensure validity and practical relevance.

Chapter Five: Data Analysis and Findings of the Exploratory Interviews

This chapter reports findings from preliminary interviews with experts from Malaysian construction authorities (JKR, CIDB, RISM) and resilient non-construction organizations (Petronas, EPF). It explores historical crisis experiences (1998 and 2008 financial crises) and the Covid-19 pandemic's impact on vulnerable areas such as labour, supply chains, contracts, and project continuity. The study reveals that the construction sector largely relied on reactive measures and lacked formal Crisis Management Plans (CMPs), while Petronas and EPF demonstrated proactive strategies through robust risk management, business continuity planning, and digital transformation. Insights from these interviews support the proposed five-step CSCMP framework includes Prepare, Prevent, Respond, Recover, and Redesign to enhance resilience and ensure business continuity in the construction industry.

Chapter Six: Data Analysis, Findings of the Questionnaire Survey and Framework Validation

Chapter Six presents quantitative findings from a survey of Malaysian construction stakeholders (contractors and consultants) to validate the proposed CSCMP. Descriptive and inferential analyses identify the most vulnerable areas during crises such as planning, supply chain, contracts, and finance, and confirm that existing strategies are largely reactive and ineffective. Spearman Correlation results show a

strong positive relationship between CSCMP implementation and business continuity, supporting the five-phase CSCMP framework: Prepare, Prevent, Respond, Recover, and Redesign. The chapter also details expert validation of the CSCMP, confirming its completeness, appropriateness, and practical applicability. Recommendations emphasize proactive planning, digitalization, and structured resilience strategies to ensure long-term business continuity.

Chapter Seven: Conclusion, Recommendation and Future Research

This chapter synthesizes the research findings, confirming that all objectives were achieved. It concludes that Malaysian construction organizations face critical vulnerabilities during crises and rely on reactive strategies, highlighting the need for a structured approach. The validated five-phase Construction Sector Crisis Management Plan (CSCMP) Prepare, Prevent, Respond, Recover, and Redesign was developed and shown to significantly enhance business continuity. Contributions include extending crisis management theory to the construction domain, providing a practical framework validated by industry experts, and introducing a KPI Toolkit for implementation. Recommendations for future research include applying the CSCMP to live projects, expanding geographic scope, conducting longitudinal studies, aligning with policy frameworks, and refining KPI metrics for continuous improvement.

1.9 Summary of Chapter

In summary, this chapter has established the foundation of the study by highlighting the need for a Construction Sector Crisis Management Plan (CSCMP) framework to enhance crisis preparedness and resilience among Malaysian construction organisations. It has outlined the background of the study, research problem, research objectives, research questions, scope and significance, while emphasising the vulnerability of the construction sector to various crises that may disrupt organisational operations and project delivery. Accordingly, Chapter 2 extends this foundation by reviewing relevant theoretical and empirical literature on crisis management, crisis preparedness, organisational resilience and construction sector responses to crisis, in order to identify the knowledge gaps that support the development of the proposed CSCMP framework.

CHAPTER 2

READINESS AND STRATEGIES OF THE MALAYSIAN CONSTRUCTION ORGANISATION DURING PLIGHT

2.1 Introduction

The overall goals of this chapter are firstly to establish the significance of the general field of study by presenting an overview of the Malaysian construction industry, disruptive in the vulnerable areas during crisis, response strategies and fundamental of crisis. Those reviews will provide better understanding of the relevance of the research variables. The bulk of this chapter is on critically evaluating the characteristics of crisis management plan to identify the appropriate approach for answering the research questions.

2.2 Malaysian Construction Outlook

The Malaysian construction industry experienced steady growth from 2010 to 2016, averaging 7.9% annually, supported by infrastructure and housing investments under the 10th Malaysian Plan (2011–2015). Growth remained strong between 2016 and 2017, averaging 7.1% per year. In Q4 2019, the value of construction work increased by 1.3%, reaching RM37 billion (MEDAC, 2021).

However, the Covid-19 pandemic triggered a global economic crisis of historic scale, disrupting economies worldwide. The World Bank Group (2020) described it as the most severe economic shock in decades. Before the pandemic, Malaysia's construction industry was projected to recover by 2020. Instead, it faced an 8.8% contraction due to the worsening situation (Bank Negara Malaysia, 2020).

The impact of Covid-19 on Malaysia's economy has been profound, not only through the loss of lives but also through the suspension of both essential and non-essential economic activities. In 2020, Malaysia's GDP grew by just 0.7%, its lowest rate since 2009 (DOSM, 2020). Among all sectors, construction was the hardest hit, shrinking by 7.9% as the Movement Control Order (MCO) forced the shutdown of all non-critical construction sites. Figure 2.1 below illustrates the Malaysia's GDP trend and construction sector since 2019 until 2025 (DOSM, 2025).

Table 2.1
Malaysia Quarterly GDP and Construction since 2019

GDP Growth Decomposition (%)	2019	2020	2021	2022	2023	2024	2025
GDP	4.4	-5.5	3.1	8.9	3.6	5.1	5.2
Consumption							
Private Sector	7.6	-4.3	1.9	11.3	4.7	5.4	5.6
Public Sector	2.0	4.5	6.6	3.9	3.5	4.2	4.4
Gross Fixed Capital Formation	-2.1	-14.5	-0.8	5.0	5.5	6.1	6.3
Trade							
Exports of Goods & Services	-1.3	-8.9	14.9	11.1	-7.9	8.3	7.2
Imports of Goods & Services	-2.5	-8.4	13.3	13.3	-6.4	7.6	6.9
Sectoral							
Agriculture	2.0	-2.2	1.2	0.2	1.0	2.8	3.0
Mining	-2.0	-10.0	0.3	3.3	0.5	2.1	2.4
Manufacturing	3.8	-2.6	9.5	8.1	0.7	4.3	4.6
Construction	0.1	-19.4	-5.2	5.0	6.1	17.5	12.5
Services	6.1	-5.5	1.9	10.9	5.4	5.4	5.7

The figure indicates that although the construction sector has recorded strong post-pandemic recovery, volatility in growth performance and continued exposure to external shocks suggest that resilience planning remains necessary despite improved sector performance (DOSM, 2025)

During the Movement Control Order (MCO), most construction activities in Malaysia were suspended, except for works classified as "critical" by the government (The Star, 2020; Ong & Shazni, 2020). This disruption impacted not only the projects themselves but also the contractual parties and their organizations. The Covid-19 pandemic triggered widespread crises across the construction sector, including issues related to labour, finance, operations, materials, equipment, supply chains, contracts, project timelines, and communication (DOSM, 2020; CIDB, 2020; MIDA, 2020; Harun, 2020; Gamil & Alhagar, 2020; Ramli, 2020).

Numerous discussions and articles emerged addressing legal and contractual concerns such as force majeure, extension of time (EOT), losses and expenses, suspension, and contract frustration. However, the effectiveness of these solutions often

depends on how well organizations were prepared for such a crisis (Toh & Patrick, 2020). In response to the pandemic, many employees had to shift suddenly to remote work, relying on digital tools and platforms to maintain communication and workflow with both internal and external parties (Lee Yu Nan et al., 2023).

To mitigate the economic impact, the government introduced multiple stimulus packages totalling RM260 billion. The Prihatin Rakyat package (March 2020) and further assistance for SMEs and micro-enterprises (April 2020) aimed to preserve jobs and economic stability. Later, the National Economic Recovery Plan (PENJANA), launched in June 2020, specifically targeted the revival of sectors like construction (CIDB, 2020). Despite these efforts, challenges remained in ensuring the timely delivery and long-term effectiveness of such aid (Lim, 2020).

Historically, Malaysia's construction industry has shown a pattern of repeating past mistakes. Survival strategies during previous financial crises (1984–1987, 1996–1999) were largely reactive, lacking long-term planning in areas like education, HR development, technological adoption, and reduced dependency on foreign labor (Bakar & Awang, 2011; Bakar & Yusof, 2011). These gaps resurfaced during Covid-19, causing repeated vulnerabilities and disruptions.

According to the Master Builders Association Malaysia (MBAM), the sector faced long-term consequences including layoffs, business closures, material and labour shortages, and rising costs due to new health and safety protocols. These conditions reduce productivity and increase project risks, while potentially triggering legal disputes over unmet contractual obligations. Despite careful planning, unanticipated disruptions are a common feature of construction projects (Ding, 2025).

The Covid-19 pandemic, a rare global crisis, has further exposed the need for construction organizations to adopt structured crisis management and business continuity strategies. Even firms with existing continuity plans struggled under the scale of disruption (Victor, 2020). Studies by CIDB and others highlight the urgent need for the industry to learn from Covid-19, adapt to new norms, and prepare for future threats (CIDB, 2020). As the pandemic caused widespread health, economic, and social upheaval (Cheval et al., 2020; WHO, 2020) (CIDB, 2022), it serves as a compelling case for building resilient crisis management frameworks in the construction industry.

The Malaysian construction sector has shown notable growth and importance to national GDP, yet its performance during crises reveals recurring structural weaknesses such as chiefly cash-flow fragility, dependence on foreign labour, and slow digital

adoption. While government stimulus and public projects temporarily stabilise activity, these measures often fail to address underlying governance, workforce and technological gaps. Implication for the framework: include financial-buffering and digital-readiness indicators under vulnerable areas and treat public-investment levers as a core macro-level strategy for short-term continuity.

2.2.1 Construction as an Economic Activity

The The construction industry remains a vital component of Malaysia's economy: recent data show that in 2022, the sector produced RM 205.1 billion in gross output and contributed RM 65.7 billion in value added (DOSM, 2023). Globally, construction contributes around USD 1.7 trillion and typically accounts for 5–7% of a country's GDP, showing its major economic impact (Alaloul, Musarat, Rabbani, & Iqbal, 2021).

Since the early decades, construction has been broadly understood as an economic activity that encompasses the entire value chain, from the production of raw and manufactured materials to the provision of professional services such as design and project management, and ultimately to the physical execution of work on site (Dang & Pheng, 2015). Within this broader perspective, construction spans all three economic sectors: (1) Primary (extraction of resources); (2) Secondary (manufacturing materials and building components); and (3) Tertiary (consulting, engineering, and management services) (Pheng & Hou, 2019). From this viewpoint, construction activity begins long before physical works commence on site, integrating processes such as planning, design, material fabrication, and supply chain coordination.

Conversely, other definitions adopt a narrower lens by focusing solely on the final phase, namely the on-site construction activities. This view excludes off-site services like project management and material production. The International Standard Industrial Classification (ISIC) follows this narrower definition, categorizing services like architecture, engineering, and manufacturing separately from construction (Pheng & Hou, 2019; UN Stat, 2023). While this classification system provides clarity for statistical and industrial reporting, it fails to capture the full spectrum of construction activity, which also includes planning, design, consultancy, and component manufacturing (Pheng & Hou, 2019; Ruhoma, 2025).

There's also a middle-ground definition that sees construction as a complete process, from planning and design to maintenance and operation. This definition includes both on-site and off-site roles such as contractors, consultants, and project managers (Pheng & Hou, 2019; Ruhoma, 2025). These professionals work closely with clients and financiers, highlighting the interconnected nature of the industry. Furthermore, Alaloul et al. (2021) confirm that the construction sector is interdependent with other parts of the economy. When other sectors perform well or poorly, construction tends to follow the same trend. This highlights how sensitive and interconnected the construction industry is within the overall economic system (Alaloul et al., 2021). Figure 2.1 below translate the interdependent link of the sectors.

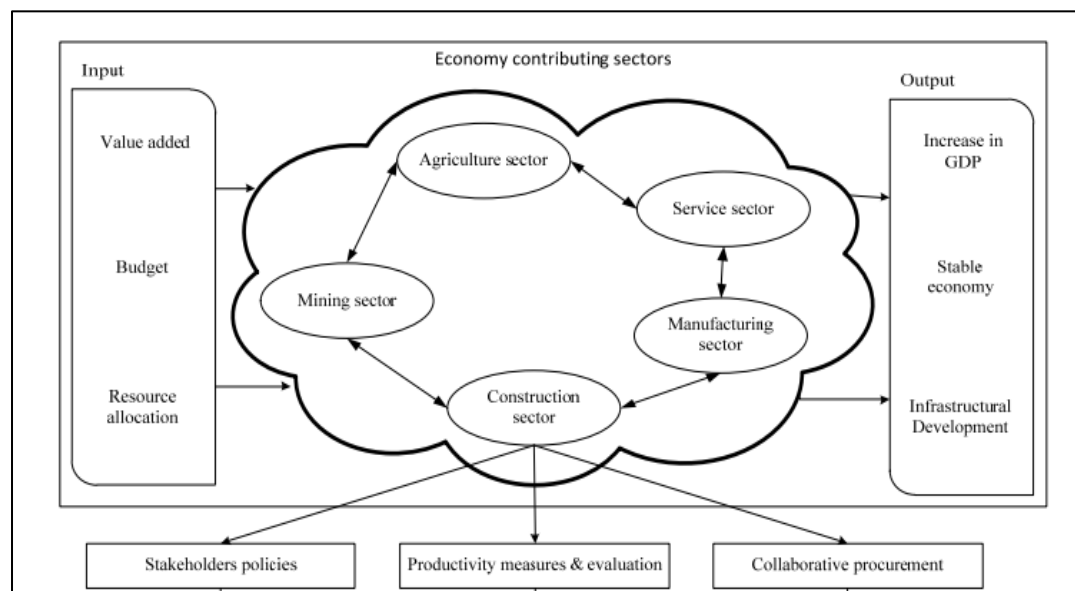


Figure 2.1 Economy Contributing Sectors

Source: Adapted from Alaloul et al. (2021)

Recent studies confirm that changes in the construction sector continue to exert a strong influence on related industries. For example, a Malaysian analysis found that the construction sector has significant forward and backward linkages with manufacturing and the services sector, implying that fluctuations in construction output can ripple across the national economy (Alaloul et al., 2021). At a global level, the construction industry's integration in the global value chain amplifies its economic importance, as it both relies on and contributes to upstream and downstream sectors in high-value markets (Niu & Xu, 2023). Domestically, Malaysia's construction activity, boosted by major projects has been a key driver of public and private investment and is

expected to fuel broader economic growth in infrastructure, real estate, and other sectors (Harinderan, 2024). Thus, the construction sector has a considerable influence on the socio-economic aspects of any nation.

Construction's wide forward and backward linkages make it a powerful multiplier across the economy, yet standard statistical classifications underplay off-site activities and service dimensions that matter for resilience (planning, procurement, design). This mismatch creates blind spots in policy and firm-level contingency planning. Implication for the framework: broaden the definition of the sector in your variables to capture off-site services and supply-chain nodes, and treat these as separate vulnerable areas for continuity planning

2.3 Malaysia and the External Global Crises

Since independence, Malaysia has faced four periods of major external crisis i.e. economic crises and health crises. It is worth noting that the causes of each crisis were very different in nature, given that the country was at different developmental stages over the last four decades (Lee, 2020). Malaysia's experience illustrates the pervasive in macroeconomic effects of structural adjustment to the global external crises (Sheng, 1989). Figure 2.2 below walk through the timeline of major external global crises affecting Malaysia.

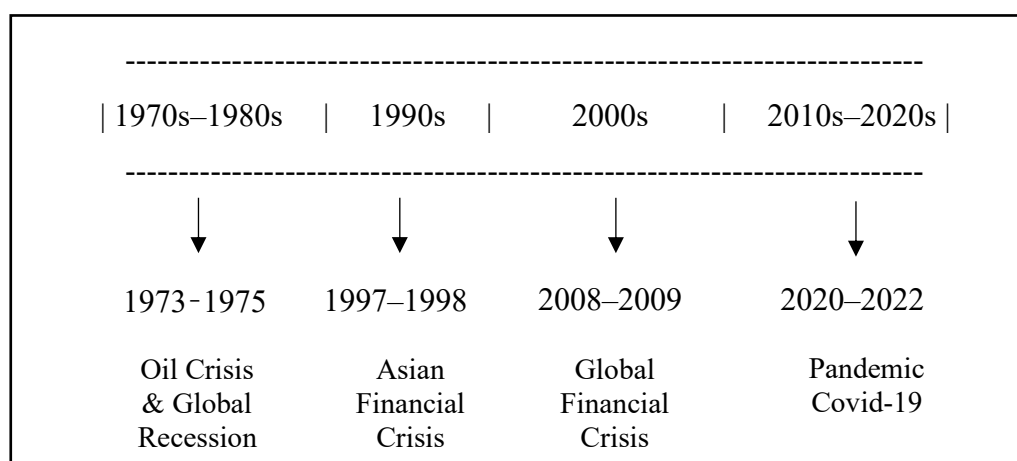


Figure 2.2 Timeline of Major External Global Crises Affecting Malaysia

Source: Adapted from Lee (2020) and Sheng (1989)

From Figure 2.2, it shows that each crisis differed in nature and impact, reflecting Malaysia's evolving economic and developmental context. These events illustrate the country's exposure to global economic shocks and the cascading effects on domestic sectors.

The crisis timeline demonstrates that each shock is different in origin and mechanism, producing varied sectoral outcomes; nevertheless, common responses recur (fiscal stimulus, labour measures, debt restructuring). Contradictions appear where short-term rescue policies succeed in stabilising activity but do little to prevent repeated vulnerabilities. Implication for the framework: capture both event-specific triggers and recurring failure modes, so the CMP can combine tailored responses with systemic resilience measures.

2.3.1 Asian Financial Crisis 1997/98

The 1997–1998 Asian Financial Crisis is widely regarded as one of the most severe economic shocks in Malaysia's history, originating from external sources (Athukorala, 2010). The crisis began with a speculative attack on the Thai baht in July 1997, which subsequently exerted heavy pressure on the Malaysian ringgit (Basri & Hill, 2010). At the onset, the Malaysian economy appeared resilient, yet it was unexpectedly vulnerable to regional contagion. Foreign investors and international rating agencies had underestimated underlying risks in Thailand and concerns that similar currency devaluations could spread across the region prompted large-scale capital withdrawal from perceived weak economies, including Malaysia (Ariff & Bakar, 1999). Consequently, the ringgit plummeted from 2.40 to 4.90 against the US dollar in 1997 (Ariff & Bakar, 1999; Nambiar, 2009). The crisis caused severe disruptions in both the currency and stock markets, illustrating the profound economic impact. Malaysia's real GDP growth rate contracted sharply from 7.3% in 1997 to –7.4% in 1998, marking the worst downturn since independence (Nambiar, 2009).

The construction industry, closely linked to broader economic performance, experienced a substantial decline during the crisis. Output in the basic metals sector fell by 35.6%, reflecting the industry's strong interconnections with related manufacturing sectors such as metal products and electrical machinery. Prior to the crisis, private infrastructure financing in East Asia was expanding rapidly, but investment activity collapsed after the financial shock, leading to deferred or cancelled projects. In

Malaysia, domestic financial institutions faced liquidity constraints, and ringgit devaluation further increased construction costs (Khoon & Hui, 2010). As a result, construction growth fell from 14.2% in 1996 to 9.5% in 1997 and further contracted to –24% in 1998 (Khoon & Hui, 2010). Between 1998 and 1999, the construction sector faced an estimated RM8 billion in bad debts, extensive retrenchments with 37,357 workers affected in 1999, and the suspension or abandonment of 115 projects valued at RM2,457.47 million (CIDB, 2004). This period underscores the vulnerability of the construction industry to macroeconomic shocks and highlights the cascading effects of financial crises on sectoral output, employment, and project continuity. Figure 2.3 shows construction growth was highly volatile compared to GDP, with sharp peaks and deep troughs (Khoon & Hui, 2010).

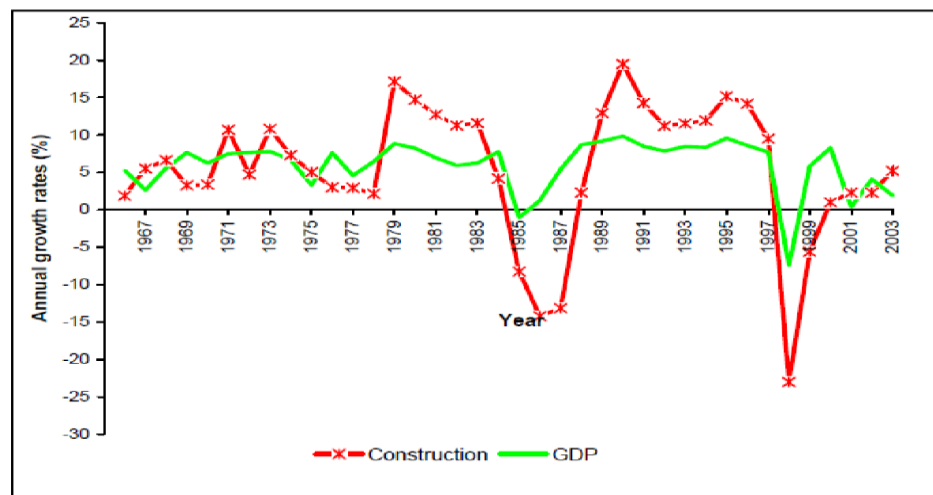


Figure 2.3 Malaysian Annual Growth Rates of GDP and Construction, 1965-2003

The AFC case highlights how financial contagion and weak domestic banks quickly translate into construction bankruptcies and project abandonment. Past recovery actions focused heavily on recapitalisation and project prioritisation but paid less attention to long-term regulatory strengthening and workforce development. Implication for the framework: include financial-sector linkages (bank health, contractor indebtedness) and regulatory reform readiness as variables under vulnerable areas and redesign stages.

2.3.2 Global Financial Crisis (GFC) 2008/09

In contrast, Global Financial Crisis did not start in Asia or Malaysia but is due to the weaknesses in the United States financial industry which escalated into a severe international financial crisis and deep slump in global trade and global recession by late 2008. Being a small open export-dependent economy, Malaysia has not been spared from this external shock. Since the demand for electronics goods largely comes from developed countries (particularly the US, EU, and Japan), a decline in consumption in these economies bounce negative impact on export of Malaysian manufactured goods, industrial output deteriorated and investment declined (Nambiar, 2009).

The so-called unprecedented collapse in exports in Asia has three notable features. First, the fall in exports across Asia, from Japan to Indonesia beginning from July 2008 to the trough around February 2009, was highly synchronized. Second, the export contraction was swift and sharp due to exports tumbled by about 35 percent from peak to trough (July 2008 to February 2009). This was far sharper than the 18 percent drop during the 2001 information technology (IT) downturn, as well as the 16 percent fall during the Asian financial crisis, when Asia was at the epicentre of the crisis. Third, intra-Asian exports contracted by even more than shipments to the advanced economies. Intra-Asian exports fell by 48 percent peak to trough, against a 29 percent decline in exports to the U.S. and 15 nations of the European Union (EU-15) over the same period (Keat, 2009).

Growth in Malaysian economy contracted by 1.7 per cent due to a significant drop in Manufacturing sector (-9.4 per cent) while Mining & Quarrying sector shrank 3.8 per cent. Nonetheless, the positive trend recorded by the services and construction sectors counteracted the overall downturn momentum. As for construction sector, the growth of Selangor (4.5 per cent), WP Kuala Lumpur (9.2 per cent) and Johor (14.0 per cent) reflected the overall scenario at the national level (5.8 per cent). This sector was dominated by Selangor with 37.8 per cent, WP Kuala Lumpur (15.8 per cent) and Johor (10.5 per cent). Most states also showed a positive impact due to the implementation of the first and second stimulus packages (MOF, 2010).

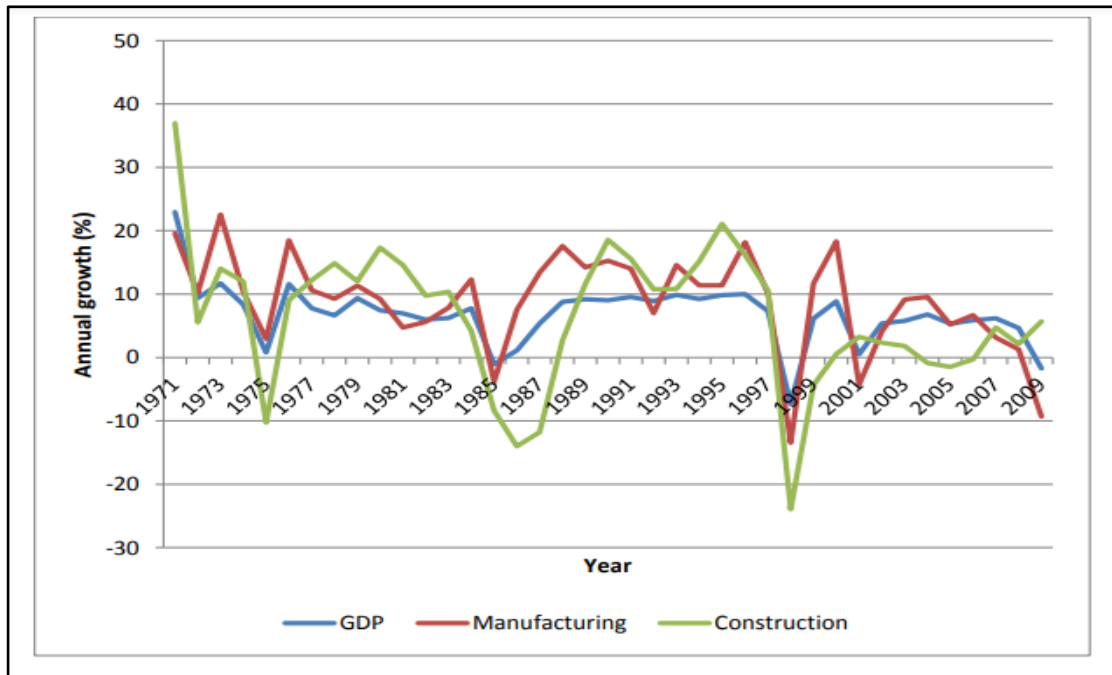


Figure 2.4 Annual Growth Rates of GDP and Construction and Manufacturing

Figure 2.4 is extracted from Economic Report Issues 1970/71 to 2009/10 where it shows when GDP drop for 1.7% during the 2008 - 2009 recession, construction growth is at 5.8%. This is due to construction demand remained high in 2008 to 2011 with private sector spending contributing an ever increasing share of the total demand due to the government's efforts to enhance development projects under the Public Private Partnership Programme (PPP) (DOSM, 2012). Also supported by Keat (2009), there has been no evidence of reduction in government expenditure especially for construction activities in year 2008, RM 63.15 billion worth of projects was awarded (of which 43.7 per cent of RM 27.60 billion, is from government coffers) compared to 2007 and 2006 values of RM 47.48 billion and RM 22.45 billion respectively, that is, no cutback in government spending for construction activities (Keat, 2009).

The GFC shows that export-dependent, open economies can be cushioned by counter-cyclical public investment, but that stimulus timing, targeting and governance determine whether benefits reach SMEs and subcontractors. A gap persists in evaluating how stimulus design affects resilience at firm level. Implication for the framework: add indicators for stimulus targeting and institutional capacity (e.g., PPP governance) to assess strategy effectiveness and SME continuity.

2.3.3 Global Economic and Health Crisis of Pandemic Covid-19 2019/20

Evidence across the literature, news sources and institutional reports consistently suggests that the global economy experienced its deepest recession since the Great Depression of the 1930s in 2020 (World Bank, 2020; BNM, 2021). This was a culmination of economic disruptions resulting from the containment measures implemented in response to the unprecedented health crisis known as Coronavirus Disease 2019 (Covid-19) and heightened risk aversion. Consequently, labour market conditions weakened amid a decline in firms' production activities, which weighed on countries' domestic demand, external trade and global growth (BNM, 2021). Amid a highly challenging global and domestic operating environment, the Malaysian economy contracted by 5.6% in 2020, the lowest since 1998 (-7.4%). This was due to broad-based weaknesses in exports, production and domestic demand, arising from adverse external spillovers and the introduction of stringent domestic containment measures to combat Covid-19. The weaker domestic economic activities led to a deterioration in labour market conditions and income losses, thereby impacting consumer spending. Private investment activity was affected by adverse business confidence and the slower implementation of projects. Figure 2.5 delineates sharp decline in Malaysia's GDP growth, the lowest since 1998 the unprecedented economic shocks emanating from the pandemic while Figure 2.6 shows the real GDB by economic sector.

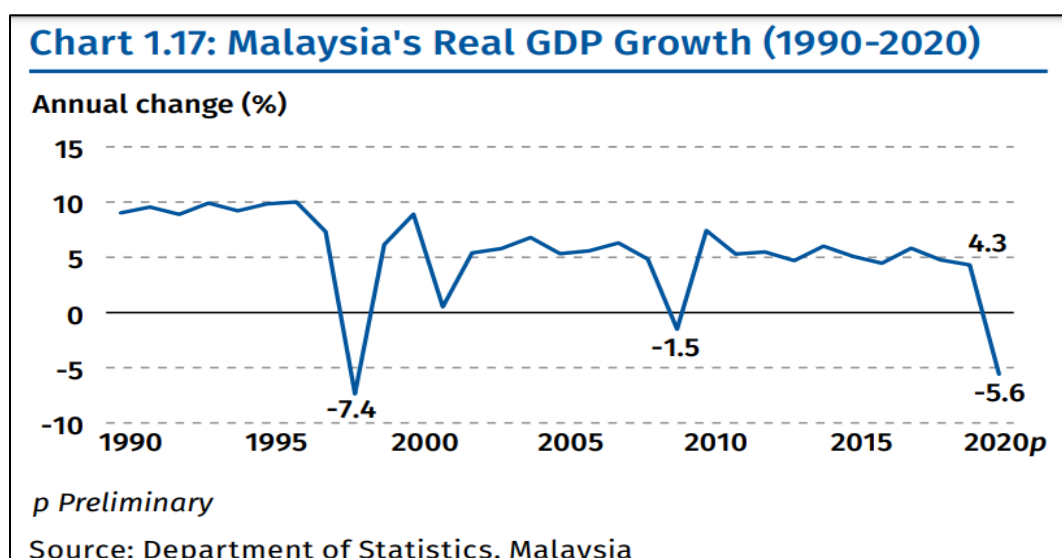


Figure 2.5 Malaysia's Real GDP Growth (1990-2020)

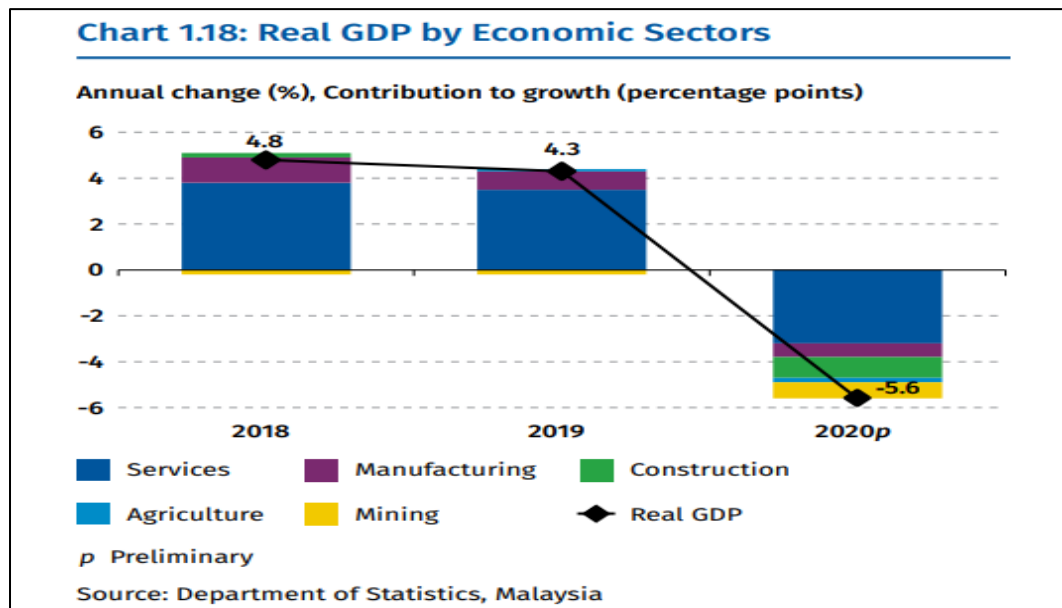


Figure 2.6 Malaysia's Real GDP by Economic Sectors

As the pandemic persisted, organisational profitability deteriorated and labour market conditions weakened in tandem with broader economic contraction. The construction sector experienced a particularly sharp decline, contracting by 19.4% in 2020 compared with 0.1% in 2019. This downturn reflected substantially reduced work capacity due to stringent containment measures, acute labour shortages arising from international border closures, widespread supply-chain disruptions, and repeated site shutdowns following Covid-19 outbreaks. The suspension of nearly all construction activities in March and April 2020 weighed heavily on second-quarter performance. Although operating restrictions were gradually relaxed in May, the majority of project sites remained inactive as developers faced financial constraints, compliance challenges, and difficulties in re-establishing supply chains to facilitate work resumption (BNM, 2021).

Nonetheless, sectoral activity demonstrated gradual recovery in the second half of 2020. Improved clarity in standard operating procedures, wider implementation of COVID-19 testing among construction workers, and the introduction of extended operating hours contributed to increased work continuity. Furthermore, the rollout of government stimulus packages supported the implementation of numerous small-scale projects and stimulated growth in the special trades' subsector. Activity in the residential and non-residential subsectors also strengthened, driven respectively by the initiation of new housing developments and the accelerated completion of ongoing projects. Meanwhile, the civil engineering subsector benefitted from continued progress

on major infrastructure initiatives (BNM, 2021). (BNM, 2021). Labour market conditions similarly recorded substantial deterioration in 2020 due to movement restrictions and operational constraints imposed throughout the year. Employment growth contracted by 0.2% (2019: 2.1%), resulting in a net job loss of approximately 30,000 workers, while the unemployment rate rose to 4.5%, the highest level recorded in three decades (2019: 3.3%). Sectoral analysis indicates that employment losses were most pronounced in industries severely affected by the pandemic, particularly construction and tourism-related services. Employment in the construction sector specifically contracted by 4.4%, attributable largely to the postponement and deferral of numerous projects (BNM, 2021).

Covid-19 exposed non-linear, multi-dimensional vulnerabilities including health, labour mobility, supply chains and digital capability, revealing that traditional continuity plans were often insufficient. While health SOPs and infrastructure spending proved effective, coordination failures and uneven preparedness left many firms exposed. Implication for the framework: explicitly include health protocols, supply-chain mapping, digital capacity, and coordination mechanisms as variables in both preparedness and response phase.

2.3.4 Post-Pandemic and Emerging Polycrisis Conditions

While Covid-19 was a trigger, the sector now faces compounded polycrisis conditions rather than isolated shocks. A synthesis of literature, news sources and institutional reports confirms that the global economy underwent its deepest recession since the Great Depression of the 1930s in 2020. However, rather than marking an isolated disruption, the post-pandemic period has evolved into what recent literature describes as a polycrisis era, characterised by interconnected economic, geopolitical, climate and technological shocks that reinforce systemic uncertainty (Ansell et al., 2024; Lawrence, 2024). In recent years, persistent supply chain volatility, inflationary pressures, energy insecurity and labour shortages have continued to affect global economic recovery, including the construction sector. More recently, escalating geopolitical tensions and conflicts in the Middle East have introduced additional risks through disruptions to energy markets, maritime trade routes and material supply chains, contributing to renewed inflationary pressure and heightened uncertainty for project-based industries such as construction (Parkin, 2026). These compounded

disruptions suggest that crises are no longer episodic events but interacting systemic risks requiring resilience-oriented and adaptive crisis management approaches (Ansell et al., 2024; Fraser & White, 2024).

2.4 Impact of Crisis towards Vulnerable Areas of Construction Industry

Crises represent extraordinary episodes that disturb and threaten established modes of operation and the dominant assumptions underpinning societal functioning. They pose risks to lives, property, markets, infrastructure provision, public services, policy agendas, political careers and even prevailing governing paradigms. Confronted with such threats and high uncertainty, organisations experience substantial pressure and accountability demands (Ansell & Sorensen, 2021). As noted by Shishehgarkhaneh et al (2024), the construction management literature does include a considerable body of crisis-related research: however, these studies remain insufficient in examining crisis management practices within construction organisations across the full crisis lifecycle.

Much Much of the earlier construction crisis literature focused on specific dimensions such as crisis communication, contractual conditions, organisational behaviour, preparedness and environmental influences (Loosemore, 1997, 1998a, 1998b, 1998c, 1998d, 1998e, 1999; Loosemore & Hughes, 1998, 2001; Loosemore & Teo, 2000; Ocal et al., 2006). While these studies provided important foundational insights, more recent scholarship indicates that crisis vulnerability mapping, organisational resilience capabilities and integrated crisis management frameworks remain insufficiently theorised and empirically underdeveloped within the construction sector (Marzouk, 2021; Shrestha et al., 2022; Le & Nguyen, 2023; Shishehgarkhaneh & Moehler, 2024). Recent studies further emphasise the growing relevance of business continuity and adaptive resilience capabilities under polycrisis conditions (Panteli et al., 2023; Fraser & White, 2024).

Malaysian studies remain limited. To date, no comprehensive attempts have been made to examine the vulnerable dimensions of crisis exposure within the Malaysian construction industry. Although some research has explored the financial performance of construction firms during the global financial crisis (Lai et al., 2014) and the survival strategies of construction companies during economic downturns (Bakar & Awang, 2011), the literature still lacks conceptual clarity regarding which organisational areas become disrupted during crises. This gap has become especially

evident in light of the Covid-19 pandemic, which exposed previously undocumented vulnerabilities in construction supply chains, workforce dependencies, contract governance structures, digital readiness, and project financing models (CIDB, 2020; World Bank, 2021; OECD, 2022).

Accordingly, the present research constitutes the first systematic attempt to identify and conceptualise crisis-vulnerable areas within Malaysian construction organisations. This analysis draws primarily on extant literature and authoritative government and industry reports pertaining to the Covid-19 crisis. The pandemic exerted heterogeneous impacts across the sector, affecting project owners, contractors, developers, consultants, subcontractors, and supply chain vendors in varying intensities. The nature and severity of these impacts were contingent upon organisational roles, project characteristics, and operational dependencies. The key vulnerable areas and disruptions affected construction organizations, during the pandemic have been discussed in Problem Statement No. 1 in Chapter 1, and is summarised in Table 2.3 as follows:

Table 2.2

Vulnerable Areas in Construction Sector during Crises

Disruptive Vulnerable Areas	ILO, 2020; Panteli et al, 2023; Fraser & White, 2024)	United Nations, 2020; Kum & Yap, 2024	Bank Negara Malaysia, 2020; Fraser & White, 2024)	DOSM, 2020; Panteli et al, 2023	WHO (2020)	CIDB, 2020; Fraser & White, 2024	MIDA, 2020; Fraser & White, 2024	World Bank, 2020; Fraser & White, 2024	Ramli, 2020; Shishehgharkhaneh & Moehler (2024)	Harun, 2020; Ding, 2025	Mohamad, 2020; Kum & Yap, 2024	Gamil, 2019; Fraser & White, 2024	Le & Nguyen (2023)	Babulal, 2020; Panteli et al, 2023
Finance & Economy	√	√	√	√	√	√	√	√	√	√	√	√		
Labour	√	√		√	√	√		√					√	
Organisation	√			√		√			√	√		√		
Supply chain		√		√		√		√		√		√		
Contract						√	√				√	√		
Technical & Planning						√						√		
Communication						√						√		√
Other industries				√			√	√						
Reputation						√							√	

Based on the synthesis of literature in Table 2.3, crises such as the Covid-19 pandemic expose multiple vulnerable areas in the construction industry. Financial instability arises from project suspensions and reduced cash flow, followed by labour shortages and health-related absenteeism. Organisational operations become strained as firms adapt to changing regulations, while supply chain disruptions, especially in materials, equipment, and logistics has shown slow project progress. Contractual risks intensify due to delays and uncertainties, and technical and planning activities are affected by interruptions in site work and coordination. Communication issues further complicate decision-making among stakeholders. These impacts also extend to related industries such as manufacturing and transportation. Collectively, these disruptions heighten reputational risks as organisations face scrutiny over delays, safety compliance, and crisis response.

Crises generally produce wide-ranging consequences for organisations and society, stemming from operational disruptions, health threats, and systemic vulnerabilities (Amankwah-Amoah et al., 2020). They destabilise organisational integrity, divert resources, and lead to financial and operational losses (Fraser & White, 2024). As highlighted by Kum & Yap (2024), such events may result in loss of life and property, production interruptions, monetary losses, and reputational damage which are patterns clearly observed during Covid-19. They also contribute to reduced morale, absenteeism, and loss of skilled personnel (Kum & Yap, 2024). These effects were evident across the Malaysian construction sector, where delays, labour constraints, financial pressure, and safety concerns significantly hindered performance. The following sections elaborate on each vulnerable area in detail.

The literature synthesis identifies a consistent set of vulnerable areas including finance, labour, supply chain, contracts, technical planning and communications, but empirical work is sparse on how these interact over time during a crisis. This gap limits the ability to prioritise interventions under resource constraints. Implication for the framework: operationalise interactions (e.g., cash-flow → labour → supply delays) in a simple causal logic so the CMP can rank and sequence actions under each vulnerability.

a) Finance & Economic

Covid-19 crisis has pushed construction sector to contract to the greatest extent (-7.9 percent) which is the lowest growth since Q2 1999 (-7.9%) (DOSM, 2020). Movement Control Order (MCO) has led to the closure of all construction's sites (CIDB, 2020). MCO has led to the closure of all construction's sites (CIDB, 2020). Due to the crisis, Malaysian construction industry sustained RM18.5 billion in losses during the initial phase of the MCO in middle of March 2020 (Harun & Razak, 2020). Concurrently, the Former Senior Works Minister Datuk Seri Fadillah Yusof during a conference with Klang Valley's construction players updated that RM11.6 billion in losses were recorded in Q1 of 2020. These include loss of workforce at a rate of 30 per cent, which was worth RM3.3 billion, the decline in the use of construction materials by 42 per cent worth RM4.6 billion, claim and payment prolongation as well as cash flow in the whole supply chain was affected (Harun, 2020; Ding, 2025).

The construction sector is an important part of all countries' economies because it promotes the financial system and the general well-being of its population (Alawag & Alaloul, 2020). Construction is crucial as it represents the economy, wellness and quality of life in the country (Alaloul, Musarat, Rabbani, & Iqbal, 2021). As construction is a backbone of economic growth in all countries, it affects each industry's performance at all levels of the economy (Alaloul, Musarat, Rabbani, & Iqbal, 2021). The construction of a country with a considerable number of people working in conjunction on projects with their respective capacities at various hierarchical levels adds to the overall gross national product (GDP) (Zamani & Rahman, 2021). As the Covid-19 epidemic spread throughout the world, the construction industry, particularly building projects, has been affected (CIDB, 2020; ILO, 2020). The lack of appropriate infrastructure for construction causes underdevelopment in the sectors of a country, an undeveloped economy, poor living standards and unequal distribution of revenue, which are all contributing to an economic collapse of a country (Gaal & Afrah, 2017; Musarat, Alaloul, & Liew, 2020). In view of the current state of social and economic sphere, it clearly indicates the world is underprepared in encountering this global crisis (World Bank, 2020; United Nations, 2020). These findings justify including cash-flow disruption, revenue loss, and financial exposure in the Finance & Economy construct for this study and will guide survey items that assess organisational liquidity risk and preparedness during crises.

b) Labour

Crisis of Covid-19 pandemic has affected labour markets around the world, resulting in job losses and reduction in working hours significantly. Furthermore, the construction job recovery varied among different sectors of the construction industry. According to the most recent global estimates and country-level data, the crisis has resulted in a severe employment shortfall that has persisted in most nations (ILO, 2022). The circumstance has taken the industry's toll especially on employment where unemployment rate was increased in Malaysia by 1.5% from 3.5% (United Nations, 2020). Furthermore, a survey conducted by Pertubuhan Akitek Malaysia (PAM) showed that almost 90% of the Architectural Consultancy Practice (ACP) not be able to pay their employees after more than three months (Mohamed, 2020). Most companies allow their staff to work at a distance and some are forced to leave their jobs (Shah, 2020). Besides, Rajendran & Hasmori (2022) via a journal explained, the construction industry was severely affected because of the financial issues, arising due to the crisis. The severe financial issues have given constraints to labour employment, on top of the restriction in movement of workers in sites and returning the foreign labour to their own country especially during construction phase. This has given a risen in the loss of workforce and salary cut down at 30% rate which was worth RM3.3 billion (Rajendran & Hasmori, 2022). These findings justify incorporating labour dependency, workforce availability, and employment stability into the Labour vulnerable-area construct, informing survey items that capture manpower readiness and resilience during disruptions.

c) Organization

The Covid-19 pandemic has a tremendous negative impact on corporate performance Shen et al. (2020). The operation of companies and construction works is the central aspect of the construction business industry. These factors are identified related to the operation, which are project timeline, labour, employees, and material. Due to Covid-19, these factors facing problems that caused the project operation to delay (Zamani, 2021). Gamil & Alhagar (2020) conducted an exploratory interview with ten selected experts from the construction industry sectors in Malaysia to share and express their insights and opinions on the construction industry's state in the mid of the

pandemic. Quantitative data also had collected on 129 respondents. The data analysis results have shown the suspension of projects, workforce shortage, and time and cost overruns are the most impacting factor by the Covid-19 which in return has significantly impact the organizations. Top management teams' lack of awareness has made it difficult for workers to have a safe workplace. Site personnel are likely to experience fear and apprehension as their level of exposure to the coronavirus increases at work, especially if they feel that the vendors or other staff are not practicing safety measures such as social distancing. The number of people working in a workspace may also raise the employees' stress level due to the restrictions and precautions (Ho & Chee, 2020). A shortage of workers is always a concern for the construction industry, but the pandemic has intensified it as a large percentage of construction staff has reportedly screened positive for the coronavirus.

As the propagation of Covid-19 is largely related to individual contact, encounters between construction employees have played a major role in the delays in reopening projects. Physical distancing policies intended to decrease the virus spread have affected the number of workers permitted to work in an area, how the staff handles their jobs, and how project managers foresee the working environment (Pamidimukkala & Kermanshachi, 2021). CIDB in April 2020 has examined 6,363 construction sites and found that 1,398 construction sites have operated nevertheless 4,965 has yet to re-open for business. Of the 1,398 operated sites, 272 sites fail to comply with the new SOP (Sinar, 2020). Construction industry continued face downward pressure of the enforcement of working from home that might not be suited to everyone's personality or ability. This new normal is difficult to monitor staff performance also give negative impact on mental health (Salim, 2020; CIDB, 2020). Therefore, it is important to identify how crisis induced threats towards vulnerable areas in construction organisations. These findings justify including operational continuity, internal coordination, and employee well-being in the Organisation vulnerable-area construct, supporting survey items on organisational adaptability and crisis-time workforce management.

d) Supply Chain

Besides, Covid-19 crisis disrupts supply and demand on construction material for instance supply of steel bars, electric and electronic items, as well as machinery and

parts (DOSM, 2020). Global supply chains sternly impacted as China is the substantial supplier of industrial products to the rest of the world and China is Malaysia's top trading partner since 2009 (World Bank, 2020). Problematic supply chain eventually results in delays, a project fails to have more control on the project itself, reduce profits, constitute to time, and cost at large and contractual conflict (CIDB,2020). The circumstance also been highlighted by (CIDB,2020) and (Mohamed, 2020) stating that for many reasons on these multiple crises caused many projects were suspended, cancelled, and postponed of new awarded works (CIDB, 2020; Mohamed, 2020).

The construction industry was uncertain about supplies from suppliers as the pandemic spreads due to complications in accessing supplies leading to possible shutdown by suppliers (Zamani & Rahman, 2021). Some of these complications came into place as a result of issues associated with cleaning and sanitization of supplies (materials), and the absent workforce at the suppliers' ends. This led to delivery failures in keeping to material delivery schedules, which impacted heavily on the local supplies and projects (Salami & Ajayi, 2023). These findings justify including material delays, supplier reliability, and logistics disruption as core elements of the supply chain construct, shaping survey items that evaluate supply continuity and mitigation capacity.

e) Contracts

Due to an interrupted supply chain and employee shortages due to quarantines, many projects have been halted or postponed (Pamidimukkala & Kermanshachi, 2021). Other effects due to Covid-19 have ranged from a slowdown of available material and labour through to suspensions and, in some cases, terminations of parties or entire projects. Construction activities in certain states and cities continue in flux (James & Gina, 2020; Gamil & Alhagar, 2020). These emerging realities affect almost every part of the construction process, and directly on topics such issues as: project suspension, termination and reinstatement; notice of default, scheduling and adjustments, contract or project; work force management; Occupational Safety and Health Administration (OSHA) and workplace safety compliance; risk management and insurance; materials, subcontractor and supply chain delays and impacts; claims averting or, alternatively, claims management; and the disputes process (James & Gina, 2020). Gamil & Alhagar (2020) concurred the same outcomes and findings after conducting a survey from 129 participants throughout the construction players. On technical perspectives, project

delays cause interruption towards work progress, planning and scheduling. Impact on the existing accomplished activities at sites which demand more on expertise to monitor and control the project including intellectual properties (Gamil & Alhagar, 2020). These findings justify capturing contract rigidity, dispute exposure, and EOT/L&E vulnerabilities within the Contract construct, informing survey items related to contractual preparedness and risk allocation during crises.

f) Communication

Lockdown imposed on construction projects was imminent since the former Ministry of Health, Malaysia, reported that 53.2 percent of Covid-19 clusters emerged from the workplace, where one of the three most important contributors is the construction industry (Babulal, 2021). This trend is expected to continue if drastic measures are not initiated. The Covid-19 pandemic impacts human life and drags the economy to its worst, involving most major economic contributors (Ibrahim, 2020). As a result, construction projects had to be put on hold or cancelled because there were insufficient materials and equipment because of the lockdown. Beside these reasons, Furthermore, the COVID-19 standard operating procedure (SOP) by the National Security Council (NSC) imposes the requirements to ensure social distancing, reduction in the workforce and limiting face-to-face interaction, which are strictly enforced (NSC, 2020). Since 90 percent of time spent on a project is through communication (PMI, 2017), Olanrewaju et al. (2021) added that there is a need to explore the situation and initiate measures that include improvising communications management in the industry that are Covid-safe.

Having said that, it is imperative to ensure that every individual involved in a project has a good grasp of daily activities happening on the site. With so many limitations, the construction industry needs a strong platform and mechanism for communication if it wants to stay on track (Subramaniam & Ismail, 2020). These findings justify embedding communication breakdowns, information delays, and coordination failures into the communication vulnerable-area construct, guiding survey items that measure communication readiness and clarity during crisis events.

g) Other Industries

As construction plays a significant role in the development of other industries, it has impacted other industries development as well. For instance, 201 manufacturing projects, representing 5.3% of approved projects in Malaysia, were suspended during the MCO, further disrupting industrial linkages with the construction sector (MIDA, 2020). It also brought the real estate industry to a halt because it depends on construction activity for new developments, renovations, and infrastructure. When construction slows or stops due to a crisis, it naturally affects real estate supply, project completions, and market activity. Besides, deterioration on tourism, aviation, and oil and gas sectors have suppressed development of construction industry (MIDA, 2020; Panteli, 2023). These findings justify integrating cross-industry interdependence and external sectoral shocks into the Other Industries construct, shaping survey items that assess the construction sector's exposure to broader economic disruptions.

h) Technical & Planning

The pandemic caused unprecedented disruptions to construction project planning in Malaysia, affecting timelines, budgets, risk management, and design strategies. The Movement Control Order (MCO) halted 6,363 construction sites in 2020; only 1,398 resumed initially, with 272 failing SOP compliance (CIDB, 2020). This has caused RM11.6 billion losses (March–April 2020) due to labour shortages and material delays (Harun & Razak, 2020). 30% of projects missed deadlines, escalating costs by 15–20% (Sinar, 2020). Critical path delays increased by 3–6 months for high-rise and infrastructure projects (KPMG, 2021). Contractual disputes rose by 40% over delay penalties (Construction Industry Dispute Resolution Centre, 2021). These findings justify including planning interruption, scheduling volatility, and technical decision delays in the Technical & Planning construct, supporting survey items on project management resilience under crisis conditions.

i) Reputation

Missed deadlines across the board led to eroded trust with clients. Lockdowns and supply chain disruptions resulted in delayed deliveries, fuelling frustrations and

reputational strain when commitments were unmet. Many firms faced cash flow issues, missed payments, and even insolvencies, significantly damaging market confidence. Globally, contractor insolvencies increased. Firms that failed to proactively implement protective measures (like testing, social distancing, PPE) were viewed as irresponsible, undermining both public image and trust among employees and clients. Those lacking agility or digital readiness were seen as stagnant, potentially losing both talent and clients while others seized market leadership (CIDB,2020; Nguyen & Le, 2023). These findings justify including client trust, stakeholder perception, and organisational credibility as elements of the Reputation construct, informing survey items on reputational risk and stakeholder confidence.

2.5 Existing Strategies in Managing Crisis

This subsection presents a narrative of existing strategies, illustrating how crisis management has evolved over time in response to the increasing need for the construction industry to effectively anticipate, respond to, and recover from crises.

Various Crises

Over the past two decades, the world has experienced a succession of global crises with wide-ranging economic, social, and environmental repercussions. Crises such as the 1997–1998 Asian financial crisis, the 2000–2002 dot-com collapse, the 2008 global financial crisis, the 2011 Fukushima nuclear disaster, the 2015 migration crisis, and various political and trade conflicts have disrupted corporate operations, financial systems, and labour markets worldwide (Coombs, 2014; Bansal & Kim, 2018). Despite differing in origin and scale, these crises share the potential to threaten organizational survival, leading to industry collapse, widespread unemployment, and socioeconomic instability. Their transboundary nature often complicates responses, as the severity of impact depends on the governance capacities and institutional readiness of affected nations.

Covid-19 and Response Mechanism

The Covid-19 pandemic represents the most recent and pervasive of such crises, severely disrupting global economies and organizational operations. In response, governments implemented drastic containment measures, including lockdowns, border closures, and the suspension of business and educational activities to reduce infection rates and protect public health (WHO, 2020; PMO, 2020; World Bank, 2020). These necessary interventions, however, created significant economic strain, challenging the sustainability and resilience of organizations across sectors. The pandemic has been described as a “perfect storm,” combining health, economic, and social crises under conditions of heightened political and financial uncertainty (Wenzel et al., 2020)

In addressing how organizations adapt to such crises, Wenzel et al. (2020) identified four strategic responses commonly employed during periods of turbulence: retrenchment, persevering, innovating, and exit. Retrenchment involves cost-reduction measures and downsizing to maintain financial viability (Bruton & Ahlstrom, 2003; Benner & Zenger, 2016). Persevering denotes efforts to sustain existing operations despite external shocks (Chakrabarti, 2015; Stieglitz & Knudsen, 2016) (Chakrabarti, 2015). Innovating reflects strategic renewal through the development of new products, services, or processes to adapt to changing environments (Brinckmann & Villanueva, 2019). Finally, exit refers to the discontinuation or divestment of unviable business units or operations (Dai & Eden, 2017; Ren & Hu, 2019).

Crisis and Construction Sector

Since the 1970s, crises have become an embedded feature of organizational life, compelling managers and employees to operate under sustained uncertainty and ambiguity regarding the appropriateness of business decisions (Wenzel, Kramer & Koch, 2020; Alvarez, Afuah & Gibson, 2018). The Malaysian construction sector is no exception. Economic recessions and the Covid-19 pandemic have demonstrated the sector’s vulnerability to prolonged disruptions, with recovery trajectories often difficult to predict due to the uncertain duration and severity of crises.

Initiatives

Lessons from previous pandemics, such as the H1N1 outbreak in 2009, underscore the complexity of crisis management, which requires coordination, effective communication, surveillance, containment, and delivery of countermeasures (Bell, 2009). Similarly, Malaysia's response to Covid-19 reflected these principles. The Government, through the National Security Council (MKN), implemented the Movement Control Order (MCO), enforcing lockdowns, travel restrictions, quarantine protocols, and health protection measures such as mask-wearing and physical distancing (PMO, 2020; Lim, 2020). To mitigate economic fallout, the Government introduced fiscal stimulus packages namely PRIHATIN and PENJANA, amounting to RM260 billion, aimed at protecting livelihoods, supporting businesses, and stabilizing the economy (CIDB, 2020).

The World Health Organization (WHO, 2009) emphasizes that crisis prevention and control require nationally coordinated strategies supported by regional and global cooperation. However, policy effectiveness depends on evidence-based, context-specific measures and sustainable resource allocation (Gupta & Guina, 2010). The Covid-19 experience thus reinforces the importance of preparedness frameworks to guide timely, coordinated, and adaptive responses to crises at both national and organizational levels.

Malaysia and Crisis Management Plan

In Malaysia, crisis management research and practice remain relatively underexplored and largely reactive, emphasizing response and recovery rather than preparedness and prevention (Murad, 2019). Evidence suggests that only a limited proportion of organizations possess structured crisis management plans with 70% reporting they have one, 62% having implemented it, and merely 17% expressing confidence in its effectiveness (Bernama, 2020). This indicates significant room for improvement in strategic readiness and resilience-building within the construction sector. Accordingly, it is imperative to examine existing crisis response strategies to identify effective practices and address critical gaps in managing current and future disruptions.

2.5.1 Current Construction Sector Plans

In response to structural vulnerabilities exposed by recurring crises and evolving industry challenges, several national initiatives have been introduced to strengthen the Malaysian construction sector's productivity, competitiveness and resilience. Among the key initiatives are the Construction Industry Development Board (CIDB) Strategic Plan 2021–2025, the Construction 4.0 Strategic Plan, the Twelfth Malaysia Plan (12MP), and the National Construction Policy 2030 (NCP 2030), each contributing to sector transformation from different but complementary perspectives (CIDB, 2025).

The CIDB Strategic Plan 2021–2025 focuses on strengthening industry capacity, governance, sustainability and productivity while supporting digitalisation and improved industry performance. It reflects a broader agenda of improving sector readiness and institutional capability in response to changing economic and technological conditions (CIDB, 2025).

Complementing this, the Construction 4.0 Strategic Plan (2021–2025) provides a roadmap for digital transformation of the construction industry through twelve emerging technologies and four strategic enablers including people, integrated technologies, economy and governance. Its strategic thrusts emphasize smart construction, innovation, workforce readiness and improved business ecosystems, with the aim of enhancing productivity and future-proofing the sector (CIDB, 2025).

At the national development level, the Twelfth Malaysia Plan (12MP) reinforces sustainable infrastructure development, resilience, digital adoption and inclusive growth, while prioritising high-impact infrastructure projects and strengthening economic recovery post-pandemic. These priorities have direct implications for improving sector adaptability under uncertainty (CIDB, 2025).

Further extending these efforts, the National Construction Policy 2030 (NCP 2030) provides a longer-term policy framework for transforming the sector through six policy thrusts covering quality and safety, sustainable construction, productivity, infrastructure maintenance, competitiveness and good governance. Importantly, the policy introduces resilience-oriented considerations through infrastructure maintenance, sustainable built environments and governance reforms (CIDB, 2025).

Collectively, these initiatives demonstrate substantial progress in improving current practices, particularly in digitalisation, sustainability, productivity and institutional strengthening. However, despite these advances, limited emphasis is placed

on integrated crisis preparedness, structured business continuity mechanisms and a validated crisis management framework at organisational level. While the plans improve sector performance broadly, they do not explicitly provide a dedicated framework guiding construction organisations in preparing for, responding to and recovering from compounded disruptions associated with polycrisis conditions.

This gap suggests that, although current industry plans contribute significantly to sector transformation, areas for improvement remain in integrating crisis management and business continuity considerations more explicitly into sector planning. This gap further supports the need for a Construction Sector Crisis Management Plan (CSCMP) as proposed in this research.

2.6 Action Plan, Impact and Response: A Comparative Study (Macro)

In 2020, the global economy faced a severe recession, with real GDP shrinking by 3.5% compared to a growth of 2.8% in 2019. The recovery was uneven and slow, taking place in a climate of high uncertainty. The Covid-19 pandemic and the extraordinary policy measures taken to reduce its economic impact significantly influenced global economic trends. Early in the year, global growth and trade were expected to improve due to easing tensions between the US and China. However, the sudden outbreak of Covid-19 quickly changed that outlook. Countries with stricter lockdowns, like the Philippines and the UK, experienced a greater economic impact compared to those with more moderate measures, such as some Asian economies. Figure 2.7 illustrates the real GDP of selected countries around the world (IMF, 2025).

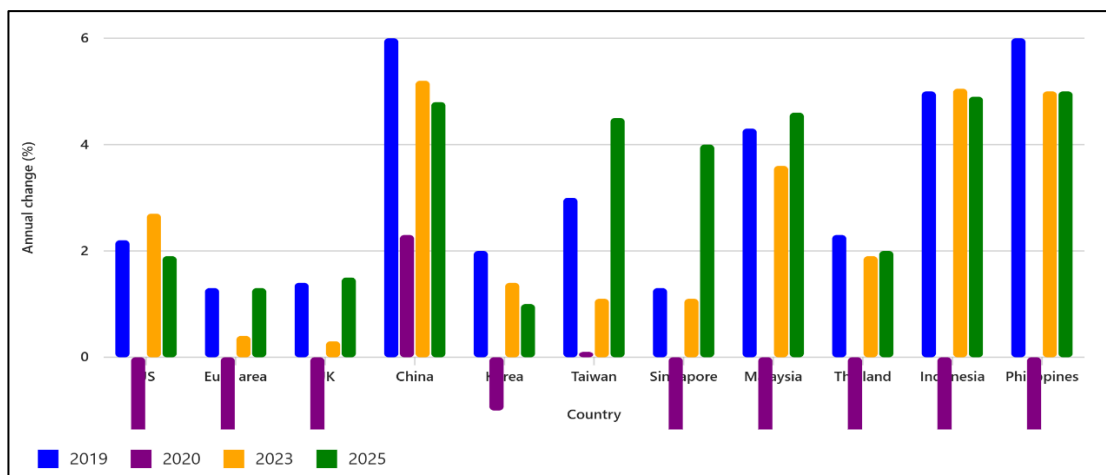


Figure 2.7 Real GDP Growth of Few Countries 2019-2025

Source: IMF (2025)

According to the October 2020 World Economic Outlook Report (International Monetary Fund, 2020), countries that implemented stricter lockdowns experienced sharper GDP contractions in the first half of 2020. Accordingly, this research will examine and compare the actions, responses, impacts, and outcomes of the government and construction sector in Malaysia and selected countries, with a focus on managing external global shocks as discussed above.

2.6.1 Asian Financial Crisis (1997-98) - Comparative Impact, Action Plan and Lessons Between Countries

During the 1997–98 Asian Financial Crisis, all affected countries saw economic and construction downturns, but their impacts and recoveries varied depending on policy responses and financial resilience. Table 2.4 summarizes these differences.

Table 2.3
Asian Financial Crisis (1997-98): A Comparative Study

Country	Impacts	Policies (macro)	Construction actions	Outcomes	Key lessons
Malaysia	GDP -7.3%; construction -24%; RM8B bad debts	Capital controls; fixed rate; rate cuts	Prioritised projects; cleared RM8B; privatized infra	GDP & construction recovered by 2000 (+1%); bad debts reduced	Early stabilization + infra spending speeds recovery
Indonesia	GDP -13.1%; hyperinflation; mass job losses	IMF bailout; banking & fiscal reforms	Public works; Construction Law 1999; institutional setup	Slow recovery; stronger legal/regulatory framework	Structural reform needed to prevent deep collapse
Thailand	GDP -7.6%; construction -35.9%; property collapse	IMF support; bank & corporate restructuring	Major project delays; property debt restructuring	Gradual recovery; FDI revival after reforms	Delayed reform worsens impact; timely reform attracts FDI
Singapore	GDP -2.1%. firm closures +49%	S\$10.5B stimulus; CPF cuts; land sale suspension	Property tax rebates; SME credit; productivity push	Rapid rebound (GDP +7.2% in 1999); market stabilised	Fast, targeted stimulus protects firms and demand
China	Largely unaffected; GDP ~7.8%	Maintained macro stability; limited intervention	Construction stable	Continued growth; acted as regional stabiliser	Strong fundamentals buffer external shocks
US / UK	Not affected by AFC	No special measures	Not applicable	Economies stable	Being outside regional contagion limits direct impact

References: Elias & Noone (2011), World Bank (2004), IMF (2000), BNM (1999), Supriadi & Pheng (2017), CIDB (2004), Athukorala (2010), Fisher (2004), Chew (2009), Bakar & Yusof (2011)

From Table 2.3, it can be summarised that the Asian Financial Crisis (1997–98) affected all countries in the region, but the scale of impact and pace of recovery varied widely. Malaysia, Indonesia, and Thailand experienced sharp economic and construction-sector contractions, while Singapore recorded a milder slowdown, and China remained largely unaffected. Each country adopted different policy responses, from capital controls and fiscal stimulus to IMF-led reforms which directly shaped their recovery outcomes. Countries that responded quickly with targeted support for the construction sector, such as project prioritisation, debt restructuring, and financial assistance, recovered faster and maintained sector stability. Overall, the comparison shows that strong financial systems, timely policy intervention, and dedicated construction-sector measures are critical for resilience during major crises.

2.6.2 Global Financial Crisis (2008-09) - Comparative Impact, Action Plan and Lessons Between Countries

The Global Financial Crisis (2008 - 09) caused varying impacts across countries, largely shaped by their financial exposure, policy responses, and reliance on private-sector construction demand. While some economies slipped into recession, others used aggressive stimulus packages to cushion the downturn. Table 2.4 compares the impacts, government actions, and construction-sector outcomes across selected countries.

Table 2.4
Global Financial Crisis (2008-09): A Comparative Study

Country	Impacts	Policies (Macro)	Construction Actions	Outcomes	Key Lessons
Malaysia	GDP –1.5%; retrenchments ↑; private demand fell	RM60B stimulus; OPR & SRR cuts; PPP support	EPF cuts; loan flexibility; public projects maintained	Public spending sustained sector momentum	Public investment is critical to offset private slowdown
Indonesia	GDP –4.6%; informal labour ↑; moderate sector impact	Interest cuts; flexible FX regime; stimulus	Infrastructure loans; better decentralised governance	Maintained growth; stable workforce	Decentralised oversight + infra spending stabilises jobs
Thailand	GDP –0.7%; housing slowdown; higher debt burden	Two large stimulus packages; tax cuts	Housing tax cuts; debt rescheduling; major infra borrowing	Public sector demand softened private contraction	Timely fiscal support protects residential & infra pipelines
Singapore	Mild GDP growth (+0.1%); 13k retrenchments	S\$20.5B Resilience Package; SME support	\$4.4B for infra, housing, healthcare; SPUR	Strong recovery in 2010	Skills upgrading + SME support strengthen sector resilience
China	GDP slowed to 9.3%; job losses for migrant workers	RMB4T stimulus; RRR cuts; strong fiscal push	80% of stimulus to infra/housing; urbanisation drive	Boosted infra & housing; rapid post-crisis recovery	Massive infra spending creates jobs & drives rapid recovery
US/UK	GDP –2.5% / –4.2%; housing crash; huge layoffs	Interest cuts to 0.5%; ARRA stimulus	Green building, public infra, regeneration	Slow recovery; major industry contraction	Over-reliance on private housing markets amplifies crisis impact

References: World Bank (2021), BNM (2009), Basri & Hill (2010), IMF (2009), CIDB (2010), Bank of Thailand, (2009), Slusna, (2014), Zhang, (2009), Merie, (2018),

As summarised above, the Global Financial Crisis affected countries differently depending on their economic exposure and policy responses. Malaysia and Indonesia avoided deeper damage by maintaining public spending and offering liquidity support, while Thailand and Singapore relied heavily on stimulus packages to stabilise housing, SMEs, and construction jobs. China delivered the strongest response with a massive infrastructure-focused stimulus that accelerated recovery. In contrast, the US/UK experienced severe construction declines due to high dependence on private housing markets. Overall, the comparison shows that construction-sector resilience during global crises depends on rapid fiscal intervention, sustained public infrastructure spending, job protection measures, and strong financial systems to offset private-sector contraction.

2.6.3 Global Economic and Health Crisis of Pandemic Covid-19 2019/20 - Comparative Impact, Action Plan and Lessons Between Countries

The Covid-19 pandemic caused an unprecedented global health and economic crisis, disrupting labour, supply chains, and construction activities across all countries. The scale of disruption and speed of recovery varied depending on lockdown policies, stimulus measures, and the strength of each country's healthcare system and economic fundamentals. Table 2.5 summarises the cross-country impacts, policy responses, and construction sector outcomes.

Table 2.5

Global Health of Pandemic Covid-19 and Economic Crisis (2019-20): A Comparative Study

Country	Impacts	Policies (Macro)	Construction Actions	Outcomes	Key Lessons
Malaysia	GDP -17.1%; RM18.5B losses from site closures; unemployment ↑ to 5.3%	RM260B stimulus; PENJANA; interest rate cuts	SOPs for reopening sites; RM7M for worker testing	80% of sites reopened by late 2020; unemployment improved by 2021	Clear SOPs + targeted support allow safe, gradual sector reopening
Indonesia	GDP -5.3%; 2.4M job losses; supply disruptions	Rp744T stimulus; bond issuance; tax incentives	USD29B infra budget; support for labour-intensive projects	Construction rebounded to +2.1% in 2021	Infra-led recovery stabilises labour and demand
Thailand	GDP -9.7%; 5.2M layoffs; demand decline	THB1.5T support; cash handouts; soft loans	Housing tax cuts: public-sector projects drove 56% of spending	Employment stabilised; infra spending revived sector	Public investment cushions private contraction
Singapore	GDP -12.6%; migrant labour impact; 26,900 job losses	S\$92B support; wage subsidies; SME relief	\$4.4B for infra/housing; SPUR skills upgrading	Strong labour recovery (2021)	Skills upgrading + SME support strengthen sector resilience
China	GDP -6.8%; severe migrant worker disruptions	RMB4.9T stimulus; tax relief; unemployment insurance	RMB3.6T to infra/housing; rapid project resumption	90% of infra projects restored by mid-2020	Large-scale infra spending accelerates recovery and absorbs labour
US/UK	GDP -5% / -2.2%; high unemployment; construction job losses	US\$2.3T stimulus; furlough schemes; PPP loans	Infra acceleration packages; worker retention support	Slow but steady recovery by 2021	Overreliance on private housing weakens crisis resilience

References: World Bank (2021), Harun & Razak (2020), Kwok (2021), World Bank (2020), IMF (2021), CIDB (2020), IMF, (2021), Statista, (2021), IMF, (2021), PMO, (2020)

The Covid-19 crisis caused severe disruption to construction across all countries, primarily due to lockdowns, labour shortages, and supply chain interruptions. Countries that implemented early health protocols and large stimulus packages such as Singapore, China, and Malaysia, were able to reopen construction activities faster and limit sector decline. China's infrastructure-heavy stimulus delivered the strongest recovery, while Indonesia and Thailand relied on public-sector spending to stabilise their markets. The US and UK experienced deeper disruption due to heavy private-sector dependence. Overall, the comparison shows that construction-sector resilience during a pandemic requires clear health SOPs, strong public investment, labour protection measures, and rapid digital and operational adaptation.

Each country responded differently to the crisis based on its capacity, risk level, political and social context, and healthcare system. These differences in national circumstances led to varied approaches and timelines in handling the crisis. Nonetheless, history shows that during major crises and recessions, including Covid-19, governments around the world have consistently turned to significant fiscal and monetary measures to cushion the economic impact and prevent a full-blown recession.

2.6.4 Emerging Polycrisis, Sector Responses and Remaining Gaps (2021 – 2026)

While earlier sections discussed major historical crises such as the Asian Financial Crisis, Global Financial Crisis and Covid-19 pandemic, the current risk environment has evolved into what recent literature describes as a polycrisis, characterised by multiple interconnected and overlapping disruptions. Beyond post-pandemic recovery challenges, construction organisations continue to face emerging risks associated with supply chain volatility, inflationary pressures, geopolitical instability, climate shocks, digital vulnerabilities and, more recently, tensions arising from the Iran–U.S. crisis and associated disruptions to global energy and maritime routes. These developments suggest that crisis exposure is no longer episodic but increasingly systemic and compounded (World Bank, 2026). Table 2.6 summarises these emerging polycrisis risks, their implications for the Malaysian construction sector, current responses, and remaining gaps.

Table 2.6

Emerging Polycrisis, Sector Responses and Remaining Gaps in the Malaysian Construction Industry (2021–2026)

Emerging Polycrisis Risk	Recent Crisis Trends (2021–2026)	Implications for Construction Sector	Current Responses / Industry Measures	Remaining Gaps
Global supply chain volatility	Post-pandemic disruptions and logistics instability	Material shortages, delays, procurement uncertainty	Supplier diversification, local sourcing	Weak contingency planning
Inflation and cost escalation	Rising material, fuel and financing costs	Contract strain, project viability risks	Price adjustment measures	Limited financial buffering
Geopolitical instability	Russia–Ukraine spillovers, trade uncertainty	Imported material and energy exposure	Market adaptation strategies	Limited systemic shock preparedness
Middle East / Iran–U.S. crisis (2026)	Strait of Hormuz disruptions, maritime security risks, oil and freight volatility	Potential material shortages, logistics disruption, rising construction input costs	Supply rerouting and procurement adjustments	Limited preparedness for geopolitical spillover and energy-security shocks

References: Reuters (2026)

Recent disruptions, particularly geopolitical instability and Middle East-related trade disturbances, demonstrate that crisis exposure in construction has evolved beyond traditional economic or project-level risks into interconnected systemic threats. While adaptive responses are emerging, significant gaps remain in integrated crisis preparedness and business continuity planning. Unlike earlier crises that were largely event-specific, emerging disruptions after 2020 are increasingly interconnected and cumulative, reflecting what recent literature terms a polycrisis environment. While current responses show movement towards adaptation, the persistence of fragmented approaches reveals a continuing gap in integrated crisis preparedness and business continuity planning.

Table 2.7 below summarise the common fiscal and monetary response discussed above during Asian Economic Crisis 1998, Global Economic Recession 2008 and the Global Pandemic Covid-19 and Economic crisis that provided by the governments worldwide. The world is forecasted to see a modest recovery in 2021, but this depends on the relaxation of lockdown constraints and an improvement in international trade and economic activities.

Table 2.7

Fiscal and Monetary Measures as Government's Responses During the Crises

No	Policy Area	Specific Interventions
1.	Fiscal Policy	Economy stimulus through several packages Public investment in infrastructure
a.	Income and Employment Protection	Efforts to limit lay-offs Unemployment benefits Minimum wages
b.	Social protection	Cash and in-kind of transfer programmes Additional social expenditure
c.	Increase Employability	Training Public employment services
d.	Group-specific initiatives	Informal economy workers Youth Migrant workers
e.	Sector-specific Initiatives	Support for SMEs Support for key export sectors Support for 'green' jobs
2.	Monetary and Financial Policy	Interest rate reductions Quantitative easing Deposit guarantee scheme Moratorium Debt restructuring

Cross-country comparisons reveal repeatable policy packages (liquidity support, stimulus, job schemes) but mixed outcomes depending on implementation capacity and timing. The main contradiction is that similar measures produce divergent results when governance, coordination and sectoral design differ. Implication for the framework: make implementation capacity and timeliness explicit assessment criteria when evaluating macro and sectoral strategies.

2.7 Challenges in Managing Crisis

Crisis management faces a critical challenge in recognising that crises rarely occur in isolation; disparate and seemingly unrelated events often intersect, amplifying their overall impact and complicating organisational responses (Mitroff, 2022). In this

context, the United States Department of Defence (2020) underscores the importance of operating under the assumption that a crisis is inevitable.

The Covid-19 pandemic exposed several major challenges that affected governments, economies and the global construction sector. First, the crisis demonstrated how health emergencies quickly escalate into economic and supply chain disruptions, as lockdowns halted mobility, restricted labour availability and delayed cross-border materials (ILO, 2020). Second, many countries and organisations were not adequately prepared with crisis protocols, digital infrastructure or contingency planning, resulting in slow and fragmented responses (WHO, 2020). The construction industry in particular faced severe labour shortages, dependency on migrant workers, site shutdowns, and sharp cash flow constraints (CIDB, 2020). Third, coordination challenges emerged across ministries, agencies and industry stakeholders, leading to inconsistencies in SOPs, regulatory delays and contractual disputes. Finally, the pandemic highlighted the lack of global collaboration despite its borderless nature, with countries responding in isolation rather than through shared frameworks or coordinated early warning systems (WHO, 2020). These underlying challenges shaped the severity of the crisis and influenced the effectiveness of national intervention strategies.

The following section reviews how selected countries responded to these challenges and what lessons can be drawn for the Malaysian construction sector. Sydney's Lowy Institute ranked almost 100 countries on their Covid-19 management capacity, with New Zealand, Singapore, Australia, and Taiwan performing best, while Brazil, Mexico, Colombia, and the United States ranked lowest; Malaysia placed 16th (Chang, Hong, & Varley, 2020).

New Zealand managed the crisis effectively by adopting an early elimination strategy, implementing a clear four-level alert system, and ensuring consistent public communication. The government also introduced a Covid-19 wage subsidy for contractors, allowed variations for public projects, and immediately issued a Construction Covid-19 Protocol to maintain sector continuity.

Singapore's response was shaped by lessons from SARS, supported by a strong public health infrastructure, including 900 Public Health Preparedness Clinics (PHPCs) and regular crisis simulations (Kuguyo et al., 2020). The construction sector was safeguarded through Safe Management Measures (SMM), legal reliefs such as contractual and rental support, and cost-sharing for delays (Toh, 2020). Clear

communication, rapid policy execution, and strong political coordination were central to Singapore's success.

At a broader level, Covid-19 exposed global weaknesses in crisis preparedness. Many organisations and industries, including construction has faced unprecedented disruption, labour shortages, and cash-flow pressures, revealing significant gaps in operational readiness (Zhang-Zhang & Varma, 2020). For Malaysia, the Malaysian Social Science Association (2020) identified five priorities: strengthening crisis preparedness, promoting civic responsibility, enhancing MSME resilience, improving digital connectivity, and advancing research and governance (Ramli, 2020). Supply chain studies similarly showed that only some firms were prepared to mitigate or respond effectively, while many struggled (Deloitte, 2020).

For the construction sector, financial discipline became critical, requiring stricter cost control, renegotiation of supply chain terms, and more selective tendering to avoid underbidding. The Minister of Works stressed reducing reliance on foreign labour and accelerating the adoption of technology, mechanisation, and digitalisation areas where construction significantly lags other industries (CIDB, 2020). This aligns with McKinsey's (2020) recommendations to prioritise innovation, digitisation, and process modernisation to build long-term resilience.

Despite these efforts, Malaysia still lacks a comprehensive national framework to coordinate crisis preparedness, response, and recovery for the construction sector (Salim, 2020; CIDB, 2025). International bodies such as UNDP (2017) and Fraser & White (2024) emphasise that a structured framework is essential to enable coordinated action, strengthen humanitarian support, and minimise disruptions during future crises. As highlighted by Nordin (2015) and Shishehgarkhaneh (2024), such a framework provides a clear structure for linking variables, actions, and outcomes are critical for ensuring effective crisis response. Therefore, the development of a dedicated Crisis Management Plan (CMP) for the Malaysian construction industry is necessary, both to address current vulnerabilities and to prepare for future threats.

2.8 Summary of Chapter

This chapter reviewed the Malaysian construction industry's outlook and vulnerability to major external shocks, drawing evidence from the Asian Financial Crisis (1997–98), the Global Financial Crisis (2008–09), the Covid-19 pandemic, and

emerging polycrisis conditions extending into 2025–2026. While construction remains a significant engine of growth, the review shows the sector continues to be highly sensitive to macroeconomic disruptions, geopolitical instability, supply chain volatility, inflationary pressures, climate-related disruptions and digital vulnerabilities. These crises have repeatedly compressed cash flows, disrupted labour and supply chains, delayed projects, intensified contractual disputes and exposed weaknesses in organisational preparedness and business continuity.

The chapter further showed that the pandemic revealed critical gaps in contingency planning, workforce resilience, digital readiness and coordination across stakeholders, while more recent disruptions, including current geopolitical tensions and energy-security risks, reinforce that crisis exposure is increasingly systemic and compounded rather than episodic. The review of current national initiatives, including the CIDB Strategic Plan 2021–2025, Construction 4.0 Strategic Plan, the Twelfth Malaysia Plan and National Construction Policy 2030, indicates substantial progress in strengthening productivity, digitalisation and sector transformation. However, areas for improvement remain, particularly in integrating crisis preparedness, business continuity and structured resilience mechanisms into current industry practices. Cross-country comparisons and updated vulnerability matrices further suggest that effective resilience depends not only on fiscal support, governance reforms, supply chain diversification and technology adoption, but also on integrated crisis management approaches capable of responding to interacting disruptions under polycrisis conditions. Despite these developments, a significant gap remains in the absence of an industry-specific Crisis Management Plan that links macro-level policy responses, organisational practices and sector-wide coordination mechanisms.

Accordingly, the chapter establishes the necessity for a Construction Sector Crisis Management Plan (CSCMP) to bridge these gaps and strengthen organisational resilience and business continuity in the Malaysian construction sector. The next chapter therefore develops the conceptual and theoretical foundations underpinning the proposed CSCMP framework, mapping preparedness, prevention, response, recovery and redesign measures to the vulnerable areas identified in this chapter.

CHAPTER 3

CRISIS MANAGEMENT PLAN AND BUSINESS CONTINUITY

3.1 Introduction

The primary objectives of this chapter are, first, to clearly define the concept of a crisis, including its types and characteristics. Next, it aims to examine various theoretical Crisis Management Models through content analysis and a review of relevant literature, which will support the development of a Construction Sector Crisis Management Plan (CSCMP) tailored for organizations in the construction industry. These reviews will help establish a deeper understanding of the relevance of the research variables in the context of CSCMP. By identifying these variables, the study aims to draw connections to business performance, with the goal of ensuring organizational sustainability, resilience, and continuity. The core focus of this chapter is a critical evaluation of the key components of a crisis management plan to determine the most appropriate framework for addressing the research questions

3.2 Concept of Crisis

According to Bakar and Awang (2011), the Malaysian construction sector has been repeatedly exposed to major economic shocks since 1967, reflecting a cyclical pattern of vulnerability. Their review highlights that the downturn of 1974–1978 was driven by an oversupply of built premises, while the recession of 1984–1988 was precipitated by the United States' high-interest-rate policy, which triggered global liquidity tightening. This was followed by the 1997–1998 Asian Financial Crisis, during which the construction sector experienced one of its sharpest contractions. The subsequent recession in 2007–2008 was associated with the Global Financial Crisis, where surging oil and diesel prices accelerated the cost of raw materials and placed further pressure on project viability. Drawing on these historical trajectories, Bakar and Awang (2011) projected a further contraction between 2020 and 2024, anticipating a human-resource-driven crisis that aligns with their observation of a roughly ten-year recurrence cycle of economic shocks in Malaysia.

Although their prediction was broadly accurate in terms of timing, the global Covid-19 pandemic surpassed historical patterns in scale and severity, producing unprecedented disruptions across all sectors, including construction (United Nations, 2020; WHO, 2020). The pandemic also exposed chronic underinvestment in crisis preparedness and risk governance worldwide. Many countries developed and developing alike were unable to mount timely or coordinated responses, revealing substantial gaps in institutional readiness and crisis management capacity (Arcadis, 2020). This situation raises important questions about whether existing approaches to crisis anticipation and prevention are adequate, and what strategic shifts are required to enable national and global systems to respond more effectively to future shocks.

Crises, regardless of their origin, are deeply interlinked with economic, social, political and well-being conditions at the individual, organisational and governmental levels (Ozcan, 2015; Boin & 't Hart, 2003). A clear conceptual understanding of crisis is therefore essential before establishing the theoretical foundations of an effective Crisis Management Plan (CMP), as undertaken in this chapter. Recent scholarship further suggests that contemporary crises are increasingly characterised by uncertainty, interdependence and cascading effects, requiring organisations to move beyond traditional reactive approaches toward more adaptive and resilience-oriented crisis management (Ansell & Sørensen, 2024; Fraser & White, 2024). In this context, renewed attention has emerged on whether current approaches to crisis management and crisis prevention remain adequate, and what strategic shifts may enable national and global organisations to respond more effectively to future crises.

3.2.1 Defining Crisis

Before developing a suitable framework, it is essential to establish a clear definition of crisis. The term originates from the Greek word *krisis*, meaning a moment of decision or turning point—often between opposing outcomes such as success and failure, or even life and death (Larsson & Rudwall, 2010; Šubrt, 2014). Over time, scholars have offered various definitions of crisis, reflecting changes in context, priorities, and disciplinary perspectives. Table 3.1 summarises key definitions from the 1970s to the present, illustrating how the understanding of crisis has evolved and how these perspectives inform the development of this study's crisis management framework

Table 3.1
Summary of Various Crisis Definitions

Definition of Crisis	Author
A turning point when decisions are made by governments	Bell (1971)
An unstable time or state of affairs in which a decisive change is impending	Fink (1986)
A disruption that physically affects a system as a whole and threatens its fundamental assumptions and existential core	Mitroff (1992)
A threat to the core values of the affected system and thus must quickly be dealt with at times of deep uncertainty	't Hart (1993)
A rare, harmful, sudden event that become known to the mass public and policy makers simultaneously	Birkland (1997)
A low-probability, high impact event that threatens the viability of the organisation	Pearson & Clair (1998)
A threat that can damage the quality of the relationship between and organisation and its stakeholders	Coombs & Holladay (2001)
A major occurrence with a potentially negative outcome affecting an organisation or a company, as well as its reputation	Fearn-Banks (2002)
A key moment that brings dramatic change into people's lives	Gene Klann (2003)
A sudden change causes an urgent problem that may be coped with immediately	Luecke (2004)
Feeling of panic, fear, danger or shock	Darling et al (2005)
Unexpected, definitely unstructured and outside the typical operation framework of the organisation	Beall (2007)
An unpredictable event that threatens important expectancies of stakeholders and can seriously impact an organisation's performance and generate negative outcomes	Coombs (2007)
An unexpected and unpredictable event that threatens high priority organisational goals and place non-routine demands on the organisation by producing negative outcomes and accusations	Adkins (2010)
Risk, catastrophe and collapse	Subrt (2014)
A harmful or threatening event that is highly salient, unexpected, and potentially disruptive	Bundy et al (2017)

From Table 3.1, it is evident that scholars commonly characterise a crisis as a serious threat to the core values of a system—an unexpected and harmful event that imposes non-routine demands on individuals and organisations under conditions of uncertainty. Notably, the more recent definitions emphasise the emotional strain,

pressure, and judgemental consequences that crises generate, highlighting how such events affect not only structures and processes but also human experience and behaviour. Drawing from the collective insights of these definitions, this study adopts the following working definition of crisis:

A crisis is an unexpected and unanticipated event or circumstance with low probability that emerges with little warning at any time that threaten or potentially disrupt the core or high priority values, integrity, reputation and survival of individuals and organisations by putting people under immense pressure, usually resulting from instability that impacts individuals and organisations with unacceptable consequences which place non-routine demand of rapid response and crucial decision making in restricted amount of time.

Having established the working definition of crisis from the preceding literature, this research is now positioned to examine its key features and typologies in greater depth. The following sections build on the adopted definition by elaborating the fundamental characteristics of crises and the various forms they may take.

3.2.2 Characteristic of Crisis

Crises differ markedly in their origins, trajectories, impacts, and uncertainties, making each event inherently unique (Ozcan, 2015; Williams et al., 2017). The Covid-19 pandemic, for instance, demonstrated how crises can escalate rapidly and cascade across multiple social, economic, and institutional systems (WHO, 2020; Ansell, Sørensen & Torfing, 2021). Despite this diversity, scholars agree that crises generally exhibit a number of shared characteristics. Bundy et al. (2017) emphasise four core features: crises disrupt established routines; they create harm for organisations and stakeholders with competing interests; they are shaped by human interpretation and behaviour; and they unfold within interconnected systems rather than as isolated incidents (Bundy & Farrer, 2015; Coombs, 2010; James et al., 2020).

Following the 1998 global recession, Lagadec and Carli (2005) argued that modern crises are increasingly difficult to anticipate due to globalisation, digital interdependencies, transboundary risks, and the accelerating circulation of people, information, and pathogens. This observation has been reinforced by recent studies

showing how Covid-19 spread across borders at unprecedented speed, turning local outbreaks into a global systemic shock (WHO, 2020; Hale et al., 2021). Boin (2016) also highlight that crises typically cut across geographic and institutional boundaries, producing overlapping organisational, political, and human challenges. This multi-layered complexity is echoed by Stern (2000), who contends that crises are simultaneously political, institutional, temporal, and informational in nature—conditions that make decision-making especially difficult when information is incomplete, ambiguous, or rapidly changing (March, 1994; Christensen, Lægreid & Rykkja, 2020).

Recent literature continues to confirm these patterns. Studies after Covid-19 recognise crises as dynamic, multi-domain disruptions characterised by uncertainty, urgency, high emotional pressure, and cross-sectoral interdependence (Hannah et al., 2022; Wenzel et al., 2021). These attributes complicate coordination and intensify the need for rapid, non-routine responses.

Table 3.2
Characteristics of Crisis

Uniqueness: Each crisis has its own causal factors, effects, period and rhythm
Uncertainty: Each crisis has some unknowns, produce unforeseen results
Unexpectedness: Emerges with little or no warning
An unstable time: A decisive change is impending
Threatening: Threatens to the basic human needs such as security, wellbeing or health
Time limitation: Each crisis requires immediate decisions under time pressure
High level of anxiety: Crises generate extreme psychological stress, fear, panic etc.
Transnational: Any crisis in one country can rapidly spill over to others
High politics: Crises disrupts a wide range of social, political and institutional processes
Political Complexity: Crises affects political order and its actors
Institutional complexity: Various decision makers and agencies are drawn into a crisis at different moments, from different points of view
Temporal complexity: Crisis perception and behaviour are affected by prior experience of key actors and stakeholders
Informational complexity: Information shortage and overload challenge
Dynamic and chaotic processes: multiple levels of individual and organisational conflict
Difficult to manage: Crises cannot be managed by routine and structured structures

Thus far, the characteristics of crises underscore how such events threaten an organisation's sense of safety, stability, and core values. In an increasingly volatile and interconnected environment, these challenges highlight the need for organisations to adopt a holistic perspective and establish robust business continuity and crisis management plans to safeguard operations and enhance resilience.

3.2.3 Type of Crisis

UNDP The United Nations Development Programme (UNDP, 2020) describes the Covid-19 pandemic as the most serious global health crisis since World War II. Since its emergence in Asia in late 2019, the virus has spread across all continents except Antarctica. More than just a health emergency, Covid-19 has triggered a far-reaching socio-economic crisis, impacting societies, economies, and political systems worldwide. Glaesser (2006) previously identified epidemics as crises, while Ozcan (2015) noted that crises can arise from both internal and external organisational forces, driven by economic, technical, or social factors. In general, crises are often categorised as either natural or man-made (Fischer et al., 2016; Harwati, 2013).

Over time, different perspectives have emerged on how crises are defined and classified. Booth (1993) outlined three main types: sudden crises (like earthquakes), creeping crises (such as climate change), and chronic crises (long-term issues with no clear solution). Other scholars have identified natural disasters, accidents (like explosions), and intentional crises (such as workplace violence or unethical leadership) as common crisis types (Mitroff, 2004; Laufer, 2007; Gilpin & Murphey, 2008; Ulmer et al., 2007; Holladay, 2010).

Gundel (2005) further classified crises as unexpected, fundamental, conventional, or intractable. Koutsoukis and Farantos (2015) proposed a more detailed approach, categorising crises by factors such as geographical scope, duration, type of victim, level of damage, root causes, and predictability. Finally, Lindstrom and Petersson (2011), referencing Mitroff (2001), suggested seven categories of crisis: economic, informational, physical, human resource-related, reputational, psychopathic acts, and natural disasters. These various frameworks reflect the complex and evolving nature of crisis theory. A summary of these categories and examples is provided in Table 3.3.

Table 3.3
Category of Crisis

Categories	Example of events
Economic	Labour strikes, decline in stock price, market crash and decline in major warnings
Informational	Loss of confidential information, getting wrong information, manipulation of information
Physical	Loss of breakdown of key equipment of facilities, other major plant disruptions.
Human Resources	Loss of key personal, rise in absence of personnel, accidents of personnel, workplace violence, bad attitude among the workforce
Reputational	Bad gossip or rumours that concerns the company, damage of corporation reputation, tampering with corporate logos
Psychopathic Acts	Product manipulations, kidnapping, terrorism
Natural Disaster	Earthquake, fire, floods, hurricanes

In 1987, Shrivastava and Mitroff identified a wide range of crisis types, noting that a crisis is defined by its underlying causes. Crises can be triggered by either internal or external forces and are generally classified based on their origin. According to Koutsoukis and Farantos (2015), these causes fall into two main categories: Technical and economic factors and people, organizational and social factors. Figure 3.1 illustrates this classification and highlights various crisis types observed by scholars over a four-year period.

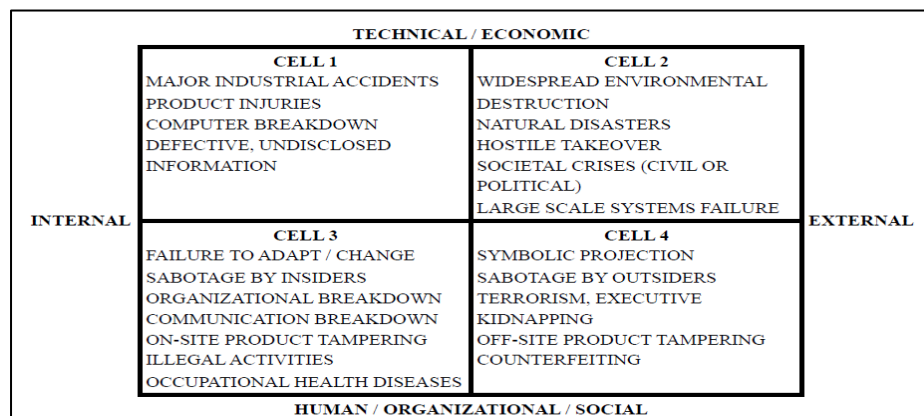


Figure 3.1 Different Forms of Crisis-Triggering Events

Figure 3.1 highlights the different types of crises that can impact organisations. Starting with Cell 1, it shows crises caused by internal economic and technological failures, particularly related to an organisation's core technologies. Examples include major industrial accidents like Chernobyl, Bhopal, and Three Mile Island, which were

primarily due to defective machinery and systems. Cell 2 refers to crises driven by external technical and economic factors, such as hostile takeovers, exchange rate fluctuations, and macroeconomic changes, all of which can have serious negative effects on an organisation.

The remaining cells focus on crises caused by human, organisational, or social processes. Cell 3 represents failures in internal social systems, often due to poor management, internal conflict, or unsafe working conditions. These crises could often be avoided with better communication and leadership. A notable example is the Challenger space shuttle disaster, which involved both NASA and its contractors. Cell 4 illustrates crises triggered by the wider societal environment, where stakeholders respond negatively to an organisation. These include situations such as executive kidnappings or sabotage by outsiders.

Shrivastava and Mitroff (1987) concluded that organisations are exposed to a wide variety of potential crises. While many organisations assume these crises can be resolved, their vulnerability depends greatly on their clients, products, and technologies. Hällgren and Wilson (2008) noted that, in some industries like construction, such events are often tolerated or overlooked. However, in today's environment, crises are becoming increasingly inevitable, and organisations must learn to manage them effectively. It is therefore essential for organisations to understand the different categories and types of crises in order to prepare appropriate responses.

3.2.4 New Nature of Crisis

The umbrella term of crisis helps capture extraordinary phenomena such as pandemic viruses, volcanic ash clouds, oil spills, animal welfare diseases, hurricanes, tsunamis, terrorist bombings, school shootings, urban riots, water contamination episodes, chemical explosions, policy failures and institutional failures (Rosenthal et al., 2001). It has been noted that recent crises have confronted political leadership and the landscape of organisations in many countries, often due to sudden and unpredictable circumstance, nevertheless, it is also attributed to poor ties and breakdowns in the information flow. These can be refer to the events of the SARS and H1N1 pandemic outbreaks in 2003 and 2009 respectively, 11 September 2001 tragedy, Hurricane Katrina in 2005, the 2004 Indian Ocean tsunami, the 2010 Iceland volcanic eruption and its ash cloud over Europe, the 2011 Tohoku earthquake in eastern Japan, in which

the tsunami and the Fukushima Daiichi nuclear explosion culminated in cascade impacts and similar to current 2019 pandemic, the coronavirus Covid-19. In these cases, government, organisations, processes and systems were under prepared and not been trained to deal with them.

In some ways, these new crises significantly vary from the past in several respects: (1) their unpredictably broad scale; (2) the fact that they are new, fresh or unprecedented at least in human memory or their rare combination (Leonard, 2012); and (3) their trans-national nature (Broekema & Graaf, 2024; Boin & Lodge, 2020). Cross-border crises extend across territorial borders (between countries, states or other local authorities) and/or policy boundaries (between administrations, sectors, public-private etc). These crises give rise to fundamental uncertainties and threaten political systems and build conflicts between multiple players in the public and private sectors (Baubion, 2013). These cross-border effects can be generalized to what the OECD (2011) has described as a "global shock," that is, a "rapid onset event with serious disruptive consequences for at least two continents" (OECD, 2011). This definition also takes into account another trend of new crisis: cascading risks that become significant challenges as they propagate through global systems, whether in health, climate, social or financial structures. A typical crisis may become cross-border and also become a global shock at a later point, by non-linear mechanisms (Broekema & Graaf, 2024; Boin & Lodge, 2020).

3.3 Organisation

An organization is made up of two or more people working together co-operatively within identifiable boundaries to accomplish a common goal or objective (Daft & Marcic, 2021; Hatch & Cunliffe, 2020). Three important aspects of organisations emerge from this definition. First, organisations are made up of people - the human component is therefore important because of its complexity nature of social relationships, variability and diversity. When people work together, various things become necessary such as the division of labour among people and the need for specialized knowledge (Robbins & Judge, 2021). Second, organisations have identifiable boundaries such as people and membership and where certain activities take place (Bolman & Deal, 2022). Third, organisations are purposeful, goal seeking work arrangements. That is organisations exist to pursue commonly held goals (Daft &

Marcic, 2021). This has also been highlighted by modern definitions emphasizing that an organization is defined as a collection of people who work together to achieve a wide variety of goals (Hitt et al., 2022).

3.4 Crisis Management Plan (CMP)

A crisis may be understood as an unplanned and disruptive event that threatens organisational stability, stakeholders and broader societal systems, often requiring urgent action under conditions of uncertainty and incomplete information (Boin & 't Hart, 2003; Bundy et al., 2017; Biörck et al., 2020). Recent scholarship further emphasises that contemporary crises are increasingly interconnected, transboundary and compounded in nature, reinforcing the need for adaptive and resilience-oriented approaches to crisis management (Boin & Lodge, 2020; Broekema & Graaf, 2024; Ansell & Sørensen, 2024). In this context, crisis management has become a critical strategy for organisational survival, particularly in sectors vulnerable to external shocks such as construction.

The Malaysian construction sector has historically experienced disproportionate exposure to economic downturns and environmental disruptions, often responding more slowly to changing external conditions than other sectors (Abu Bakar & Awang, 2011). These vulnerabilities have become even more pronounced in the 21st century with emerging challenges such as climate-related disruptions, geopolitical instability, supply chain volatility and the Covid-19 pandemic, all of which have intensified pressures on organisations to strengthen preparedness and mitigate losses (Amankwah-Amoah et al., 2020; Fraser & White, 2024). As recent studies suggest, organisational survival and continuity are closely linked to the effectiveness of crisis management capabilities and preparedness mechanisms (Panteli et al., 2023; Kum & Yap, 2024).

Crisis management is generally understood as the set of organisational structures, practices and decision processes used to anticipate, prepare for, respond to and recover from disruptive events (Bundy et al., 2017; Christensen et al., 2020; Hannah et al., 2022). While earlier scholars such as Mitroff and Shrivastava (1987) and Lockwood (2005) laid important foundations, contemporary perspectives increasingly frame crisis management as a dynamic capability involving flexible response, sense-making and adaptive decision-making under pressure (Mikušová & Horváthová, 2019; Ansell & Sørensen, 2024). Importantly, the purpose of a Crisis Management Plan

(CMP) is not to eliminate crises, which is unrealistic, but to minimise impacts, support continuity, accelerate recovery and strengthen preparedness across all crisis phases.

In high-risk sectors such as construction, where projects involve significant upfront investment, complex stakeholder interdependencies and fragile cash-flow structures, even a single crisis can threaten organisational survival (Şahin et al., 2015; Le & Nguyen, 2023; Shishehgarkhaneh & Moehler, 2024). This underscores the need for construction organisations to continuously assess both internal capabilities and external vulnerabilities and reinforces the relevance of developing a structured Construction Sector Crisis Management Plan (CSCMP).

3.5 Strategy

Approaches to the crisis management selection strategy consider the internal and external environment (Mikušová & Horváthová, 2019). It is concluded that the development of key crisis strategic guidelines should also consider the time factor and the interests of all stakeholders. These approaches to a crisis are a fundamental aspect of the systematic process of crisis management. In order to answer the deep existential questions that occur during a crisis, these are applied to different defensive strategies (Litovchenko, 2012; Tanase, 2012).

3.6 Crisis Management Model (CMM) – Theoretical Underpinning

A properly executed efficient and effective strategic crisis management plan can lead to organization renewal, stability, and growth after crisis situations and events (Taneja et al., 2014). That is why Ozcan (2015) indicated that a helpful way to interpret the definition of crisis management is to position the idea within the context of the strategy. In addition, crisis management literature is lush with the crisis model of the phases, and different academics have contributed in this respect. Therefore, a brief review of the most popular models originating in the varying periods of time that provide solutions for organisation crisis management plan choices as seen in Table 3.4.

Table 3.4
Characteristics of Crisis

Model	Characteristics of Model
Petak (1985)	Established on four stages: mitigation, preparedness, response and recovery
Fink (1986)	Founded on four stages: prodromal stage, the acute stage, the chronic stage and the resolution stage
Mitroff (1994)	Includes five stages; signal detection, probing and prevention, damage containment, recovery and learning
Mitroff (2005)	Add redesign stage (after learning) into Mitroff's (1994) model
Moore (2002)	Comprises six broad activities: situation monitoring, crisis detection support, containment, response, de-escalation, and recovery
Boin, 't Hart, Stern and Sundelius (2005)	Based on five critical challenges that public leaders in the actual crisis management process: sense-making, decision making, meaning making, terminating and learning from crisis
Coombs (2007)	Composed of the three stages: pre-crisis, crisis and post-crisis

As been illustrated by Table 3.4, the crisis management field passed through several evolutions over the past few decades before it reaches this wide-ranging view (Murad, 2019). It is almost agreed in the literature that Tylenol (pain relief capsules product for Johnson & Johnson Company) poisoning with cyanide in 1982, cause the launch of modern crisis management (Burnett, 1998; Mitroff, 2005; Crandall & Parnell, 2013). Existing research recognises the critical role played by crisis management where even though crisis management models vary regarding various academics, though, they all specify a full-scale mechanism to include preparations and advice to handle each and every level of the crisis. In the subsequent section, five crisis models have been presented in detailed description as the model framework for crisis management plan .

3.6.1 Petak's Model

The first crisis model reviewed in this study is Petak's (1985) four-stage framework: mitigation, preparedness, response, and recovery. Mitigation focuses on preventing or reducing potential damage, for example through risk assessment, warning systems, and other preventive measures. Preparedness involves planning for emergencies, training first responders, and establishing coordination mechanisms among key stakeholders. Together, these two stages aim to lessen the severity of a crisis.

The response stage covers immediate actions taken once a crisis occurs, including search and rescue, medical assistance, and efforts to control further harm.

Finally, the recovery stage involves restoring operations to normal, repairing damage, and evaluating the effectiveness of the response. Petak's model is widely used, particularly in explaining natural disaster crises (Ozcan, 2015).

3.6.2 Fink's Model

Various scholars have recognised Steven Fink's crisis life cycle as the earliest model considered the successive phases of crisis, centred on corporate demand, assists in all phases of crisis response and crisis preparation and is commonly used in crisis communication. The model was originally designed for the purpose of market orientation, but it is also useful in other forms of crisis. According to the model, if an entity is faced by the following events, it tends to be in a serious state of turmoil, and this model is applicable in these situations: (1) when the events are uncontrollable and the situation is getting worse fast. (2) Pressure of the media and administration. (3) Disruption of daily company activities. (4) Endangering the organization's positive image and employees and (5) organisation's bottom line disrupted. Fink emphasized that all scenarios are calculated as a tipping point, whether the company controls the situation or the situation escalates. The crisis would not blow completely if the incidents were understood and regulated, otherwise the Fink model could be implemented. (Jabeen, 2018). To describe four phases of the crisis life cycle, Fink uses a medical epidemic metaphor: (1) prodromal: hints as to when a crisis is about to occur, (2) crisis outbreak or acute: causing incident strikes along with the related disruption, (3) chronic: the consequences of the crisis continue as efforts to clean up the crisis advance and (4) resolution: there is a strong indication that the situation is no longer a problem for stakeholders, in other words, it is over.

To Fink, in the prodromal phase, crisis managers should take a proactive rather than reactive strategy and try in this phase to detect an approaching crisis through internal and external audits. This means that when a crisis arises (being reactive), a well-prepared crisis planner is not only about working out the crisis response plan; they are still interested in identifying and solving problems that may turn into or trigger a crisis (being proactive). In the Fink model, the acute period is categorized by the crisis and the resulting damage. The severity of the situation and the loss are affected by the first phase's progress. As Coombs (2015) points out, if a crisis leader correctly detects an impending crisis in the prodromal phase, the effect of the crisis in the acute phase can

be minimized. As for the chronic stage, it contains the crisis management implementation, selection of response methodologies. Finally, the resolution stage is where a phase to identify a clear end to the crisis. It is important to remember that the resolution stage will theoretically take a long time. As shown, the paradigm of Fink does not recommend evaluation or feedback measures on attempts to resolve crises. Fink still does not approach crisis management as a cyclical mechanism, and this is a significant oversight of the model. It has been used in many aspects of crisis management, including analytical analysis, societal problems, crisis negotiation, crisis preparation and relationship building. The Fink model is known as a practical framework for various forms of crisis for instance the SARS outbreak and crisis of September 11, 2001 (Penuel, Statler, & Hagen, 2013).

3.6.3 Mitroff's Model

Ian Mitroff's (1994) crisis-management model is widely regarded as one of the most comprehensive frameworks in the field, expanding earlier linear models such as PPRR by introducing five interconnected stages: signal detection, probing and prevention, damage containment, recovery, and learning. The first two stages emphasise proactive efforts to identify warning signs and eliminate potential vulnerabilities before a crisis emerges, an enhancement of Fink's prodromal stage, which focuses only on early signals. The remaining stages address actions during and after a crisis, including limiting the spread of harm, restoring operational stability, and reflecting on lessons learnt. Unlike Fink's model, which concludes with crisis resolution, Mitroff explicitly incorporates organisational learning as a core component, making the model cyclical rather than linear. Mitroff later strengthened this cyclical nature by adding a redesign stage, encouraging organisations to update their systems, structures, and crisis plans based on insights gained from the event (Mitroff, 2005). This iterative emphasis on continuous improvement and systemic redesign underscores the model's relevance for high-risk sectors such as construction, where recurring disruptions and structural vulnerabilities demand sustained organisational learning and adaptive resilience.

3.6.4 Moore's Model

Lakha & Moore (2002) published Moore's model consists of six tasks include situation monitoring, crisis detection, containment, crisis response, de-escalation and recovery. Almost like Fink's and Mitroff's models, firstly, the organisations must actively keep an eye on the picture to find out if everything is as it must be throughout the year. At the second step, techniques and methods are used to check routine situational monitoring from the first step. The goal is to recognise the risks and patterns that cause something that is troublesome. As for the containment mission, it will arise when a threat to high priority targets or principles is identified. At this point, the acquisition of intelligence should concentrate on identifying the causes of the crisis. Determine alternative solutions, and a proposal can then be put into effect. The technique defined must be used during the response process in conjunction with the plan established in the previous phase. In this stage, it is crucial to evaluate the implications of the action taken and, if appropriate, managers should update the alternatives. Next stage is de-escalation, where a timeline is set to return to normality. This ensures that the condition recovers to an appropriate standard, which could be higher than before the case (recovery phase).

3.6.5 Boin, 't Hart, Stern and Sundelius Model

Boin, 't Hart, Stern and Sundelius conceptualise crisis management as a series of leadership tasks undertaken to mitigate the effects of an emergency, emphasising that crises typically require coordinated action across multiple actors and organisational levels. Their model identifies five core challenges that leaders must navigate—sense-making, decision-making, meaning-making, termination and learning—which unfold across three broad phases: incubation, onset, and aftermath. Sense-making involves detecting and interpreting ambiguous early signals, a difficult process given that most crises escalate gradually rather than erupt suddenly. Decision-making during crises requires improvisation, flexibility, and coordination across organisations with differing structures and priorities, often under intense time pressure and with incomplete information. Meaning-making refers to leaders' efforts to provide coherent explanations, manage uncertainty, and stabilise public expectations, working within the dynamic interactions among political actors, the media, and affected communities.

Termination involves guiding the transition back to normal operations while ensuring accountability, avoiding premature closure, and recognising when continued crisis-mode operations are no longer justified. Finally, learning requires extracting lessons from the event and institutionalising them within organisational memory to improve preparedness for future crises. Overall, the model underscores that effective crisis leadership depends not only on technical decisions but also on communication, coordination, legitimacy, and a leadership style capable of building trust and guiding collective action under extreme uncertainty. As noted by Schoenberg (2005), crisis leaders must demonstrate authenticity, clarity, and the ability to influence behaviour constructively as qualities that are essential for sustaining confidence during turbulent conditions. Figure 3.2 depicts Schoenberg's crisis leadership model.

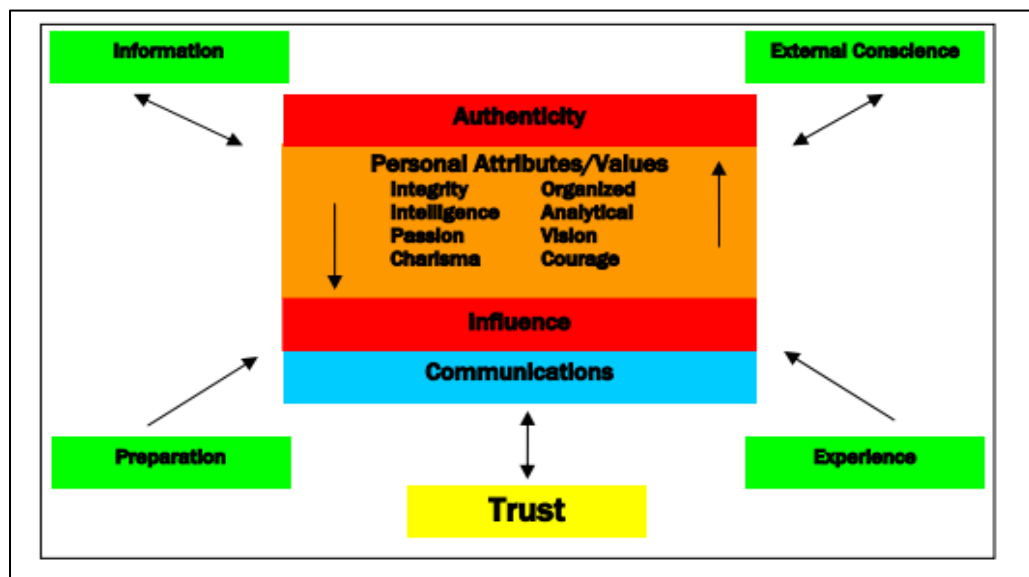


Figure 3.2 Crisis Leadership Model

(Source: Adapted from Schoenberg, 2005)

In addition to Boin et al.'s process-oriented model, Schoenberg (2005) offers a leadership-focused framework that explains how crisis leaders build the trust necessary for effective crisis response. Schoenberg's model highlights the central role of authenticity, personal values, influence, and communication, supported by information, preparation, experience, and external conscience. These elements interact to produce trust, which is essential in guiding teams through uncertainty. Unlike Boin's emphasis on systemic tasks such as sense-making and decision-making, Schoenberg focuses on the behavioural and interpersonal qualities of crisis leaders, making the model

particularly valuable for understanding leadership competence in high-stress environments.

3.6.6 Coombs' Three Staged Model

Coombs (2007) proposes a three-stage crisis management model consisting of pre-crisis, crisis, and post-crisis phases. The pre-crisis stage focuses on prevention and preparedness, including risk scanning, signal detection, developing crisis plans, training spokespersons, and conducting simulations. The crisis stage begins with the triggering event and covers all actions taken to manage the situation such as information management, stakeholder communication, message development, and protecting organisational reputation. This phase emphasises timely, transparent interaction with stakeholders to reduce uncertainty and maintain trust. The post-crisis stage starts once the organisation returns to normal operations and centres on fulfilling commitments made during the crisis, providing ongoing updates to stakeholders, and evaluating the overall response to identify lessons learned. Coombs highlights communication as central to effective crisis management and, together with Holladay (2002), introduced the Situational Crisis Communication Theory (SCCT), which advises organisations to assess crises based on severity and prior performance history. These assessments guide appropriate response strategies, allowing organisations to demonstrate empathy, address stakeholder concerns, restore confidence, and rebuild reputational standing. Several variables which need to be added to SCCT are shown in Figure 3.3.

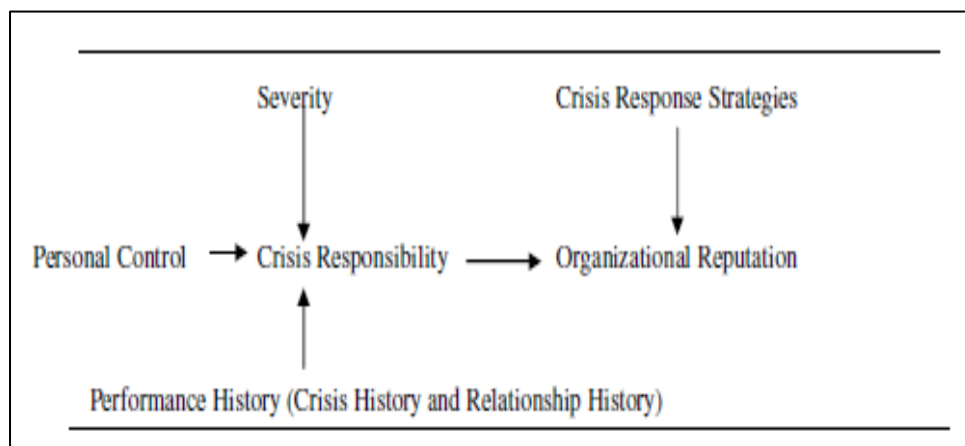


Figure 3.3 Variables and Relationships in the SCCT Theory

3.6.7 Organizational Resilience Theory

Organisational Resilience Theory complements Crisis Management Theory by emphasising the capability of organisations to anticipate, absorb, adapt to and recover from disruptions while maintaining continuity of critical functions under conditions of uncertainty (Duchek, 2020). Whereas crisis management models primarily provide process-oriented guidance across phases such as preparedness, response and recovery, resilience theory contributes an additional focus on adaptive capacity, organisational robustness and long-term renewal beyond immediate crisis response. In this sense, resilience extends crisis management from simply responding to disruptions towards sustaining and strengthening organisational functioning through adversity.

In the context of this research, Organisational Resilience Theory supports the continuity and adaptability dimensions embedded within the proposed Construction Sector Crisis Management Plan (CSCMP), particularly across the Prepare, Prevent, Response, Recover and Redesign phases. The Prepare and Prevent phases align with resilience concepts of anticipation and absorptive capacity, while the Recover and Redesign phases reflect adaptive recovery, learning and transformative renewal. Together, these dimensions reinforce the ability of construction organisations not only to withstand crises, but also to emerge more resilient and better positioned for future disruptions.

Accordingly, while Crisis Management Theory provides the principal process foundation for the CSCMP, Organisational Resilience Theory serves as a complementary theoretical lens that strengthens the framework's business continuity and long-term resilience orientation.

3.6.8 Evaluation of the Models

Among the reviewed models and theoretical perspectives, Petak's Integrated Emergency Management Model provides the principal process foundation for this research, as its cyclical logic underpins the five-phase structure of the proposed CSCMP. Mitroff's model, Moore's governance perspective and Coombs' crisis communication model serve as complementary supporting models, while Organisational Resilience Theory strengthens the framework's continuity and adaptive resilience dimensions. While the crisis management process is split into several phases

and these phases are described in various ways across the models, there are no major variations between them. It may also be argued that what researchers have done is to use synonyms or related terminology to describe the steps of the crisis management process. For demonstrating, to describe the first stage of the crisis management process, Mitroff uses the term signal identification instead of the term prodromal stage in the Fink model. Similarly, to describe the third step of the crisis management process, Mitroff uses term damage containment, Fink uses the word "chronic stage". Both, though, mean the steps taken after the event of the crisis. To offer more examples, acts performed in the Fink model during the prodromal period will easily be put in the Coomb model's pre-crisis stage as they approach crisis management. The last step of the Fink model, the resolution stage, resembles the post-crisis stage of the Coomb model as it guarantees that the crisis has ended and communicates the message. For a clearer perspective, all similarities of the six related models listed above have been illustrated in Table 3.5 as follows:

Table 3.5
Similarities and Differences Between Four Different Models

Petak's Model	Fink's Model	Mitroff's Model	Moore's Model	Boin & 't Hart's Model	Coombs' Model
Mitigate	Prodromal stage	Signal detection	Situation monitoring	Sense making	Pre-Crisis
Prepare		Probing and prevention	Detection support Containment	Decision making	
Response	Acute stage	Damage containment	Response	Meaning making	Crisis
	Chronic stage	Recovery	De-escalation		
Recovery	Resolution stage	Learning Redesign	Recovery	Termination Learning	Post-Crisis

Note: Light shading denotes pre-crisis phases (mitigation, preparedness and prevention); Darker shading denotes crisis response phases; Orange shading denotes post-crisis recovery, learning and redesign phases.

There are also no major improvements between the three terms, such as support for crisis identification, acknowledgement of crises and sense-making used in the models developed by Moore and Boin et al. Furthermore, the phrase recovery from the crisis use in the Petak's and Moore's models are not that different from the term learning

from crisis used in the Mitroff's model. As a result, even though the crisis management process is divided into many phases and these phases are described in various ways by academics, it can be characterized by five main phases, i.e. preparation, prevention, response, evaluation and redesign. According to various scholars while preparation phase often refers to dealing with problems such as planning, form a team and training. Preventing phase is about mitigating, avoiding a crisis and recognising.

In the response stage, it is usually related to coping with problems such as rehabilitation, recovery, damage control, crisis containment, decision-making on critical response strategies, execution, and cooperation with stakeholders (meaning making). As for the evaluation phase, it starts when the organisation returns to normal and then proceeds with the accountability process, which includes the handling of the blame. Perhaps specifically, it involves learning from experience and discovering opportunities to properly plan for the next crisis. The final phase is redesign, this phase is important for the betterment of the overall crisis management plan as it act as feedback into entire system thus promoting cyclical iterative process and important reflection on the experience of the crisis, review of the effect of the crisis on the mechanisms of the core and ancillary systems, and then adaptation of attitudes and systems to strengthen crisis management practices.

Having reviewed all the CMMs, clearly indicates that an organisation must have a plan to efficiently manage a crisis. The main purpose of the initiative is to put order into the middle of chaos. The aim of the plan is to recognize individuals to assemble modes of communication, participate in managing the situation, effectually coordinate by using the tools of the organisation to resolve such an incident and take the appropriate steps to restore the organization to its pre-crisis status. Basically, this involves taking charge immediately, making the best possible evaluation of the situation, solving the issue and explaining the story effectively. The CMM reviewed by Fink, Mitroff, Petak, Coombs and Boin et al. offer a structured understanding of how crises evolve and how organisations and governments should strategically respond. These frameworks align directly with Research Objective 2, as they provide the conceptual basis for analysing the macro-level strategies and action plans implemented across different countries during the Asian Financial Crisis, Global Financial Crisis and Covid-19.

Although these models differ in terminology, a synthesis of the literature shows five recurring themes, preparation, prevention, response, recovery, and redesign. These commonalities form the basis of the framework proposed in this study. They also guide

the interpretation of which actions were preventive, responsive or recovery-oriented, thereby informing the development of the Malaysian CSCMP. However, despite applying these crisis management principles in various forms, especially during Covid-19 were predominantly reactive and implemented at the national policy level, rather than being operationalised within the construction industry itself. As a result, industry players had limited sector-specific guidance and were often left to interpret general government directives on their own. This gap reinforces the need for a dedicated, construction-focused crisis management plan that translates national strategies into actionable, organisation-level practices tailored to the realities of the sector. Based on the insights derived from the reviewed crisis management models and literature, this study proposes a Construction Sector Crisis Management Plan (CSCMP) structured around five phases: Prepare, Prevent, Response, Recovery, and Redesign. The following subsections present the proposed CSCMP framework, tailored specifically to the vulnerabilities and operational realities of the Malaysian construction sector.

As shown in Table 3.5, despite differences in terminology, the reviewed models exhibit substantial convergence around common crisis management components. The pre-crisis components (e.g. mitigation, signal detection, situation monitoring and sense-making) collectively inform the Prepare and Prevent phases of the CSCMP. The response-related components (e.g. damage containment, response, de-escalation and meaning-making) inform the Response phase, while recovery-related components (e.g. learning, termination and redesign) support the Recovery and Redesign phases. Although the models differ in emphasis while Petak and Mitroff focus more on process phases, Moore and Boin & 't Hart emphasise governance and decision-making, while Coombs focuses on communication whereby, they share sufficient commonality to support their integration into the conceptual framework.

While Table 3.5 compares similarities and differences among the reviewed models, Table 3.6 summarises the components synthesised and adopted into the proposed CSCMP framework.

Table 3.6
Components Synthesised into Proposed CSCMP Framework

CSCMP Phase	Derived Components from Reviewed Models	Reviewed Models
Prepare	Planning, team formation, training, signal detection	Petak, Mitroff
Prevent	Mitigation, probing, monitoring, early warning	Petak, Mitroff, Moore
Response	Damage containment, decision-making, crisis response, stakeholder coordination	Mitroff, Moore, Boin & t'Hart, Coombs
Recovery	Rehabilitation, continuity restoration, learning	Petak, Mitroff, Boin & t'Hart
Redesign	Review, adaptation, improvement, feedback into system	Mitroff, Boin & t'Hart, Resilience Theory

The synthesis presented in the table demonstrates how the proposed CSCMP integrates common and complementary components derived from the reviewed crisis management models into a coherent five-phase framework. Although the models differ in emphasis, their recurring components converge around preparedness, prevention, response, recovery and learning. These were synthesised and extended in this research into the five CSCMP phases, with the redesign phase representing an important extension that incorporates feedback, adaptation and continuous improvement. Collectively, this integration provides the conceptual foundation for the proposed CSCMP framework.

3.6.9 Previous Studies, Limitations of Existing Frameworks and Research Gaps

In addition to the crisis management models reviewed, recent studies have contributed important insights into crisis preparedness, resilience and response across organisational and project contexts. However, as summarised in Table 3.7, much of the existing research has tended to focus on specific dimensions of crisis management such as preparedness, response strategies or resilience capability, rather than developing integrated and validated crisis management frameworks tailored to sector-specific vulnerabilities.

In the construction context, earlier work by Şahin et al. (2015) established the importance of crisis planning in the sector, while more recent studies have advanced understanding of crisis readiness, resilience and response under complex disruptions. Nevertheless, significant gaps remain in linking vulnerable areas, business continuity

requirements and resilience considerations within a single structured framework applicable to construction organisations.

Among the reviewed models, Petak's Integrated Emergency Management Model remains the most prominent foundation for this research, as its cyclical logic provides the principal basis for the five-phase CSCMP. However, this study extends beyond previous frameworks and studies by integrating complementary elements from multiple models and resilience perspectives into a construction-specific framework designed to address identified gaps in existing scholarship.

Accordingly, this research seeks to close this gap through the development and validation of a Construction Sector Crisis Management Plan (CSCMP) capable of strengthening organisational preparedness, crisis response and business continuity in the Malaysian construction sector.

Table 3.7
Previous Studies on Crisis Management Framework

Study	Framework / Focus	Key Contribution	Limitation / Gap Identified
Şahin et al. (2015)	Crisis management in construction	Highlighted importance of sector crisis preparedness	Limited integrated framework development and validation
Marzouk et al. (2021)	Crisis impacts and response strategies	Examined crisis response measures in project settings	Focused mainly on response rather than full crisis lifecycle
Duchek (2020)	Organisational resilience theory	Introduced adaptive resilience capability (anticipation, coping, adaptation)	Not construction-specific and limited operational crisis planning focus
Jin et al. (2024)	Crisis readiness framework	Advanced integrated crisis preparedness thinking	Limited sector-specific empirical validation
Weber et al. (2024)	Organisational resilience and crisis response	Strengthened adaptive resilience and continuity perspectives	Limited translation into crisis management planning frameworks
Alanazi et al. (2025)	Crisis strategies in complex projects	Contemporary insights into managing compounded disruptions	Focused on strategy rather than validated sector-specific framework
Present Study	Construction Sector Crisis Management Plan (CSCMP)	Integrates vulnerable areas, business continuity and resilience into a validated construction-specific framework	Addresses identified gap

Table 3.7 illustrates that while prior studies have contributed important insights into crisis management and resilience, their emphasis has largely remained fragmented, focusing on discrete aspects such as preparedness, response strategies or adaptive capability. Limited attention has been given to integrating these dimensions into a validated, sector-specific crisis management framework for construction organisations. This identified gap underpins the contribution of the present research and justifies the development of the proposed CSCMP.

3.7 Development of Framework for Construction Sector Crisis Management Plan (CSCMP)

The Figure 3.4 presents the conceptual framework for the development of the Construction Sector Crisis Management Plan (CSCMP). The framework provides a schematic representation of the key components and relationships intended to guide construction organisations in strengthening preparedness, crisis response and business continuity. Rather than representing a fixed prescriptive model, the framework serves as a dynamic and iterative blueprint for performance improvement, incorporating feedback, learning and adaptation as integral elements of crisis management and organisational resilience (Duchek, 2020; Fraser & White, 2024).

A conceptual framework functions as an analytical structure for organising concepts, clarifying relationships and guiding the development of theory-informed propositions. In this research, the framework is developed through synthesis of literature, theoretical models and identified sector vulnerabilities, and is structured around five crisis management phases, namely Prepare, Prevent, Response, Recovery and Redesign. These phases reflect both recurring components found across established crisis management models and an extension of those models to incorporate adaptive renewal and continuous improvement.

In the construction context, previous studies have shown that organisations capable of managing crises across critical vulnerable areas, including labour, supply chains, financial exposure, contractual risks and operational disruptions, are better positioned to minimise losses and sustain competitiveness during and after crises (Şahin & Ulubeyli, 2015; Le & Nguyen, 2023; Kum & Yap, 2024). Recent industry assessments similarly emphasise the need for structured crisis assessment, contingency

planning and coordinated response mechanisms to improve sector resilience (CIDB, 2025).

The components included in Figure 3.4 are derived through the integration and synthesis of complementary elements drawn from the reviewed crisis management models, namely Petak's Model, Mitroff's Crisis Management Model, Moore's governance perspective, Boin and 't Hart's crisis leadership model, and Coombs' crisis communication model, together with Organisational Resilience Theory. Accordingly, the conceptual framework represents a theory-informed integration rather than the adoption of any single model.

Building on these foundations, this study posits that the development and implementation of a Construction Sector Crisis Management Plan (CSCMP) can enhance the construction sector's capacity to address crisis-vulnerable areas, strengthen business continuity and improve resilience under increasingly complex disruptions. It should be noted that Figure 3.4 presents a preliminary conceptual framework guiding the research, whereas the final CSCMP presented in later chapters represents the empirically refined and validated outcome of this framework.

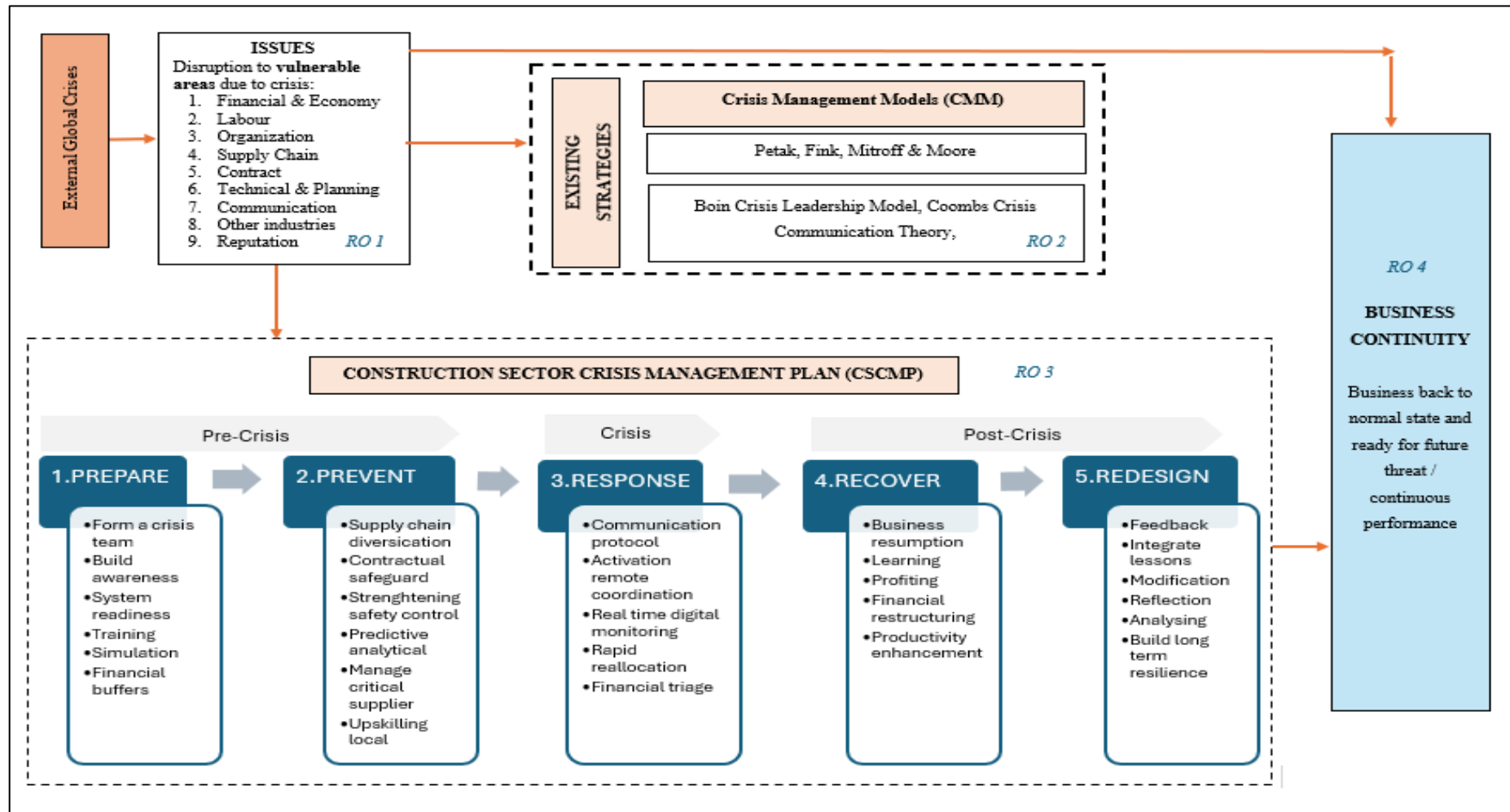


Figure 3.4 Conceptual Framework for the Development of the Construction Sector Crisis Management Plan (CSCMP)

Detail explanations of the conceptual framework for CSCMP (Figure 3.4) are as follows:

1. External Global Crises → Disruption to Vulnerable Areas (RO1)

External global crises such as the Asian Financial Crisis, Global Financial Crisis, and Covid-19, represent the initial shock that triggers widespread disruptions. These crises affect nine key vulnerable areas: finance & economy, labour, organisation, supply chain, contracts, technical & planning, communication, reputation, and inter-industry dependencies. This section satisfies Research Objective 1 (RO1) by establishing the extent and nature of crisis-driven impacts on the sector.

2. Crisis Management Models (CMM) → Understanding Responses (Supports RO1 & RO2)

The framework integrates established crisis models namely Petak, Fink, Mitroff, Moore, Boin's Crisis Leadership Model, and Coombs' Crisis Communication Theory, to interpret how crises unfold and how responses are structured across pre-crisis, crisis, and post-crisis phases. These models provide the theoretical lens to analyse and categorise the strategies used by governments, industries, and organisations during past crises. This underpins RO2, which involves reviewing existing strategies and action plans.

3. Existing Strategies (RO2)

These are the macro-level national responses adopted across different crises (AFC, GFC, Covid-19). They represent emergency measures, policy interventions, financial support, sectoral regulations, stimulus packages, operational SOPs. Existing strategies are reviewed to determine what has worked, what was reactive, and what gaps exist, especially the lack of construction-specific action. This directly addresses RO2.

4. Construction Sector Crisis Management Plan (CSCMP) (RO3)

Insights from crisis impacts (RO1), crisis models (CMM), and existing strategies (RO2) inform the development of the CSCMP, which is structured across pre-crisis, crisis, and post-crisis phases. The CSCMP provides sector-specific guidelines, bridging the gap between reactive national policies and the need for proactive, industry-level crisis preparedness. This corresponds to RO3 and the proposed relationship between CSCMP and business continuity.

5. Business Continuity (RO4)

The final component of the framework is business continuity, defined as the organisation's ability to return to normal operational performance after a crisis, and develop resilience and preparedness for future disruptions. This outcome directly addresses RO4. The framework positions business continuity as the dependent effect of CSCMP implementation.

Although the Covid-19 crisis is recent and many recommended approaches have not yet been systematically tested within the construction industry, the conceptual foundation for applying crisis management models in this sector is robust. Previous researchers, including Sfakianaki (2015), Srinivasan (2015), Sumesh (2016), Jomin (2019) and Fatma (2020) have examined and adapted crisis management concepts for construction contexts. Furthermore, this study responds directly to limitations highlighted in earlier research by Antopoulos and Kostavara (2013) and Sahin and Ulubeyli (2015), as well as contemporary concerns raised by the United Nations (2020) and CIDB (2020) regarding the sector's preparedness.

Thus, the present research contributes by establishing a structured basis for understanding how crisis-induced disruptions can be managed, and by proposing a sector-specific CSCMP that enhances resilience, continuity, and preparedness for future threats in the Malaysian construction industry. This framework responds to gaps identified in the literature and in Malaysia's construction practice, particularly the lack of sector-specific crisis protocols. Unlike national policies that are broad and reactive, the CSCMP offers operational, construction-focused guidance across all phases of crisis management.

3.7.1 CMP Phase 1 - Prepare

In the proposed CSCMP, the Prepare phase focuses on establishing the foundation of the Construction Sector Crisis Management Plan (CSCMP) by strengthening organisational readiness before disruptions occur. In the construction industry, where risks arise from supply chain delays, contractual issues, financial pressures, and labour shortages and this aligned with (Sahin & Ulubeyli, 2015) hence effective preparation enhances both crisis anticipation (RO1) and business continuity (RO4).

i. Form a Crisis Management Team (CMT)

A dedicated CMT is essential for coordinated crisis action. Coombs (2007) notes that early designation and training of crisis teams improve mobilisation and communication, while Mitroff (1994) highlights the importance of cross-functional expertise in early signal detection. In construction, the CMT integrates engineering, safety, procurement, legal, and project management functions.

ii. Built Awareness Across Divisions

Awareness ensures all organisational units participate in crisis readiness. Mitroff (1994) emphasises cross-functional involvement, and Boin et al. (2005) highlight coordinated preparedness across strategic and operational levels. This improves early detection and supports the Prevent phase of the CSCMP.

iii. Ensure System Readiness and Long-Term Preparedness

System readiness involves establishing structured procedures, communication protocols, and risk assessment mechanisms. Coombs (2007) and Petak's planning model underscore the need for contingency plans and aligned response systems before crises occur. For construction firms, this includes robust SOPs, supply chain monitoring tools, and clear escalation pathways.

iv. Conduct Training

Training supports competency and embeds lessons from past disruptions. Mitroff (2005) stresses organisational learning as a foundation for resilience. Training in construction may include emergency response, communication procedures, leadership decision-making, and handling supply chain disruptions.

v. Implement Simulations

Simulation exercises stress-test procedures and expose weaknesses. Coombs (2007) and Mitroff (2005) view simulations as essential for validating plans. In construction, simulations may involve mock site emergencies, supply chain delays, or contract risk scenarios to strengthen real-world readiness.

vi. Establish Financial Buffers

Financial preparedness helps organisations absorb shocks and continue operations. Although less emphasised in classic crisis models, financial buffers align with Mitroff's (2005) resilience-focused redesign principles and Rajprasad's (2018) emphasis on emerging stronger. Construction firms may prepare contingency funds, cash-flow protection mechanisms, and reserves for material or labour cost spikes.

An empirical study connecting data governance capability to project organisation resilience in construction highlights that strong governance systems (planning and application) increase an enterprise's ability to respond and recover from disruptions, this is aligned with this study proposing system readiness and long-term strategic preparedness concept (Hua & Kang, 2025)

3.7.2 CMP Phase 2 - Prevent

The "Prevent" phase of the proposed CSCMP emphasises on identifying, monitoring, and mitigating risks before they escalate into disruptive events. Given the construction sector's exposure to supply chain volatility, contractual complexity, and

operational interdependencies, prevention is critical for ensuring resilience and continuity. The following five components form the core of the Prevent stage.

i. Implement Cross-Functional Action Plans (including Supply Chain Diversification & Contractual Safeguards)

Effective prevention requires structured, cross-functional action plans that address known vulnerabilities. Mitroff (1994) emphasises proactive probing, where organisations act early to minimise potential disruptions. In construction, this includes Supply chain diversification to reduce reliance on single vendors, supported by recent 2024–2025 studies showing diversified sourcing significantly reduces disruption probability (Zhang et al., 2024; Singh & Rahman, 2025). Contractual safeguards, such as escalation clauses, risk-sharing, and predefined contingencies, which current research identifies as crucial for mitigating legal and financial shocks in volatile markets (Musa et al., 2024). These action plans ensure all divisions contribute to risk mitigation aligned with organisational crisis strategy.

ii. Early Warning and Digital Monitoring

Early warning systems allow organisations to detect weak signals before they escalate. This supports Mitroff’s “signal detection” phase and Moore’s crisis detection stage. Recent evidence shows: Real-time monitoring dashboards, BIM-integrated alerts, and digital supply-chain tracking significantly enhance early detection (Li et al., 2025). Early warning indicators in construction include schedule slippage, material delays, safety non-compliance and budget divergence. The adoption of digital tools such as IoT sensors or AVEVA-based platforms—directly supports proactive risk identification.

iii. Strengthen Organizational Systems

Petak’s mitigation principle emphasises the importance of reducing structural vulnerabilities that heighten an organisation’s exposure to crises. In the construction sector, this involves strengthening core operational systems such as safety management, supplier networks, and procurement processes. Strengthening safety controls is particularly critical, as it lowers the likelihood of accidents and project shutdowns, with

recent adaptive-leadership research demonstrating that robust HSE systems significantly enhance crisis resilience (Rahimi et al., 2025). Equally important is the management of critical suppliers through performance monitoring, dual-sourcing arrangements, and the maintenance of contingency stock approaches that 2025 supply-chain reviews identify as essential for improving construction sector resilience (Singh & Rahman, 2025). System strengthening also includes enhancing procurement and logistics integration to minimise bottlenecks and ensure smoother project continuity. Consistent with these findings, CIDB (2020) and post-COVID studies highlight the need for continuous system improvement to reduce organisational fragilities and build long-term operational resilience.

iv. Manage Critical Suppliers

Managing critical suppliers is a central preventive strategy in strengthening construction sector resilience. Given the industry's high dependence on key material and equipment vendors, disruptions among critical suppliers can rapidly escalate into project-wide crises. Recent studies highlight the importance of supplier performance tracking, dual-sourcing arrangements, and maintaining contingency stock as effective measures for reducing supply-chain vulnerability (Singh & Rahman, 2025). By continuously evaluating supplier reliability, capacity, and risk exposure, organisations can anticipate potential disruptions and intervene before they escalate. This approach aligns with wider post-COVID industry recommendations, which emphasise the need for proactive supply-chain risk management to ensure continuity in project delivery.

v. Upskilling Local Workforce

Upskilling the local workforce is an increasingly important component of crisis prevention in the construction industry, particularly in environments where firms are exposed to labour shortages, mobility restrictions, or dependence on foreign labour. Strengthening local skills capacity enhances organisational self-sufficiency and reduces operational risks during disruptions. Recent evidence shows that targeted training, capability development, and competency-based upskilling significantly contribute to project stability and improve an organisation's adaptability during crises (Rahimi et al., 2025; Kurniawan et al., 2024). By building a more skilled and versatile local workforce,

construction firms reduce vulnerability to external shocks and ensure continuity even when external labour supply becomes unstable.

vi. Aim Reducing Destructive Effect of Crises

The goal of the prevent phase is to minimize the destructive impact of potential crises before they materialize. Coombs (2007) identifies crisis prevention as a pre-crisis task, stressing that organizations should proactively manage issues and prepare response options in advance. Preventive actions—such as enforcing contractor performance evaluations or pre-qualifying vendors—reduce the potential severity of crises. As Fatma (2020) notes, minimizing disruption is not only a resilience strategy but also a competitive advantage for firms that can sustain operations through turbulent conditions.

The “Prevent” phase is fundamental in shaping the resilience of a construction organization. By implementing structured action plans, leveraging early warning systems, mitigating systemic vulnerabilities, and empowering the CMT to act on principal risks, organizations reduce their exposure to crisis events. These activities are consistent with established models by Mitroff, Petak, Moore, Coombs, and Boin et al., and directly address the industry's need for preparedness, especially in a post-Covid environment where proactive prevention is a strategic imperative.

3.7.3 CMP Phase 3 - Response

Within the proposed CSCMP, The Response phase is the most action-intensive stage of the Crisis Management Plan, where construction organisations must stabilise operations and prevent further escalation. Effective response relies on fast decisions, coordinated communication, and real-time situational awareness. The following six elements form the core of the Response phase:

i. Communication Protocol

Clear and ethical communication is the foundation of crisis response. Transparent updates to workers, clients, subcontractors, and regulators reduce confusion and reinforce trust. Coombs (2007) emphasises that honest, timely communication is critical for managing stakeholder expectations and protecting organisational reputation.

ii. Activation of Remote Coordination

When site access is restricted or conditions are unsafe, the Crisis Management Team must activate remote coordination mechanisms. Virtual command centres, digital collaboration tools, and off-site decision hubs ensure leadership continuity and rapid problem-solving, consistent with Mitroff's (1994) damage-containment principles.

iii. Real Time Digital Monitoring

Digital monitoring tools such as BIM dashboards, IoT sensors, drone feeds, and integrated project platforms—enable real-time visibility of safety risks, progress deviations, and resource bottlenecks. Continuous monitoring supports immediate intervention and aligns with Moore's (2002) emphasis on situational assessment during crises.

iv. Rapid Reallocation of Resources

Crisis conditions often require urgent redistribution of manpower, machinery, and materials to protect critical activities. Rapid reallocation minimises downtime, maintains safety, and contains operational disruption. This reflects Boin et al.'s (2005) view that decisive action under pressure prevents escalation.

v. Financial Triage

Financial exposure must be assessed immediately through financial triage—analysing cash flow impacts, emergency costs, liabilities, and claims. This early

assessment prevents further financial deterioration and supports stabilisation. It is consistent with Fink's (1986) chronic-stage guidance on managing legal and financial consequences during crises.

By focusing on "Response" phase, construction organisations can respond swiftly and effectively to crisis situations. These actions reflect core principles from leading crisis management models and ensure safety, operational continuity, and financial protection during high-pressure events.

3.7.4 CMP Phase 4 - Recovery

The "Recovery" phase in the proposed CSCMP framework marks the transition from immediate crisis response to the gradual restoration of business functions. In the construction industry, where time, cost, and quality are interlinked, effective recovery is vital to minimize prolonged disruptions, re-establish momentum, and prepare for future resilience. This phase also serves as a bridge between past experiences and future crisis preparedness, ensuring organizations emerge stronger from the crisis.

i. Enhance Human Readiness

Recovery must begin by restoring the capabilities, morale, and readiness of the workforce. Mitroff (1994) emphasized that recovery is not only about systems but also about people where staff need to feel safe, supported, and empowered to resume work. After disruptions such as Covid-19 or project shutdowns, retraining, re-briefing, and reskilling workers become critical. CIDB (2020) similarly emphasized that post-crisis workforce engagement is crucial for the construction industry, which relies heavily on labour performance and coordination.

ii. Review Crisis Management Mechanism for Lessons Learned

A core component of recovery is reflection. Mitroff's (2005) learning phase and Coombs' (2007) post-crisis stage both highlight the importance of reviewing what worked, what failed, and what can be improved. This includes evaluating the

effectiveness of communication, coordination, and decision-making during the crisis. In construction, a structured review of crisis response via post-mortem reports, stakeholder feedback, and project audits helps improve crisis protocols and enhances organizational resilience against similar future threats (Sahin & Ulubeyli, 2015).

iii. Recover and Restore Business

One of the principal goals of this phase is to return business operations to a stable and functioning state. Fink (1986) calls this the resolution stage, where the crisis is formally closed, and the company moves toward normalcy. For construction firms, this involves restarting suspended works, re-aligning project milestones, re-engaging subcontractors, and negotiating revised timelines. Moore (2002) referred to this as the recovery phase, which is the culmination of de-escalation, restoring confidence and ensuring project continuity.

iv. Find Ways to Properly Plan for Future Crises

Recovery is also a forward-looking process. Coombs (2007) emphasized the need to build capacity for future crisis management by embedding lessons into contingency planning, updating CMPs, and running simulations. In construction, each crisis can offer insights for improving project-level risk management, contractual clauses, or supply chain flexibility. Mitroff's (2005) addition of the redesign phase encourages organizations to re-engineer policies and frameworks based on actual crisis experience, ensuring that recovery informs prevention and preparedness for the next cycle.

v. Ensure Business Continuity

Business continuity is both a goal and an outcome of recovery. The ability to maintain critical operations or resume them with minimal disruption defines a resilient construction organization. As CIDB (2020) suggested, the pandemic highlighted the need for comprehensive business continuity planning (BCP) as part of CMPs. This includes integrating backup plans, securing critical resources, maintaining cash flow, and establishing remote work capabilities where applicable. Ensuring continuity also

builds client confidence, protects revenue streams, and preserves long-term project viability.

The “Recovery” phase focuses on rebuilding and strengthening the organization after a crisis. In the construction industry, this involves restoring workforce capacity, learning from crisis events, reinstating project operations, planning and ensuring business continuity. These priorities are strongly supported by crisis models developed by Mitroff, Coombs, Fink, and Moore. A structured and reflective recovery process ensures that the organization not only survives the crisis but also emerges more resilient, efficient, and better prepared for future disruptions.

3.7.5 CMP Phase 5 - Redesign

The “Redesign” phase represents the final and forward-thinking stage of the Crisis Management Plan (CMP), where organizations move beyond recovery to embed resilience, continuity and adaptability into their systems. In the construction sector, where crises expose structural, operational and human weaknesses, the redesign phase is essential to transform experiences into institutional improvements. It is about surviving, evolving, and thriving in a volatile and competitive industry.

i. Ensure Survival and Continuity of Business

The ultimate purpose of redesign is to institutionalize practices that support long-term business survival and continuity. Mitroff (2005) introduced redesign as the sixth stage of his revised model, stressing that organizations must rebuild with the lessons from crises to avoid repeating mistakes. In construction, this includes reevaluating project delivery models, supply chain strategies, and contractual frameworks to enhance agility and reliability. CIDB (2020) also emphasized the importance of embedding business continuity into the organizational structure, especially following the Covid-19 pandemic’s disruptions to labour, logistics and finance.

ii. Remain Relevant and Resilient in a Changing Environment

Construction companies must also remain relevant and resilient amidst evolving technologies, client demands and regulatory frameworks. Redesign is not just about fixing past problems also it's about adapting for the future. Boin et al. (2005) refer to learning and adaptation as essential leadership challenges in post-crisis situations, where organizations must evolve their strategies to remain competitive. Redesigning project workflows, embracing digital tools (e.g., BIM, AI in planning), and adopting more sustainable construction practices are examples of how firms stay ahead while strengthening their crisis resilience.

iii. Promote Systematic Analysis and Reflection

The redesign phase must be grounded in structured reflection and analysis. According to Mitroff (1994), true learning from crises occurs only when organizations systematically analyze what went wrong and redesign systems accordingly. This involves reviewing crisis data, performance gaps, stakeholder feedback and organizational behaviour. Coombs (2007) and Moore (2002) also highlight post-crisis review and evaluation as critical for continuous improvement. In construction, this may involve revisiting safety protocols, project planning assumptions, subcontractor vetting, or cash flow buffers and ensuring risks are addressed with institutional changes.

iv. Produce Young Professionals for Future Readiness

Redesign also involves developing future-ready human capital, especially young professionals who can lead in complex and uncertain environments. The construction industry is often criticized for an aging workforce and a slow adoption of innovation (Sahin & Ulubeyli, 2015). Investing in the next generation of leaders ensures the continuity of knowledge and the adaptability of the organization. Crisis experience should be translated into mentorship programs, leadership development tracks, and exposure to risk management practices that prepare young talent for future roles.

v. Train Staff on the Importance of Business Continuity

Staff at all levels must understand the role they play in ensuring business continuity. Training programs, simulations, and knowledge-sharing initiatives should be embedded post-crisis to improve organizational response and preparedness. Mitroff (2005) emphasized integrating learning into the organizational memory, while Coombs (2007) suggested that post-crisis communication and training are essential for resilience. For construction firms, this may mean upskilling staff in digital tools, crisis response protocols, or contract management so that everyone from site teams to executives can act quickly and confidently in future crises.

The “Redesign” phase is where crisis response becomes institutional transformation. In the construction sector, it involves embedding continuity mechanisms, evolving to remain competitive, reflecting on lessons learned, developing future leaders, and ensuring that all staff understand and contribute to continuity efforts. This phase aligns with the cyclical and learning-based models of Mitroff, Coombs, and Boin et al., and addresses the strategic needs of the construction industry to survive, evolve, and lead in a crisis-prone world. By redesigning based on lived experiences, construction organizations can transform vulnerabilities into strengths and become truly crisis resilient.

3.8 Resilience

Although definitions of resilience vary by field, they share a common focus: the ability to adapt, absorb shocks, and recover from disruptions (Opdyke & Javernick-Wil, 2017; Meerow et al., 2020; Panteli et al., 2023). The concept first appeared in the 1970s, when Holling (1973) described resilience as a system’s ability to absorb change while maintaining its core functions. In the late 1990s, it gained attention in the social sciences and was later adopted by the Multidisciplinary Center for Earthquake Engineering Research (MCEER). MCEER defined community resilience as the ability of social units (e.g., organizations or communities) to reduce hazard impacts, manage disaster effects, and recover with minimal disruption (MCEER, 2005; Bruneau et al., 2021).

The United Nations later built on this, defining resilience as the ability of a system or society to adapt and maintain functioning during crises by learning from past

disasters and improving future responses (United Nations, 2005; UNDRR, 2022). Earlier studies focused mainly on resistance to shocks (Norris & Steven, 2008), but later work added more depth. Vugrin et al. (2010) suggested resilience includes three key capacities: to absorb, adapt, and recover. Cutter et al. (2010) expanded on this by identifying five resilience dimensions: economic, environmental, governance, infrastructure, and social, stressing how important it is for the built environment to withstand and recover from crises (Vugrin, Warren, & Ehlen, 2010; Cutter, Burton, & Emrich, 2010; Panteli et al., 2023).

3.9 Business Performance and Continuity

Crisis management and organizational resilience are two aspects that can hardly be detached and are complementary to each other (Hu & Yun, 2022). They can collaboratively identify dimensions of organizational resilience capabilities and provide insight on how they interact with each other to predict organizational performance during crisis (Linnenluecke, 2017). The proposed five-phase Crisis Management Plan (CMP) comprising Prepare, Prevent, Response, Recovery and Redesign is designed to strengthen the capacity of construction organizations to navigate and withstand crises. This section discusses how each phase contributes to business performance and ensures continuity, supported by both classical crisis theories and recent empirical studies.

Prepare: Building Organizational Readiness

The Prepare phase enhances business performance by ensuring organizational units are coordinated and ready to act in the face of a crisis. Activities such as role clarity, team formation, and contingency planning help reduce confusion and shorten response time. Coombs (2007) emphasized that organizational readiness directly affects the ability to mobilize resources swiftly during a crisis. Subramaniam et al. (2022) found that Malaysian construction firms with early preparation and strong internal communication experienced fewer delays and disruptions during the Covid-19 crisis, preserving project timelines and stakeholder confidence.

Prevent: Reducing Operational Disruptions

The Prevent phase contributes to performance by minimizing the likelihood and severity of crises. Through proactive risk identification, early warning systems, and mitigation strategies, organizations can avoid major interruptions. Mitroff (1994) posits that the ability to detect and prevent risks is a hallmark of resilient organizations. Fadhil et al. (2022) reported that Iraqi construction projects with active risk-monitoring systems saw a reduction in cost overruns and contractual disputes. Similarly, Sahin and Ulubeyli (2015) observed that companies investing in prevention were more competitive and suffered less operational downtime during national emergencies.

Response: Minimizing Impact and Maintaining Reputation

The Response phase plays a central role in business continuity by containing the crisis and reducing its spread. Organizations that respond ethically and decisively are more likely to retain stakeholder trust and protect their brand image (Coombs & Holladay, 2002). Boin et al. (2005) stressed that swift, informed decision-making under pressure contributes to both internal stabilization and external credibility. A study by AlMaian and Bu Qammaz (2023) found that construction firms which demonstrated ethical leadership and clear crisis messaging during the pandemic were able to maintain client relationships and mitigate contractual liabilities.

Recovery: Rebuilding Business Operations and Trust

The Recovery phase is critical for restoring normal operations and maintaining long-term business viability. Fink (1986) describes this as the resolution phase, where operational, financial and reputational recovery takes place. In construction, this includes restarting paused projects, engaging contractors, and re-aligning milestones. CIDB (2020) emphasized that Malaysian firms that invested in structured recovery mechanisms such as workforce retraining and cash flow stabilization were more successful in restoring productivity post-Covid. Lean-based infrastructure recovery frameworks also showed that coordinated recovery reduces waste and accelerates performance (Lean Infrastructure Recovery, 2023).

Redesign: Embedding Resilience and Strategic Renewal

Finally, the Redesign phase ensures sustained business performance by turning crisis lessons into long-term structural improvements. Mitroff (2005) proposed this phase to institutionalize learning and promote system redesign which aligns with continuous improvement principles. Bachtiar et al. (2023) found that organizations that restructured post-crisis by investing in technology, governance, and talent development achieved improved performance and higher preparedness. Mukhtar et al. (2022) observed that construction firms in Malaysia that undertook crisis-driven redesign were more resilient and responsive to future uncertainties, highlighting the strategic benefit of this phase.

Collectively, these five CMP phases form an integrated framework that enhances business continuity and supports long-term performance. Supported by empirical studies, this approach addresses the full lifecycle of crisis from early preparation to post-crisis transformation. By adopting this CMP model, construction organizations can achieve greater operational stability, stakeholder trust and sustainable growth, even in volatile environments.

Chapter 3 reviews the concept, types, and characteristics of crises, showing how global disruptions and past economic shocks have exposed the Malaysian construction sector's vulnerabilities. It evaluates major Crisis Management Models, Petak, Fink, Mitroff, Moore, Boin et al., and Coombs to identify five common phases: Prepare, Prevent, Response, Recovery, and Redesign, which form the foundation of the proposed Construction Sector Crisis Management Plan (CSCMP).

3.10 Evolution from Proposed Conceptual Framework to Final CSCMP

It should be noted that the conceptual framework presented in Figure 3.4 represents a preliminary theory-informed framework developed from literature synthesis, crisis management models and identified sector vulnerabilities. Its purpose is to provide an initial structure to guide data collection, analysis and framework development rather than to represent the final validated crisis management plan.

The final Construction Sector Crisis Management Plan (CSCMP) presented in later chapters may differ from this preliminary framework in that it has been empirically refined and validated through findings from the sequential research phases,

namely exploratory interviews, questionnaire survey and focus group validation. While the proposed conceptual framework establishes the five broad crisis management phases of Prepare, Prevent, Response, Recovery and Redesign, the final CSCMP incorporates refined elements, operational details and validated measures emerging from empirical evidence and expert consensus.

In this sense, the proposed conceptual framework serves as the theoretical and conceptual foundation, whereas the final CSCMP represents the applied and validated outcome of the research. The differences between them reflect not inconsistency, but the expected progression of framework development in mixed-methods research, whereby preliminary concepts are iteratively refined through empirical inquiry.

This evolution also justifies the contribution of the study, as the final CSCMP extends beyond the initial conceptual proposition by translating theory-driven constructs into a sector-specific crisis management plan tailored to the Malaysian construction industry.

3.11 Summary of Chapter

In summary, this chapter reviewed and synthesised the theoretical and conceptual foundations underpinning the proposed Construction Sector Crisis Management Plan (CSCMP), drawing on Petak, Mitroff, Moore, Boin and 't Hart, Coombs, and Organisational Resilience Theory. Through comparative evaluation of these models and identification of gaps in previous studies, the chapter established the rationale for an integrated, construction-specific crisis management framework structured around five phases: Prepare, Prevent, Response, Recovery and Redesign.

The chapter further presented the proposed conceptual framework for CSCMP development and clarified its role as a preliminary theory-informed framework to be refined through empirical investigation. Collectively, the chapter establishes how adopting a structured CSCMP can strengthen business continuity and support the development of crisis-resilient construction organisations in Malaysia. The next chapter applies this framework to analyse the empirical data collected for this study.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

Chapter 4 outlines the research methodology and design guiding this study. It explains how the research problem and objectives established in Chapter 1, and the theoretical foundations reviewed in Chapters 2 and 3, inform the chosen methodological approach. This chapter specifies the systematic procedures used to conduct the study, including the research design, population, sampling strategy, instrumentation, data collection methods, and issues of validity and reliability. Collectively, these components articulate how the study connects its conceptual foundations to its empirical inquiry, thereby ensuring coherence, methodological robustness, and alignment with the overarching research aim. This study adopted the methodological structure presented by Saunders, Lewis and Thornhill (2023) as it integrates philosophical assumptions, theory development approaches, research strategies, and data collection techniques within a coherent framework. Its widespread use in management research ensures methodological credibility and provides a robust foundation for aligning research questions, methods, and analytical procedures.

4.2 The Research Philosophy

Research philosophy, or philosophy as applied to research, deals with what constitutes reality for a research project, the role of the researcher, how the researcher goes about the research, and how they make sense of it all to develop new knowledge (Hoda, 2024). On the other hand, Saunders, Lewis & Thornhill (2023) explain about the philosophical underpinnings of business and management where research philosophy refers to a system of beliefs and assumptions about the development of knowledge in particular field by addressing a specific problem in a particular organisation, nonetheless, developing new knowledge. According to Burrell & Morgan (1979), researcher has made a series of assumptions at every stage of the research. These include assumptions about the realities you encounter in your research (ontological assumptions), about human knowledge (epistemological assumptions), and about the

extent and ways your own values influence your research process (axiological assumptions). These assumptions inevitably shape how researcher understand the research questions, the methods used and how researcher interpret the findings (methodology assumptions). A well-thought-out and consistent set of assumptions will constitute a credible research philosophy, which will underpin the methodological choice, research strategies, data collection techniques and analysis procedures used for the research (Saunders, Lewis, & Thornhill, 2023). Hence, it is important to be aware of the philosophical choice of the research strategy because the significant impact does not only focus on what should be done but also to understand what should be investigated (Saunders, Lewis, & Thornhill, 2023).

Moreover, Sekaran and Bougie (2016) mentioned that there is a notion that describes something as a truth that is subjective which is constructed in the minds. Therefore, these existing body of knowledge suggest that all research is based on the beliefs about the world as well as what can be possibly discovered in research considering that different researchers tend to have different ideas about certain issues. To further comprehend, Saunders, Lewis & Thornhill (2023) encourage researcher to reflect on own beliefs and assumptions in relation to the five philosophies and the research design (Figure 4.1) that researcher will engage to undertake the research.

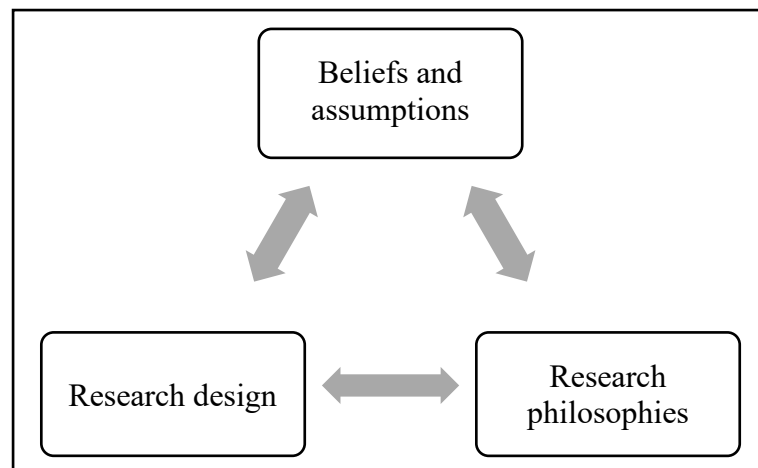


Figure 4.1 Reflection of Beliefs, Philosophies and Research Design

The invisible layers of the whole process for the current research must be carefully considered to ensure that coherence and comprehension can be achieved in serving the purpose of the present study. The layers will be considered one by one before a research design can be determined based on a thorough examination of the research

philosophy, approach, and methodological choice. “The research philosophy you adopt contains important assumptions about the way in which you view the world” whereby this implies that the most common mistake performed by researchers is prematurely determining the data collection techniques and analysis procedures prior to the thorough examination (Saunders, Lewis, & Thornhill, 2023)

To contextualise the methodological choices made in this study, the Saunders Research Onion Model is used as a guiding framework. First introduced in 2007 and subsequently refined in 2011, 2019 and 2023, the model reflects the evolving nature of research methodology and the dynamic development of knowledge. The present study adopts the 2023 version, which provides the most contemporary and comprehensive structure for designing and articulating methodological decisions (Saunders, Lewis & Thornhill, 2023).

The model conceptualises research design as a series of layers, progressing from broad philosophical assumptions to specific techniques and procedures. These six layers explain research philosophy, approach, methodological choice, strategy, time horizon, and data collection techniques that help researchers navigate from high-level conceptual decisions to practical methodological actions. The value of the research onion lies in its ability to organise these decisions systematically and illustrate how each stage informs the next.

Figure 4.2 depicts the model, and each layer is examined in detail in the following sections to justify the methodological assumptions and design adopted for this study.

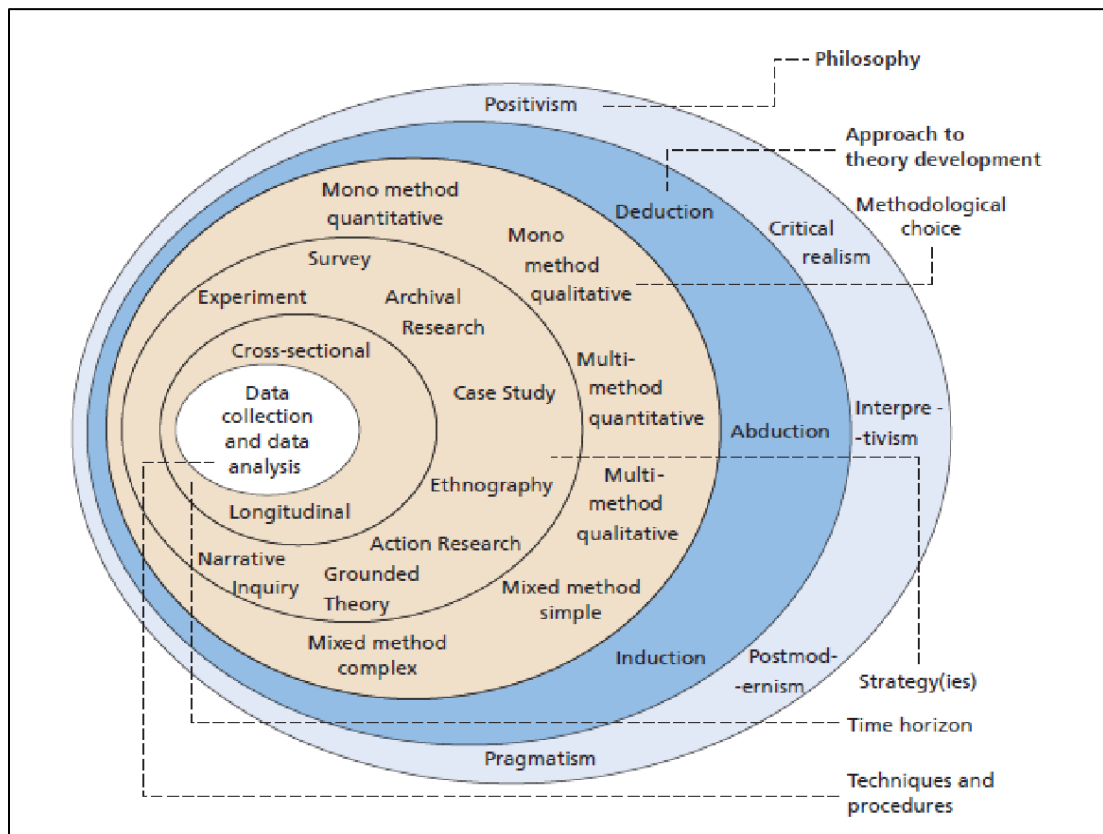


Figure 4.2 The Saunders Research Onion, 2023

4.2.1 Philosophical Stance

From Figure 4.2, the outermost layer of the research onion concerns the philosophical assumptions that underpin a study's understanding of reality and knowledge. Whether explicitly stated or implicitly held, these assumptions shape how a researcher views the world, selects methods, interprets data, and evaluates evidence. This layer encompasses three fundamental assumptions (Saunders, Lewis, & Thornhill, 2023).

i. Ontological assumptions

Assumptions regarding the reality faced in the research or what makes something a reality, and how a researcher can understand existence. In other words, it refers to what sort of things exist in the social world and assumptions about the form and nature of that social reality.

ii. Epistemological assumptions

Epistemology refers to assumptions about knowledge, what constitute acceptable, valid and legitimate knowledge and how people can communicate knowledge to others also it is about how one can attain it.

iii. Axiological assumptions

Axiology is about the nature of values and ethics in the research process. According to Saunders et al. (2016), it is an aspect of human behaviour that flourishing values during the research process. These are assumptions about the level of influence of the researcher's values on the research process or what is essential and valuable in the research.

On another note, the three type of assumptions must be able to distinguish between two opposite extremes namely objectivism and subjectivism. Objectivism incorporates the assumptions of the natural science and normally means that different people can observe the same phenomenon and agree on what it is. This is why science is objective. While subjectivism holds that our existence does not have identity until someone perceives it. For a subjectivist, a particular statement can be true for one person and false for another, based solely on one's mental choices, subjective processing, or emotions.

Saunders, Lewis & Thornhill (2023) highlight five main management philosophies in business and management: positivism, critical realism, interpretivism, postmodernism and pragmatism. Table 4.1 illustrates the comparison of the five philosophies.

Table 4.1

Comparison of Five Research Philosophical Position (Saunders et al., 2019)

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical Methods
Positivism – Explains what we see			
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically quantitative method of analysis, but a range of data can be analysed
Critical realism – Explains what we see and experience			
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanism	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retrodictive, in-depth historically situated analysis of pre-existing structures and emerging agency Range of methods and data types to fit subject matter
Interpretivism – Explain the meanings about the reality created by human			
Complex, rich Socially constructed through culture and language Multiple meanings interpretations, realities Flux of processes, experience, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researcher is part of what is researched, subjective Researcher interpretation key to contribution Researcher reflexive	Typically inductive Small samples, in-depth investigation, qualitative methods of analysis but a range of data can be interpreted
Postmodernism – It seeks to challenge the existing school of thoughts and highlight the marginalised views			
Nominal Complex, rich Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	Truth and knowledge are shaped by dominant ideologies, with emphasis placed on uncovering silenced or marginalised meanings and exposing power relations in order to challenge dominant viewpoints	Value-constituted research Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically reflexive	Typically, deconstructive – reading texts and realities against themselves in-depth investigations of anomalies, silences and absences Range of data types, typically qualitative method of analysis

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical Methods
Pragmatism – It seeks to improve by the application of concepts			
Complex, rich, external ‘Reality’ is the practical consequences of ideas Flux or processes, experiences and practices	Knowledge is valued for its practical usefulness, with ‘truth’ defined by what works to solve problems and guide effective action.	Value-driven research Research initiated and sustained by researcher’s doubts and beliefs Researcher reflexive	whether qualitative, quantitative, mixed, or action-based—are chosen to address research problem and questions, with emphasis on practical solutions & outcomes.

The *Positivism* assumes that reality is objective and measurable, focusing on observable facts and law-like generalisations. While useful for studies relying on empirical measurement, positivism alone is insufficient for this research because crisis management and organisational resilience involve human judgement, organisational behaviour, and contextual interpretations.

Critical *realism*, which recognises that observable events are shaped by deeper underlying structures, offers partial relevance. It aligns with the study’s interest in understanding how real organisations experience external shocks; however, it still limits the flexibility needed to explore varied organisational responses.

Interpretivism highlights that social realities are constructed through human experience and meaning making. This is relevant because crisis response strategies in construction organisations depend heavily on leadership perceptions, decision-making patterns, and contextual interpretation. However, interpretivism alone does not fully support the study’s aim to produce practical, actionable outcomes.

Postmodernism, with its focus on language, power, and deconstruction, does not align with the objectives of this study and is therefore not adopted.

Given the applied nature of the research that aimed at developing a practical Construction Sector Crisis Management Plan (CSCMP), the most suitable stance is *pragmatism*. Pragmatism begins with the research problem and prioritises approaches that generate useful, practice-oriented solutions. It allows the researcher to draw on multiple philosophical positions and employ mixed or complementary methods when appropriate.

Accordingly, this study adopts a pragmatic philosophical position, supported by expert insights from professionals in the built environment with experience in crisis and

recovery management. Pragmatism also accommodates methodological triangulation, used in one of the research objectives to enhance the credibility of findings.

In line with this stance, the research takes an ontological position leaning toward subjectivism, recognising that crisis responses and organisational resilience are shaped by human interpretation, contextual dynamics, and organisational culture. This aligns with the study's purpose of identifying elements, processes, and strategic actions that organisations use when responding to crises.

Pragmatism, therefore, provides the most appropriate foundation for addressing the research questions and developing a sector-specific crisis management framework, as summarised in Table 4.2.

Table 4.2
Research Questions and the Adopted Philosophical Position

Research Questions	Ontology	Epistemology	Axiology
What are the vulnerable areas within construction organizations that are most affected during a crisis?	Knowledge was drawn from an enquiry of reports from existing social phenomena. Subjectivism was used	Identifying the disruptions of crisis on the construction organisation, data drawn from existing reports and analysed using Interpretivist qualitative content analysis	This study was not independent of the researcher, thus, Value-laden
What crisis management strategies have construction organizations adopted in managing a crisis?	Knowledge is derived from existing social phenomena. Subjectivism was applied	The study was conducted with the assumption that the reality is as a result of human mind, data collection was from stakeholders' opinion. Thus, an Interpretivist approach was applied.	The study was not independent of the researcher thus Value-laden
How can a Construction Sector Crisis Management Plan (CSCMP) be developed and validated?	Knowledge is derived from existing social phenomena. Subjectivism was applied	Data were collected through qualitative literature and validated through expert's opinion survey; thus, an Interpretive approach were applied	The study was not independent of the researcher at the initial knowledge drawing stage, thus Value-laden
How does the implementation of a CSCMP influence business continuity in construction organizations during and after a crisis?	The knowledge is derived from both existing social phenomena and with the assumption that knowledge can be drawn from outside the social phenomena, therefore	The study seeks to identify the measures for managing crisis. To identify the measures, data were collected through evidence-focused reviews and experts' opinions survey using the mixed method. A Pragmatists research approach was applied.	The researcher experience and opinion were required at the initial stage of drawing knowledge but not required at the knowledge validation stage. The study was not independent of the initial knowledge drawing stage, thus Value-laden . but at the knowledge validation stage, the study became

Research Questions	Ontology	Epistemology	Axiology
	<i>Objectivism</i> applies.		independent of the researcher knowledge and experience thus <i>Value-free</i>

Table 4.2 demonstrates that the study's four research questions are grounded primarily in a subjectivist ontological stance, reflecting the view that crisis experiences and organisational vulnerabilities are socially constructed and best understood through human interpretations. Correspondingly, the study adopts an interpretivist epistemology for the first three research questions, drawing knowledge from existing reports, qualitative literature, and stakeholder perspectives to explore disruptions, strategies, and the development of the CSCMP. These phases are value-laden, acknowledging the influence of the researcher's judgement during early knowledge construction.

For the fourth research question, which examines the influence of the CSCMP on business continuity, the study incorporates elements of objectivism and applies a pragmatist epistemology, combining evidence-based reviews with expert validation using a mixed-method approach. While researcher values inform the initial conceptual development, the validation stage becomes more value-free, relying on external expert assessment.

Overall, the table shows that the study adopts a flexible philosophical orientation, moving between interpretivism and pragmatism to address different research needs, consistent with an abductive and problem-driven methodological stance. Therefore, this study adopts a pragmatic philosophical stance because it prioritises practical solutions, accommodates mixed methods, and aligns with the objective of developing a context-specific, industry-focused CSCMP for the Malaysian construction sector.

4.2.2 Research Approach to Theory Development

Saunders, Lewis & Thornhill (2023) then identify three approaches to theory development. A deductive approach begins with existing theories and uses them to guide the research design and data collection. An inductive approach, in contrast, starts with data to explore a phenomenon and build or refine concepts or frameworks. A third

option, the abductive approach, involves moving back and forth between data and theory to identify patterns, develop explanations, and refine emerging ideas.

For the purpose of this study, existing crisis management theories and models provide an initial foundation for understanding the phenomenon and shaping the conceptual framework. However, because the research also seeks to explore lived organisational experiences and generate insights specific to the Malaysian construction sector, it does not strictly adopt a deductive or inductive stance. Instead, the study follows an abductive approach, allowing the researcher to engage with existing theory while iteratively refining understanding based on data from industry experts. This approach supports both theoretical grounding and the discovery of context-specific insights needed for developing the proposed CSCMP. Accordingly, this study employs an abductive approach, enabling iterative movement between existing crisis management theories and empirical insights from Malaysian construction practitioners, which is essential for developing and refining the CSCMP framework.

4.2.3 Methodological Choice of the Research

The third layer of Saunders' Onion elaborates on research design that is generally will plan on how the study will go about answering the research questions. the first methodological choice is whether to follow quantitative, qualitative or mixed methods research design. Saunders, Lewis & Thornhill (2023) conclude each of these options is likely to call for a different mix of elements to achieve coherence in the research design. There are six methodological approaches suggested by Saunders et al., (2019) which described as follows: (1) Mono Method Quantitative, (2) Multi-method Quantitative, (3) Mono Method Qualitative, (4) Multi-method Qualitative, (5) Mixed Method Simple, and (6) Mix Method Complex as shown in Figure 4.3.

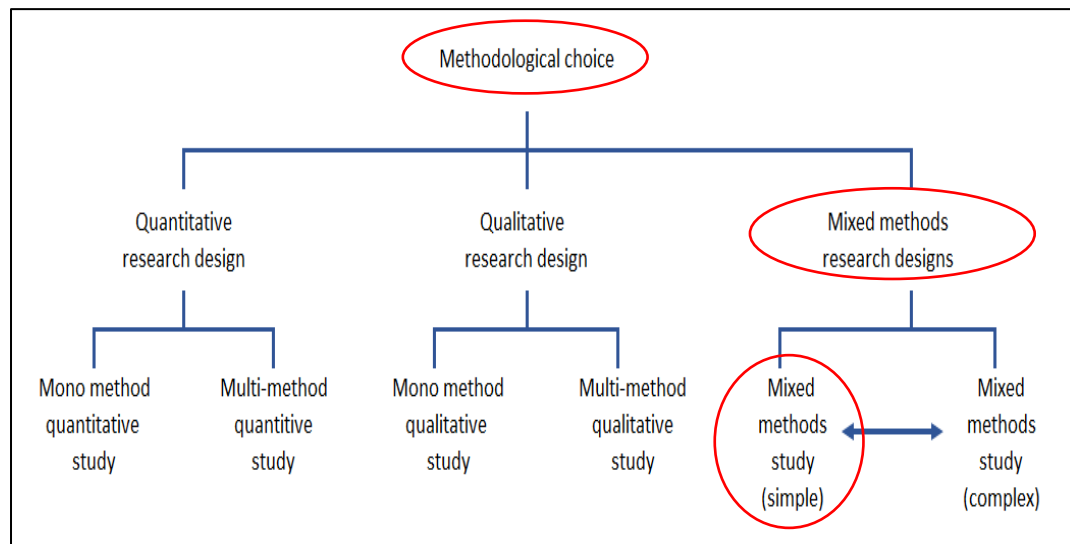


Figure 4.3 Methodological Choice by Saunders et al (2023)

One way to differentiate quantitative research from qualitative research is to distinguish between numeric data (numbers) and non-numeric data (words, images, audio recordings, video clips and other similar material) (Saunders, Lewis, & Thornhill, 2023). However, in reality, many business and management research designs are likely to combine quantitative and qualitative elements due to some reasons such as when there is a situation where a research design may be using questionnaire (quantitative method) but it requires the respondent to answer ‘open’ questions in their own words rather than ticking the appropriate box. Equally, some qualitative research data may be used to inform the design of subsequent questionnaire. In this way, quantitative and qualitative research may be viewed as two ends of a continuum, which in practice are often mixed. Therefore, mixed methods research designs are the branch of multiple methods research that integrates the use of quantitative and qualitative data collection techniques and analytical procedures in the same research project. From this broader perspective, mixed method research designs were adopted in this research through its associations to the philosophy assumptions and approaches to theory development and strategies where philosophical positions that are often associated with mixed methods research designs are pragmatism and critical realism. For this reason, a sequential exploratory mixed-methods design was selected for this study, beginning with qualitative exploration to identify crisis vulnerabilities and followed by quantitative validation to ensure generalisability and robustness of the proposed CSCMP.

4.2.4 Research Purpose and Strategy

Next Layer four of the Saunders Research Onion concerns research strategy which need to be aligned with the research purpose. The purpose of this research is inherently exploratory, descriptive, and evaluative, and this combination directly informs the use of a sequential mixed-methods strategy. The exploratory dimension is essential for identifying crisis vulnerabilities and understanding how Malaysian construction organisations experience and respond to disruptions, hence the initial phase of qualitative inquiry through semi-structured interviews. The descriptive purpose supports the need to develop an accurate profile of crisis impacts, affected groups, and existing organisational practices, which is achieved through the second-phase quantitative survey that extends and validates the qualitative findings. Finally, the evaluative purpose aligns with assessing the effectiveness of existing crisis management strategies and the feasibility of the proposed CSCMP, addressed through the third-phase expert review interviews. Integrating these three research purposes therefore justifies and strengthens the sequential exploratory mixed-methods design, ensuring sufficient depth, validation, and practical relevance in the development of a context-specific crisis management framework for the construction sector (Saunders, Lewis, & Thornhill, 2023). Hence, a sequential research strategy was adopted, progressing from exploratory interviews to descriptive survey analysis and concluding with evaluative expert validation to ensure that the CSCMP is both theoretically grounded and practically feasible.

4.2.5 Time Horizon

The second last layer of the Saunders Research Onion concerns the time horizon, which defines how the research is structured over time. A cross-sectional time horizon examines a phenomenon at a single point in time, typically using surveys or interviews, whereas a longitudinal design involves collecting data over an extended period to track changes (Saunders, Lewis, & Thornhill, 2023).

For this study, a cross-sectional approach was adopted because the research needed to collect data within a limited timeframe and capture perspectives from a broad group of participants. Cross-sectional designs are also appropriate when the aim is to obtain a representative snapshot of current practices, which can provide valid and

relevant insights without requiring long-term data collection (Greener, 2008). Given the study's objectives and practical constraints, the cross-sectional time horizon was the most suitable choice. A cross-sectional time horizon was therefore chosen because the study required capturing stakeholder perspectives within a specific period, rather than examining changes over extended time frames.

4.2.6 Techniques and Procedures

The final layer of the Research Onion concerns the techniques and procedures used to collect and analyse data. In line with the study's sequential exploratory mixed-methods design, qualitative and quantitative techniques were applied at different stages of the research. Semi-structured interviews were used to explore initial themes, followed by a questionnaire survey to validate and generalise the findings, and finally expert interviews to refine the proposed framework. This combination of methods enhances depth, triangulation, and credibility, and is consistent with the recognition that mixed-methods research offers complementary strengths and supports more robust conclusions (Molina-Azorín, 2017) (Saunders, Lewis, & Thornhill, 2023).

Having outlined the techniques and procedures associated with mixed-method research, Table 4.3 presents the specific rationale for adopting a mixed-methods design in this study. The reasons demonstrate how mixed methods support the aims of the research by enabling deeper exploration, methodological triangulation, greater generalisability, and enhanced confidence in the findings. These justifications align directly with the sequential exploratory design employed in this study, where qualitative insights guide the development of quantitative instruments and are later validated through expert review. Therefore, Table 4.3 reinforces why mixed methods are the most appropriate techniques and procedures for addressing the research questions and achieving methodological robustness.

Table 4.3
Reason for Using A Mixed Methods Research Design

Reason	Explanation
Initiation	Initial use of the mixed methods is to define the nature and scope and also used to provide contextual background and to better understanding the research problem. It also helps in the formulation of research questions, interview and questionnaire questions as well as selection of samples
Facilitation	During the research, one method may lead to the discovery of new insights which inform and are followed up through the use of other method
Complementary	Use of mixed methods may allow meanings and findings to be elaborated, enhanced, clarified, confirmed, illustrated or linked
Interpretation	One method e.g. qualitative used to help to explain relationships between variables emerging from the other e.g. quantitative
Generalisability	Helps to establish generalisability and credibility of the study or to produce more complete knowledge
Diversity	Allow for a greater diversity of views to inform and be reflected in the study
Problem solving	Helps the initial method reveals unexplainable results or insufficient data
Focus	Asist to focus on one attribute by one method e.g. qualitative on macro aspect while quantitative for micro aspects
Triangulation	Used to combine data to ascertain if the findings from one method mutually corroborate the findings from other method
Confidence	Use a single method will make it impossible to ascertain the nature of that effect. It is advisable to use mixed method which lead to greater confidence in research conclusion

On Building on this, Jose F. Molina-Azorin (2017) highlights that mixed methods have evolved into a distinct and well-established methodological approach across social science disciplines, including organisational research. Accordingly, the adoption of a mixed-methods design in this study is both appropriate and necessary to address the complexity of crisis management within the construction sector.

This research integrates qualitative interviews, quantitative surveys, and expert validation to enable methodological triangulation, thereby enhancing the credibility, robustness, and practical relevance of the findings. Such integration ensures that the proposed Construction Sector Crisis Management Plan (CSCMP) is grounded not only in theoretical foundations but also in industry realities.

To operationalise the pragmatic philosophy underpinning this study, this study adopts a mixed-methods sequential exploratory design, integrating qualitative and quantitative approaches to develop and validate the Construction Sector Crisis Management Plan (CSCMP). The rationale for adopting a mixed-methods approach is threefold:

- i. Exploratory depth – The qualitative phase enables an in-depth understanding of crisis experiences, vulnerabilities, and organisational practices within the construction sector.
- ii. Empirical validation – The quantitative phase statistically tests and validates findings derived from the qualitative stage.
- iii. Triangulation – The integration of multiple methods enhances the robustness, credibility and reliability of the findings.

In addition to mixed methods, this research incorporates multi-method techniques, including document analysis, semi-structured interviews, pilot study, questionnaire survey, and expert validation.

These methods are structured into five sequential phases, where each phase builds upon the findings of the previous stage. The qualitative phase informs theory development and variable identification, while the quantitative phase provides empirical validation. The final phase involves expert validation and verification to ensure the applicability and robustness of the CSCMP framework.

The detailed explanation of each phase and its associated methods is presented in the following sections.

4.3 Empirical Research Design & Methodological Approach

The empirical design for this study draws upon established methodological approaches used in previous crisis-related and organisational resilience research. The instruments and procedures adopted here were adapted and refined from prior studies to ensure methodological relevance, credibility, and alignment with the aims of this research. As shown in Table 4.4, numerous reputable studies within the fields of crisis management, crisis leadership, strategic planning, and comparative crisis analysis have employed mixed-methods designs, combining qualitative and quantitative techniques to strengthen the depth, validity, and applicability of findings.

Table 4.4
Previous Research With Similar Research Approach

Author	Title	Research Method	Year
Rudolph & Repenning	An over-accumulation of interruptions (crisis or crisis-like events) can shift an org. system from resiliency to fragility.	Mixed methods Personal Interview (qualitative) and survey (quantitative)	2002
Allan L. Schoenberg	What it Means to Lead During a Crisis: An Exploratory Examination of Crisis Leadership	Mixed Methods Personal Interview (qualitative) and survey (quantitative)	2004
Jose' F. Molina-Azorí'n	Mixed Methods In Strategy Research: Applications And Implications In The Resource-Based View	Mixed methods Personal Interview (qualitative) and survey (quantitative)	2007
Karam M. Ghazi	The Impact of Strategic Planning on Crisis Management Styles in the 5-	Mixed Methods Personal Interview (qualitative) and survey (quantitative)	2017
Ian Greener	Comparing country risk and response to COVID-19 in the first 6 months across 25 Organisation for Economic Co-operation and Development countries using qualitative comparative analysis	Mixed Methods fuzzy-set (qualitative) comparative analysis and macro-comparative (quantitative)	2021
Andrea Radlovacki	Crisis Communication in the Time of Corona: a comparative analysis of Danish and Swedish public news narratives	Mixed Methods case study (qualitative) and content analysis (quantitative-identify the count of occurrence)	2021
Mohammad Basheer & Kunhui Ye	A mixed-method investigation of the root causes of construction project delays in Afghanistan	Mixed Methods Open-ended Interview (qualitative) and survey (quantitative)	2025

The reviewed studies show a consistent reliance on mixed-methods designs, suggesting a well-established methodological pattern within crisis and resilience research, and reinforcing the suitability of this approach for the present study. While the studies in Table 4.4 demonstrate a consistent use of mixed-methods approaches in crisis and resilience research, the present study extends this body of work by incorporating an industry-based expert validation phase and by developing a sector-specific CSCMP tailored to the Malaysian construction industry, an area that remains underexplored in previous research.

4.3.1 Population and Sample Size

a) Population

A population refers to the complete set of individuals, organisations, or entities sharing common characteristics relevant to a research inquiry (Bryman, 2021; Saunders et al., 2023). In social and organisational research, it is rarely feasible to study an entire population due to constraints of time, cost, and accessibility. As such, researchers must determine an appropriate sample and sampling strategy to ensure that the selected respondents adequately represent the wider population (Sekaran & Bougie, 2019; Creswell & Creswell, 2018). Careful specification of the population and sampling frame is essential to enhance the relevance, accuracy, and credibility of the findings.

In this study, the population comprises construction organisations operating within the Malaysian construction sector, with specific attention to those experiencing external crises such as the Covid-19 pandemic. As part of Stage 1 exploratory data collection, the study first sought to identify which segment of the industry players of contractors, consultants, or clients was most affected by crisis events and strategies adapted during crises. Preliminary exploratory interviews were therefore conducted with key regulatory and professional bodies, namely CIDB, RISM and JKR, to develop a grounded understanding of sector-wide impact patterns.

Based on these engagements, the most affected group of contractors and consultants were identified and subsequently selected as the targeted population for Stage 2 of the study. This ensured that the sample captured individuals with direct operational and managerial experience in crisis response and resilience building, consistent with purposive and criterion-based sampling logic (Palinkas et al., 2015).

The study focuses on Klang Valley, primarily Selangor and Kuala Lumpur because the region accounts for the highest concentration of construction activity in Malaysia. Recent CIDB statistics show that Selangor contributes approximately 24–25% of national construction output, while Kuala Lumpur contributes around 14–16%, making the region the most representative and relevant location for studying crisis impacts and organisational response strategies (CIDB, 2021; DOSM, 2023). Concentrating data collection in Klang Valley therefore maximises the relevance and applicability of findings to high-activity construction environments.

In addition to construction bodies, two high-performing non-construction organisations, PETRONAS and the Employees Provident Fund (EPF) were included in the initial qualitative round. Their inclusion serves a strategic purpose: both organisations are recognised for their successful crisis and continuity management practices and thus provide benchmark insights for resilience strategies applicable to construction. Their perspectives were not treated as part of the construction population but rather as reference organisations that contribute expert knowledge to strengthen the development of the CSCMP.

Overall, this sampling approach ensures that the selected respondents offer a credible and contextually grounded representation of construction organisations most exposed to crisis conditions, thereby strengthening the validity and transferability of the study's conclusions.

b) Sampling Frame and Size

A sampling frame refers to the complete list of units from which a sample is drawn, and it plays a critical role in ensuring that relevant and accurate information is obtained (Cresswell, 2018) (Saunders, Lewis, & Thornhill, 2023). It represents the full set of population elements that meet the study's inclusion criteria and from which the actual sample is generated (Saunders, Lewis, & Thornhill, 2023). An effective sampling frame must be comprehensive, current, non-duplicated, and should contain sufficient information to allow appropriate stratification and selection of respondents. These criteria are essential for securing a representative and unbiased sample (Howell, 2010; Bryman, 2021).

Sekaran and Bougie (2016) emphasise that sampling is necessary because collecting data from an entire population is often impractical, time-consuming, and increases the likelihood of fatigue and error, whereas selecting a well-defined sample can produce reliable and meaningful results. Creswell (2018) similarly notes that decisions on sample size should consider significance levels, acceptable sampling error, and confidence intervals. Guided by these principles, this study adopts a 95% confidence level and a 5% significance threshold ($p < 0.05$), which aligns with common practice in social science research (Sekaran & Bougie, 2016) by ensuring that the sample size and statistical analysis are designed to minimise sampling error and allow conclusions to be drawn with acceptable precision. The selected sample size is

calculated to reflect the target population with a 95% probability of accuracy, while the use of $p < 0.05$ ensures that any findings reported as significant have less than a 5% likelihood of occurring by chance. Adopting these conventional thresholds ensures that the selected sample provides reliable and sufficiently accurate reflections of the target population. Based on these considerations, the sampling for this research includes:

- i. Stage 1 employs exploratory semi structured interviews with representatives from CIDB, RISM, JKR, PETRONAS and EPF because these organisations offer sector-wide, high-level, and experience-based insights essential for defining the scope of crisis management issues in the Malaysian construction industry.
 - a. CIDB represents the regulatory and policy perspective for contractors. As the national authority overseeing construction standards, capability development, and industry performance, CIDB provides critical insights into sector vulnerabilities, systemic challenges, and external shocks affecting contractors nationwide.
 - b. RISM represents consultants, particularly the quantity surveying and cost-management professions. Their perspective is important for understanding how crises impact project pricing, contract administration, risk allocation, and financial resilience across construction projects.
 - c. JKR serves as the largest public-sector client and project owner. JKR's view reflects how crisis events affect government-led projects, procurement, governance requirements, and continuity of essential infrastructure works.
 - d. PETRONAS and EPF, although not construction companies, were deliberately included as reference organisations due to their proven track records in successfully managing major crises. PETRONAS contributes lessons on corporate resilience, crisis leadership, and high-risk operations, while EPF provides perspectives on organisational continuity, governance, and long-term recovery strategies. Their inclusion strengthens the study by offering benchmark practices that can be adapted to the construction sector.

Collectively, these institutions represent the full ecosystem of the Malaysian built environment including regulators, consultants, clients, and crisis-resilient

organisations making them suitable for identifying the most affected groups and refining the direction of the subsequent research phases.

- ii. Stage 2: Based on the outcomes of Stage 1 exploratory interviews, the contractor and consultant groups were identified as the most significantly affected and most directly involved in crisis response within the Malaysian construction sector. Therefore, Stage 2 of the study employed a targeted questionnaire survey focusing on these two groups to generate broader empirical evidence to validate and extend the qualitative findings.
 - a. For the contractor group, a total of 97 organisations were selected from the CIDB directory (retrieved on 12 May 2022), specifically comprising G7 contractors with 4&5 star ratings and project values exceeding RM10 million. This group was chosen because G7 contractors are typically responsible for large-scale, complex projects that carry substantial operational, financial, and contractual risks. Organization with 4&5 star ratings also demonstrate strong organisational systems and compliance performance, making them suitable for examining structured crisis management and resilience practices. The project value threshold ensures inclusion of contractors with significant exposure to disruption, while the 2017–2022 project window captures organisations directly affected by major external shocks such as Covid-19 and supply chain interruptions. Collectively, these criteria establish a relevant and credible sampling frame for investigating crisis preparedness within high-risk, high-capacity construction organisations.
 - b. A total population of 659 consultants was identified through the official registries of BQSM (n=257 QS consultants), BEM (n=112 engineering consultants), and PAM (n=290 architectural consultants), retrieved between May and July 2022. These three disciplines were selected because consultants play a central role in project decision-making, risk identification, cost control, design management and contract administration and all of which are highly affected during crisis conditions. Their perspectives are therefore essential for understanding systemic impacts and organisational responses during external shocks. Although the total population comprised 659 consultants, 200 were approached to ensure a manageable, realistic, and

time-bound sampling strategy. This number also reflects: (i) the need to target only active firms; (ii) constraints related to timeline, accessibility and response feasibility; and (iii) the requirement to achieve an adequate sample to meet confidence levels for exploratory and descriptive analysis in a mixed-methods study. Furthermore, experts in Stage 1 confirmed that consultants, together with G7 contractors were among the most impacted groups during Covid-19 pandemic, supporting their inclusion as a priority respondent group for Stage 2.

- iii. Stage 3: This stage aims to validate the study findings and the proposed CSCMP framework using a small group of experts through a brief validation survey and semi-structured interviews. Purposive sampling is used to select participants with relevant experience, consisting of participants from the earlier sample pool in stage 2 and developers who work directly with the specific group in stage 2. Key developers, as the project owner are included because they engage with the consultants and contractors on actual project delivery and therefore offer practical, ground-level insights into operational risks, coordination issues, and crisis responses that cannot be captured solely from high-level experts. This combination provides a balanced perspective for assessing the framework's relevance and applicability. A total of 12 experts has been selected, comprising 7 experts from the earlier pool and 5 from developer organisations.

In terms of sampling frame and size for qualitative research, according to Rahimi (2024) interviews should be conducted until saturated point is reached or when there is no longer gaining new insights. Suresh et al., (2024) and Wutich (2024) point out that 6 or 10 members of face-to-face interviews should be sufficient. Hence, this research seems to fill the entire above connotation in terms of saturation point, sample size and total number of experts for Round 1 and Round 3 of data collection. While for quantitative research, according to Sekaran (2010) and Ahmed (2024), the rule of thumb for determining sample size is larger than 30 and less than 500 are appropriate for most research. Waris et al., (2014) and Ayalp (2025) emphasized that a response rate in the region of 20% to 30% was considered acceptable as the feedback from the construction industry.

c) Sampling Technique

There are two basic types of sampling technique or design which are probability and non-probability sampling. In the case of probability sampling, every unit of the population has some known, non-zero chance or the probability of being selected as a sample subject. In addition, it is used when the representativeness of the sample is important for generalizations. On the other hand, non-probability sampling refers to the elements of the population that do not have a known or predetermined chance of being selected as subjects whereby is used when time or other factors are more important than generalizability (Sekaran & Bougie, 2016; Bryman, 2021). The sampling procedure is vital to assure the validity of the data collection as well as an illustration of the population that represents generalised results on the whole population (Saunders, Lewis, & Thornhill, 2023). Figure 4.5 visualizes the sampling technique applied in this research, a heterogeneous purposive sampling strategy, a form of non-probability sampling, was deemed most appropriate.

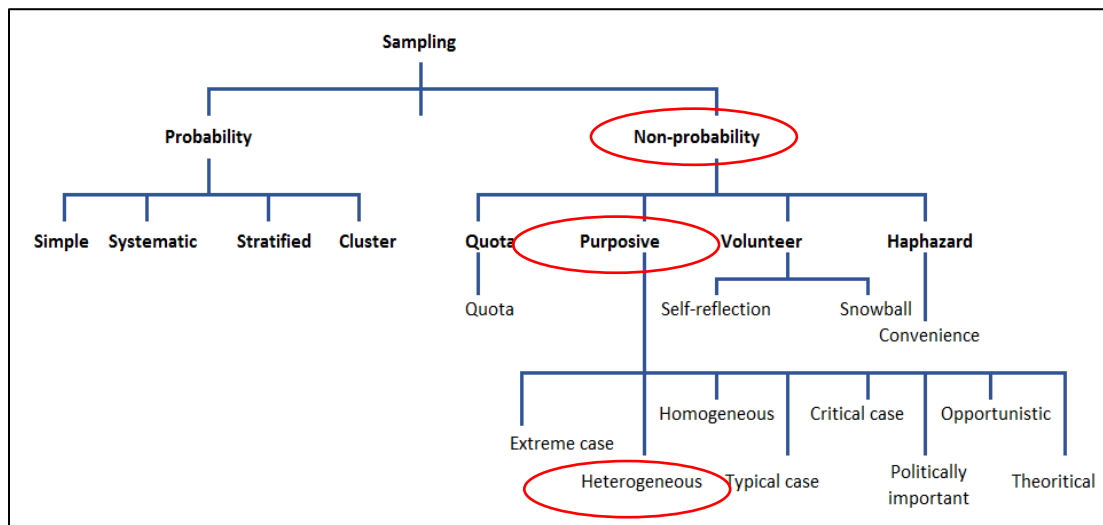


Figure 4.4 Sampling Technique by Saunders et al (2023)

This technique enables the deliberate selection of participants based on their substantive experience with crisis events (before, during, and after crises) within the construction sector. Such purposive selection is instrumental in eliciting rich, relevant insights and identifying key thematic patterns aligned with the research aims. The questionnaire survey is therefore directed towards respondents with direct crisis-related experience to ensure the relevance and applicability of the data generated. The targeted

sampling frame comprises construction organisations identified following the completion of the Stage 1 interviews. In total, 297 organisations were engaged, consisting of 97 contractors and 200 consultants.

4.3.2 Data Collection Procedures

Data collection refers to the systematic process of preparing for, obtaining, and organising data relevant to a research inquiry (Sekaran & Bougie, 2016). In this study, data collection was implemented through four sequential procedures: (1) a review of the literature, (2) a Preliminary Study involving exploratory interviews and document analysis, (3) a questionnaire survey, and (4) validation of the proposed research framework through expert panel review. Each of these phases is discussed in turn.

The first stage of data collection involved an extensive review of the literature. As noted by Creswell & Creswell (2023) and Saunders, Lewis & Thornhill (2023) the literature review constitutes an integral component of research design and may account for as much as half of the total research effort. In the context of this study, the literature review served to identify and synthesise knowledge concerning external crises affecting the construction sector, including organisational vulnerabilities, response strategies adopted by construction organisations, and the challenges encountered in crisis management. Particular attention was given to previous studies within the construction domain to ensure contextual relevance.

Furthermore, the literature review examined a range of existing Crisis Management Models (CMM), from which key factors were extracted to support the development of a conceptual framework tailored to CSCMP. This conceptual framework integrates the critical factors to influence CSCMP and its associated outcomes.

Following the completion of the literature review and the formulation of the initial conceptual framework, a Preliminary Study was conducted to further inform and refine the research approach. Figure 4.6 summarise the Research Flow (Techniques selected).

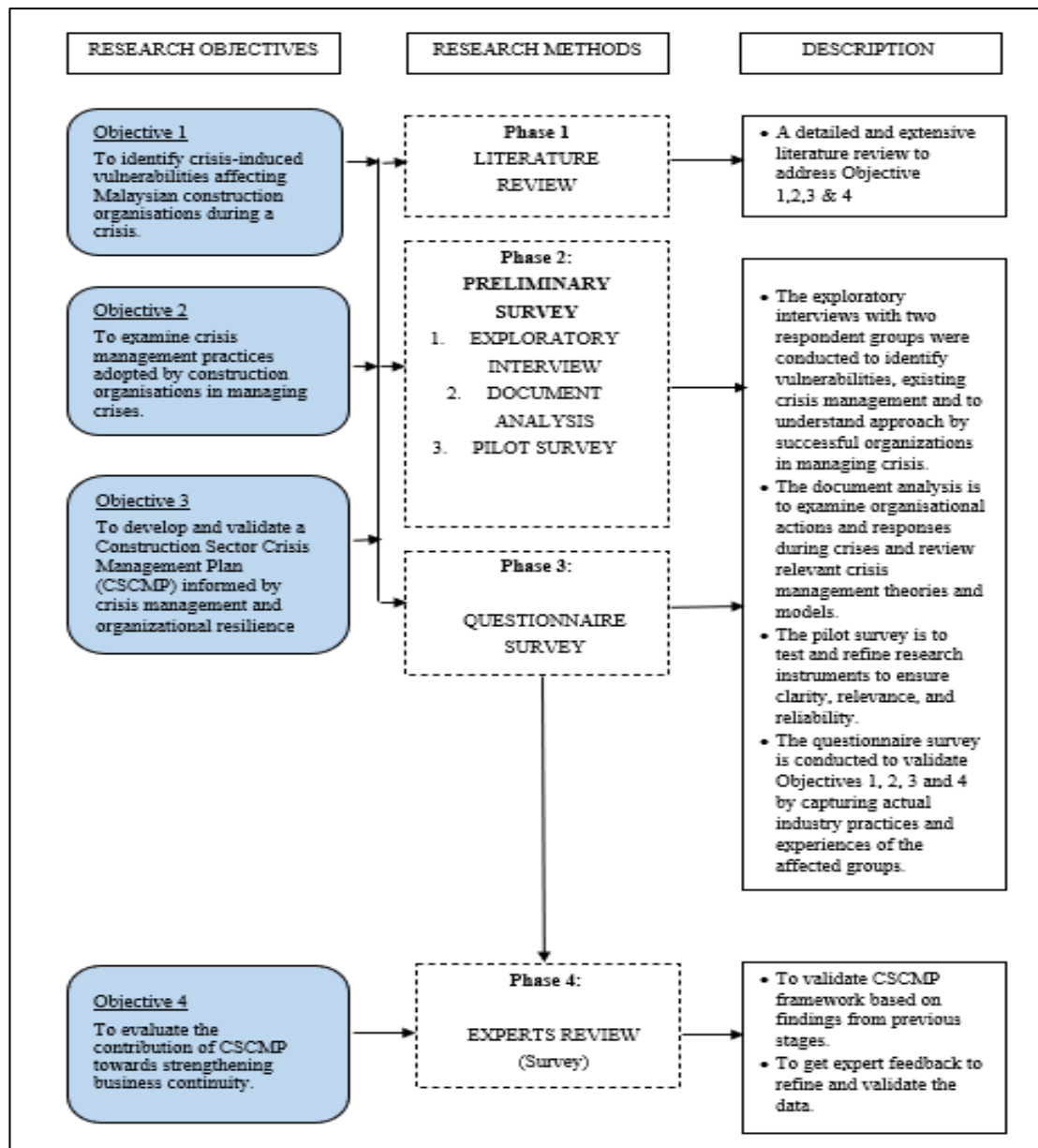


Figure 4.5 Research Flow

4.3.2.1 Phase 1: Literature Review

According to Chua (2020), the literature review constitutes a fundamental component of the research process. It enables researchers to examine and evaluate prior studies in order to derive insights that inform their own investigations. Once the research topic has been identified, the researcher systematically reviews literature related to similar themes. Through this process, valuable information such as theoretical foundations, research designs, instruments, procedures, data collection methods, and empirical findings is obtained from the existing body of knowledge. The primary purpose of the literature review is to position the current study within an established

scientific context, ensuring alignment with existing scholarship while contributing new insights to the field.

Creswell (2023) outlines three key roles of a literature review in a research project. The first is the preliminary search, which helps researchers refine research ideas and develop the research proposal. The second is the critical review, which provides the conceptual and theoretical framework guiding the study. The third role is to situate research findings within the broader academic discourse, typically forming part of the discussion chapter. Guided by these functions, the present study initiated its literature review at an early stage, focusing on crises, their impacts, organisational response strategies, crisis management theories, and challenges in implementing such responses. The review process continued iteratively, evolving throughout the duration of the research, an approach often described as an upward spiral culminating in the final synthesis.

As part of this review, various existing crisis management and strategic management models were examined, and relevant elements were extracted to support the development of a conceptual framework for a CSCMP tailored to construction organisations. This framework incorporates a range of factors believed to influence CSCMP development and its associated outcomes. Following the completion of the literature review and the establishment of the conceptual framework, an initial Preliminary Study was undertaken to further refine and validate the emerging research direction. The literature review focuses on theoretical and conceptual development by examining existing academic studies including journal articles, books and academic studies focusing on concept, theories, models and research gaps.

4.3.2.2 Phase 2: Preliminary Survey (Exploratory Interviews, Document Analysis and Pilot Survey)

The preliminary study represents a critical phase of the research, aimed at refining the research design, strengthening the development of research instruments, and establishing a comprehensive contextual understanding of crisis management practices within the Malaysian construction sector. This phase integrates three complementary components: exploratory interviews, document analysis, and pilot study. Each component contributes to enhancing the reliability, validity, and robustness of the subsequent data collection and analysis stages.

Unlike the literature review, which primarily focuses on theoretical development, the preliminary study emphasises empirical and contextual exploration of real-world practices. It enables the identification of industry-specific issues, validation of conceptual variables, and refinement of measurement instruments prior to large-scale data collection.

i) Exploratory Interviews

Exploratory semi-structured interviews were undertaken as the first component of Phase 2. These interviews involved representatives from key professional bodies, government agencies, and major organisations overseeing and engaging with construction activities in Malaysia. Specifically, participants were drawn from CIDB, JKR, RISM, PETRONAS, and the Employees Provident Fund (EPF). Their inclusion provided insights not only from regulatory and professional perspectives but also from large organisations with substantial exposure to construction project risks. It provides rich, contextual insights and supports theoretical development.

Semi-structured interviews are well-suited for exploratory research, as they help researchers understand what is occurring, uncover contextual issues, and identify emerging patterns (Saunders et al., 2020). Within mixed methods designs, such interviews also play a pivotal role in informing subsequent quantitative instrument development. Accordingly, the interviews in this study helped refine and validate variables identified in the literature review, particularly those relating to the most affected construction stakeholders, organisational vulnerabilities, and crisis management strategies.

The interview data were analysed using cross-tabulation to identify key themes and patterns. These interviews were conducted between January until May 2022 in the Klang Valley. The findings informed the development of the questionnaire items and provided early insights into crisis preparedness, response capabilities, and resilience maturity within Malaysian construction organisations. The preliminary study concluded that Malaysian construction organisations generally exhibit fragmented levels of crisis preparedness, rely predominantly on reactive rather than proactive crisis management approaches, and demonstrate inconsistencies in the documentation and institutionalisation of crisis procedures. Nevertheless, the findings also highlighted that stakeholders may draw valuable lessons from the practices of PETRONAS and EPF,

both of which have established more mature and structured crisis management systems and have demonstrated notable success in navigating past crises.

ii) Document Analysis

The second component of the preliminary study involved document analysis, which provided additional empirical evidence to complement and triangulate the findings from the exploratory interviews.

Document analysis in this study is distinct from the literature review phase. While the literature review focuses on theoretical and conceptual development, document analysis involves the systematic examination of empirical and industry-based records to identify real-world patterns of crisis impact and organisational response.

This method enabled the researcher to analyse trends, contextual influences, and recurring issues associated with major crisis events in Malaysia, particularly within the construction sector, while also allowing comparison with international contexts.

The documents reviewed include, annual financial and industry reports, publications from international organisations such as the International Labour Organization (ILO), United Nations (UN), and World Health Organization (WHO), Petronas and EPF, national statistics from Department of Statistics Malaysia (DOSM), reports from the World Bank, policy documents and crisis management guidelines as well as existing crisis management models.

These sources were selected based on their relevance, credibility, and ability to provide comprehensive insights into crisis impacts and organisational responses. Document analysis provides contextual and theoretical grounding, ensuring that subsequent data collection instruments are aligned with real industry issues.

The analysis focused on identifying, patterns of disruption across crises, vulnerable areas within construction organisations, response strategies adopted at both organisational and national levels. Insights derived from document analysis reinforced and validated the findings from the exploratory interviews, thereby strengthening the overall methodological triangulation. Additionally, the results contributed to the refinement of key variables and constructs used in the development of the questionnaire instrument. Document analysis involves the systematic review of empirical and industry-based records to understand real-world crisis impacts and organisational

responses through review conducted on reports, policies, industry data and organization documents which focusing on what actually happened during crisis.

iii) Pilot Study

Following the exploratory interviews and document analysis, a pilot study was conducted to refine and validate the research instruments prior to full-scale data collection. The pilot study was undertaken after the exploratory interviews to ensure that the questionnaire items were informed by empirical findings and reflected actual industry practices. This sequential approach strengthens the relevance and applicability of the survey instrument. The pilot involved a small group of construction industry practitioners with relevant experience in crisis management. The objectives of the pilot study were to assess the clarity and comprehensibility of questionnaire items, evaluate the structure and sequencing of questions, identify ambiguous or redundant items, ensure alignment between research variables and measurement items

Feedback obtained from the pilot study was systematically reviewed and incorporated into the final questionnaire design. This process enhanced the content validity, reliability, and overall quality of the instrument, ensuring that it was suitable for large-scale data collection in Phase 3.

4.3.2.3 Phase 3: Questionnaire Survey

Following the identification of the target respondent groups and the consolidation of crisis management practices drawn from Phase 2, the researcher proceeded to develop a structured questionnaire to examine and validate the variables underpinning the proposed research framework. The questionnaire survey represents one of the most widely used methods of data collection within survey-based research due to its efficiency in obtaining standardised information from a large respondent population (Saunders, Lewis, & Thornhill, 2023). A questionnaire is typically defined as a structured set of questions designed to capture information on specific variables based on respondents' perceptions, experiences, and opinions (Creswell & Creswell, 2023).

In this study, the questionnaire was developed to measure both objective and subjective assessments related to crisis vulnerabilities, organisational practices, and

crisis management processes within Malaysian construction organisations. The questionnaire consisted primarily of closed-ended questions, using predefined response options to ensure consistency, comparability, and suitability for statistical analysis. Careful standardisation of question wording and sequencing was undertaken to enhance clarity, minimise respondent interpretation bias, and support the reliability of the resulting dataset.

The design of the questionnaire was informed by the literature review and the findings of the exploratory interviews. In particular, the conceptual relationships between independent variables, dependent variables, and moderating variables identified in earlier phases were used to guide the operationalisation of constructs. Establishing these theoretical linkages prior to instrument development ensured that each question aligned with the research objectives and supported the testing of the proposed Crisis Management Plan (CMP) framework. The final questionnaire consisted of five sections:

Section A – Respondent Demographics:

This section captured demographic and professional information, including administrative role, management position, academic qualifications, areas of discipline, and years of experience in the construction industry.

Section B – Issues and Vulnerable Areas during Crises:

This section listed out the main issues fall under nine vulnerable areas affected during crises.

Section C – Existing Strategies:

This section covers existing strategies at the government level (macro) and industry level (micro). It also aims to get respondents feedback regarding organizations' crisis preparedness.

Section D – The proposed CSCMP:

This section details the proposed framework of CSCMP which covers the five steps; prepare, prevent, response, recovery and redesign.

Section E – Ensuring Business Continuity:

This section describes the determination of proposed CSCMP in ensuring business continuity.

A full copy of the questionnaire is provided in **Appendix 2**.

i) Rating Scales

The questionnaire employed rating scales, primarily Likert-type scales to measure respondents' perceptions of crisis-related variables. These scales were developed based on validated instruments reported in prior crisis management and organisational resilience literature and were adapted to fit the contextual requirements of the current study. This ensured both content validity and the ability to perform rigorous statistical analyses on the collected data.

The questionnaire survey was administered to CIDB G7 contractors and construction consultants, including engineers, architects, and quantity surveyors. The selection of these respondent groups was intentional and justified based on their critical roles within the construction industry. G7 contractors are typically involved in large-scale, high-value projects and are therefore highly exposed to operational, financial, and contractual risks during crisis situations. In contrast, consultants contribute professional, technical, and strategic perspectives, particularly in areas such as design, cost management, risk allocation, and project governance. The inclusion of both groups ensures a comprehensive representation of industry stakeholders, capturing both execution-level and decision-making insights.

The primary purpose of the questionnaire survey was to validate the findings derived from the qualitative phase, particularly in relation to identified vulnerabilities, existing crisis management practices, and proposed CSCMP components. In addition, the survey enables the measurement of relationships between key variables through statistical analysis, thereby providing empirical support for the study. Ultimately, the survey serves to test the effectiveness and applicability of the proposed CSCMP framework in enhancing organisational resilience and supporting business continuity within the Malaysian construction sector.

4.3.2.4 Phase 4: Data Analysis of Questionnaire

Data analysis for this research was conducted using the Statistical Package for the Social Sciences (SPSS) Version 29, a widely utilised analytical tool in construction management and social science research. SPSS was selected for its ability to efficiently manage structured survey data and perform both descriptive and inferential statistical procedures with high reliability. Recent studies reaffirm the tool's relevance in construction research, particularly for quantitative validation and performance modelling (e.g., Amadosi & Olamilokun, 2023). The analytical process for this study comprised two main stages:

a. Descriptive Analysis

Descriptive statistics, including frequency distributions, mean scores, and standard deviations that were used to summarise respondents' perceptions of crisis impacts, organisational vulnerabilities, and crisis response strategies. For example, the mean score for disruptions in technical and planning functions was 4.31, indicating a high level of severity. Additionally, 72% of respondents agreed that the proposed CSCMP contributes positively to business continuity outcomes.

b. Inferential Analysis

Inferential tests, including correlation analyses, were conducted to examine the relationships between the implementation of the CSCMP and key indicators of organisational continuity and resilience. The results demonstrated statistically significant relationships ($p < 0.05$), thereby supporting the proposition that structured crisis management enhances organisational recovery and resilience capacities.

The overall analytical approach aligns with recommendations by Tayefeh Hashemi et al. (2020), who emphasise the importance of statistical modelling in validating frameworks and predicting performance outcomes in high-risk construction environments. The use of SPSS therefore ensured that the empirical findings of this study were rigorously tested and substantiated through appropriate quantitative techniques.

4.3.2.5 Phase 5: Expert Review (Validation Process)

The fifth phase involved an expert review to validate the proposed CSCMP framework. Expert validation is an established technique in qualitative and applied research, enabling assessment of a model's clarity, relevance, and practical suitability within its intended context (Saunders et al., 2023). It strengthens the credibility and real-world applicability of frameworks developed for complex environments such as the construction sector.

Consistent with recent methodological approaches in construction research, for instance, Singla and Phadtare (2025) and Zang et al. (2025), who used expert input to refine qualitative findings and strengthen framework accuracy. This study engaged 12 senior professionals from the Malaysian construction industry. The experts evaluated the CSCMP framework across nine dimensions using a five-point Likert scale.

4.3.2.6 Phase 6: Report Findings

The sixth phase involved the synthesis and structured reporting of findings generated from the literature review, exploratory interviews, questionnaire survey, and expert validation exercises. This phase aimed to integrate evidence from multiple data sources into a coherent narrative that informs the development and assessment of the Construction Sector Crisis Management Plan (CSCMP).

Recent construction management literature highlights the importance of systematic reporting to enhance transparency, reproducibility, and industry relevance. Mazher et al. (2025) emphasise that structured reporting is essential for benchmarking emerging practices and supporting the translation of research evidence into actionable frameworks. The integration of qualitative and quantitative insights has become an increasingly important trend in construction studies, enabling more comprehensive and contextually grounded outcomes.

In line with these methodological expectations, the reporting process in this study incorporated the following components:

i. Triangulation of Data:

Findings from the exploratory interviews were cross-examined with quantitative survey results and expert review feedback to ensure consistency, credibility, and methodological robustness.

ii. Framework Validation:

A panel of 12 senior construction professionals evaluated the CSCMP framework across nine dimensions using a five-point Likert scale.

Structured reporting of the research outcomes aligns with established best practices, where clarity, empirical grounding, and practical relevance are prioritised. As noted by Karunasena et al. (2025), effective reporting not only contributes to academic understanding but also facilitates the translation of research outputs into operational strategies for industry stakeholders.

In conclusion, the report findings phase served as a critical bridge between data analysis and practical implementation, ensuring that the CSCMP framework is both theoretically rigorous and operationally viable within the Malaysian construction context.

4.3.3 Data Collection and Data Analysis Procedures

This study employed a mixed-methods sequential exploratory design, in which qualitative findings were used to inform the development of the quantitative instrument, followed by statistical analysis to validate the proposed framework. Accordingly, data collection and analysis in this study were conducted in a structured and sequential manner, aligned with the mixed-methods sequential exploratory design. Each stage of data collection informed the subsequent phase, ensuring coherence and methodological rigour throughout the research process.

4.3.3.1 Literature Review

The study began with an extensive review of academic literature, industry reports, and crisis management models to establish the theoretical foundation and identify key variables related to crisis management, organisational vulnerabilities, and business continuity.

4.3.3.2 Qualitative Data Analysis Procedure – Exploratory Interviews

Qualitative data obtained from the semi-structured interviews were analysed using an interpretive thematic analysis approach, following the procedures recommended by Creswell and Creswell (2023). This approach was selected as it allows for an in-depth exploration of participants' experiences, perceptions, and meanings related to crisis management and organisational resilience.

Semi-structured interviews were conducted with selected experts from CIDB, JKR, RISM, PETRONAS, and EPF. These interviews aimed to explore crisis experiences, identify vulnerable areas, and understand existing crisis management practices. The findings were used to refine research constructs and support instrument development.

All interviews were audio-recorded and transcribed verbatim to preserve the accuracy and richness of participants' views. The researcher then engaged in a process of familiarisation, whereby each transcript was read repeatedly to gain an overall understanding of the data and to identify preliminary patterns. During this stage, reflective notes were recorded to capture frequently mentioned issues such as material price escalation, labour shortages, organisational preparedness, supply chain disruptions, and crisis-related operational challenges. This familiarisation process provided the foundation for systematic coding and subsequent theme development.

A three-stage coding procedure was then applied to analyse the interview data.

(i) Open Coding

In the first stage, the transcripts were examined line-by-line to identify significant statements and meaningful units of data. Initial codes were assigned to capture key ideas expressed by the respondents, including financial disruptions,

contract-related challenges, supply chain delays, governance gaps, workforce constraints, and organisational learning practices. This stage ensured that the analysis remained closely grounded in participants' own words and experiences.

(ii) Axial Coding

The second stage involved grouping related codes into broader thematic categories by identifying relationships and patterns among them. For example, codes such as labour shortages, foreign worker dependency, and movement restrictions were consolidated under the theme Labour Vulnerability, while material price escalation and import delays were grouped under Supply Chain Disruption. This process enabled the organisation of fragmented codes into meaningful and analytically coherent clusters.

(iii) Selective Coding

In the final stage, the themes were refined and integrated to ensure alignment with the research objectives and research questions (RQ1–RQ3), as well as the five phases of the proposed Construction Sector Crisis Management Plan (CSCMP). At this stage, the researcher interpreted how the themes reflected organisational vulnerabilities (RQ1), crisis response strategies and challenges (RQ2), and the validation and relevance of the CSCMP framework (RQ3). This selective coding process facilitated the development of a coherent analytical narrative that links the interview findings with the theoretical discussion presented in Chapters 2 and 3.

4.3.3.3 Document Analysis

Relevant documents, including industry reports, policy documents, and publications from international organisations, were analysed to complement interview findings and identify patterns of crisis impacts and organisational responses. This step enhanced contextual understanding and supported triangulation.

4.3.3.4 Quantitative Data Analysis Procedure

i. Pilot Survey

A pilot study was conducted with a small group of industry practitioners to test the clarity, structure, and reliability of the questionnaire. Feedback obtained was used to refine the instrument before full-scale distribution.

ii. Questionnaire Survey

The finalised questionnaire was distributed to CIDB G7 contractors and construction consultants to collect quantitative data for validation of the research framework and testing of relationships between variables.

Quantitative data collected through pilot survey and the questionnaire survey were analysed using IBM SPSS Statistics Version 29. The analysis followed a structured and sequential procedure, beginning with pilot testing and instrument refinement, followed by reliability and validity assessment, data screening, exploratory data analysis, and inferential testing.

Instrument reliability was assessed using Cronbach's Alpha to evaluate internal consistency, while face and content validity were ensured through expert review and alignment with established literature. Data screening procedures included checks for completeness, outliers, and distributional properties. Normality was assessed using skewness and kurtosis values, the Shapiro Wilk test, and visual inspection of histograms and Q-Q plots. As the data did not meet parametric assumptions, non-parametric statistical techniques were primarily adopted.

Descriptive statistics, including means and standard deviations, were used to summarise respondent characteristics and variable distributions. To examine differences between respondent groups, independent of samples T-tests were applied where appropriate. Additionally, Spearman's rank-order correlation was employed to examine the strength and direction of relationships among key variables, as it does not require normally distributed data and is robust to skewed distributions.

The quantitative analysis was conducted to identify patterns, relationships and group difference. The detailed results of the quantitative analyses are presented in Chapter 6.

Findings from both qualitative and quantitative analyses were integrated to ensure methodological triangulation. The qualitative phase provided exploratory insights and informed framework development, while the quantitative phase validated the findings through empirical testing.

This integrated approach enhances the reliability, validity, and robustness of the proposed CSCMP framework and ensures that it reflects both theoretical understanding and practical industry realities.

4.4 Research Ethics

This study was conducted in accordance with established ethical research standards. Ethical approval was obtained from Universiti Teknologi MARA (UiTM) on 17 November 2021 prior to the commencement of data collection (Approval letter from UiTM Research Ethics Committee is attached under **Appendix 4**). All participants were informed of the purpose and scope of the study before their participation. Informed consent was obtained from all respondents, and participation was entirely voluntary. Respondents were assured that their identities and responses would remain confidential and anonymous, and that the data collected would be used solely for academic purposes.

In addition, participants were given the right to withdraw from the study at any stage without any consequence. All data were securely stored and handled in compliance with institutional guidelines to ensure the protection of participants' information.

4.5 Instrument Development

The development of research instruments in this study followed a systematic and iterative process to ensure alignment with the research objectives, conceptual framework, and empirical context. Both the interview protocol and questionnaire instrument were developed based on multiple sources, including literature review, document analysis, and findings from the preliminary exploratory phase.

a) Development of Interview Questions

The semi-structured interview questions were developed based on key themes identified from the literature review and supported by insights from document analysis. These themes include crisis impacts, organisational vulnerabilities, crisis management practices, and business continuity strategies.

In addition, relevant industry reports and policy documents analysed during the document analysis phase provided contextual grounding, ensuring that the questions reflect real-world crisis scenarios within the Malaysian construction sector.

The interview protocol was designed to explore participants' experiences during crises, identify key vulnerabilities and challenges, understand organisational response strategies and capture insights on effective crisis management practices

The semi-structured format allowed flexibility for probing and clarification, enabling deeper exploration of emerging themes.

b) Development of Questionnaire Instrument

The questionnaire instrument was developed through a systematic multi-stage process to ensure its validity, reliability, and alignment with the research objectives. Initially, the draft questionnaire items were derived from multiple sources, including the literature review, document analysis, and findings from the exploratory interviews. The literature review provided the theoretical constructs and variables, while document analysis contributed insights into industry practices and crisis impacts. In addition, the exploratory interviews offered empirical evidence, ensuring that the items reflected real-world experiences within the Malaysian construction sector.

Subsequently, the identified variables from the qualitative phase were operationalised into measurable items. Each question was carefully aligned with the research objectives and the conceptual framework to ensure consistency and relevance. Following this, a pilot study was conducted with selected industry practitioners to evaluate the clarity, wording, and relevance of the questionnaire items, as well as the overall structure and logical flow of the instrument. Feedback obtained from the pilot study was systematically reviewed and incorporated to refine and improve the questionnaire.

Finally, the questionnaire was finalised and structured into several sections, covering respondent demographics, vulnerabilities during crises, existing crisis management strategies, the proposed CSCMP framework, and business continuity. This structured development process ensured that the instrument was both theoretically grounded and practically relevant for the subsequent data collection phase.

c) **Validity and Reliability of the Instrument**

Several measures were undertaken to ensure the validity and reliability of the research instruments. Content validity was established by aligning the questionnaire items with insights derived from the literature review, document analysis, and expert input, ensuring that the instrument adequately captured the key constructs of the study. Construct validity was achieved by systematically linking each questionnaire item to clearly defined variables derived from the conceptual framework, thereby ensuring consistency between the research objectives and measurement items. In addition, pilot testing was conducted to enhance the clarity, relevance, and overall internal consistency of the instrument through refinement based on respondent feedback. Finally, reliability analysis was performed using Cronbach's Alpha during the quantitative phase to assess the internal consistency of the measurement scales, ensuring that the instrument produced stable and reliable results.

4.6 Summary of Chapter

This chapter presented the research methodology adopted to examine crisis impacts, organisational vulnerabilities, and the development of a Construction Sector Crisis Management Plan (CSCMP) for the Malaysian construction industry. Guided by the Saunders Research Onion (Saunders, Lewis & Thornhill, 2023), the chapter articulated the philosophical foundations, research design, methodological choices, and data collection and analysis procedures underpinning the study.

A pragmatic research philosophy was adopted, reflecting the study's emphasis on generating practical, context-specific solutions while integrating both qualitative insights and quantitative evidence. An abductive approach to theory development was employed, enabling iterative movement between existing crisis management literature and emerging empirical findings.

The study utilised a sequential exploratory mixed-methods design, supported by a multi-method approach. The research was structured into six phases. Phase 1 involved a comprehensive literature review to establish theoretical foundations and identify key constructs. Phase 2 comprised a preliminary study integrating exploratory interviews, document analysis, and pilot testing to develop and refine research instruments and contextual understanding. Phase 3 involved the development and administration of a structured questionnaire targeting contractors and consultants in the Klang Valley, enabling quantitative validation of crisis impacts, strategies, and organisational responses. Phase 4 focused on data analysis using SPSS, incorporating both descriptive and inferential statistical techniques. Phase 5 involved expert validation and verification of the proposed CSCMP framework to ensure its relevance, robustness, and practical applicability. Finally, Phase 6 synthesised findings through triangulation across qualitative and quantitative data sources, providing integrated evidence base for evaluating and finalising the CSCMP framework.

The chapter also detailed the systematic development of research instruments, including the design, pilot testing, and validation of both interview and questionnaire tools. In addition, ethical considerations were addressed, with formal approval obtained from Universiti Teknologi MARA (UiTM) prior to data collection, ensuring adherence to established research ethics standards.

Overall, the methodological approach adopted in this study ensures a coherent, rigorous, and contextually grounded research design. The integration of qualitative exploration, quantitative validation, and expert assessment enhances the credibility, reliability, and applicability of the findings. This provides a strong foundation for the subsequent chapter, which presents the empirical results derived from the implementation of this methodology.

CHAPTER 5

QUALITATIVE ANALYSIS: EXPLORATORY INTERVIEWS AND DOCUMENT ANALYSIS

5.1 Introduction

This chapter presents the findings of the Preliminary Study, which involved exploratory interviews with two key respondent groups. The study aimed to examine the challenges and impacts experienced by Malaysian construction organisations during the Covid-19 pandemic, identify the organisational areas most vulnerable to external disruptions, and explore the crisis management strategies adopted along with the challenges faced in their implementation. The study also sought to identify resilient non-construction organisations, whose practices can serve as reference points for strengthening crisis preparedness in the construction sector. These findings form the basis for developing the proposed Construction Sector Crisis Management Plan (CSCMP) and guide the subsequent phases of this research. This Chapter provides the interview data in analytical tables and all the full original narrative are tabulated and appended under Appendix 3.

5.2 Findings of the Exploratory Interview

Semi-structured, face-to-face interviews were conducted to explore issues related to the Covid-19 crisis in the Malaysian construction industry (Segment A) and to assess the practices of resilient non-construction organisations during the same period (Segment B). Semi-structured interviews were selected for this phase because they allow respondents to express their views openly while providing enough structure to guide the discussion. As noted by Nordin (2015) and Creswell & Creswell (2023), such interviews are particularly suitable for eliciting participants' perspectives on complex, emotionally charged topics, enabling the researcher to capture depth, nuance, and authenticity in their accounts. Consistent with Cohen et al., (2018), the interview protocol incorporated a combination of structured and open-ended questions to balance comparability with exploratory insight.

Segment A comprised experts from key construction authorities, while Segment B included senior representatives from high-performing non-construction organisations that demonstrated strong resilience and business continuity during the pandemic. The interview instrument consisted of three sections: the first gathered background information about the experts; the second contained structured questions examining their understanding of Covid-19 impacts, historical crisis experiences, and vulnerable organisational areas; and the third explored the crisis management strategies implemented, the challenges encountered, and their recommendations for developing a comprehensive Crisis Management Plan (CMP). Sample interview questions are provided in Appendix 1, and the detailed narrative results are presented in Appendix 3. The expert profiles are summarised in Table 5.1.

5.2.1 Respondents' Background

To address the research questions concerning (i) the vulnerable areas within construction organisations and (ii) the crisis management strategies adopted during Covid-19, two respondent segments were engaged. Segment A contributes insights into crisis impacts and strategies within the construction sector, while Segment B provides lessons from resilient non-construction organisations that can inform the development of the CSCMP.

The selection of interview participants was guided by a purposive sampling strategy to ensure that respondents possessed relevant knowledge and direct experience in managing crisis situations within the construction sector. A total of five organisations were selected, representing key stakeholder groups within the industry, including regulatory bodies, professional institutions, public-sector clients, and organisations recognised for their strong crisis management practices.

The selection criteria were based on (i) the organisation's role within the construction ecosystem, (ii) its level of involvement in project delivery and crisis response, and (iii) its experience in managing disruptions such as the Covid-19 pandemic. Within each organisation, respondents were selected based on their managerial or decision-making roles, ensuring that they were directly involved in organisational planning, operations, or crisis management processes.

This approach ensures that the data collected reflects informed, experience-based perspectives across different segments of the industry, thereby enhancing the credibility and relevance of the qualitative findings.

a) Segment A – Experts from the Malaysian Construction Industry

For Segment A, senior representatives from key industry authorities were invited to share their perspectives on how the Covid-19 crisis affected construction organisations and project environments. Although five regulatory and professional bodies were initially approached JKR, CIDB, RISM, BEM, and PAM, and three (JKR, CIDB, and RISM) agreed to participate. As national regulators and policy influencers, these organisations provided essential insights into sector-wide disruptions, organisational vulnerabilities, and the adequacy of crisis responses. Their contribution directly informs the identification of affected areas and strategic gaps within the Malaysian construction sector.

Table 5.1
Segment A – Construction Authorities: Experts' Profile

No	Experts	Ref	Experience	Organization	Participation	
			Years		Yes	No
R1	General Director	E1	33	JKR	/	
R2	Senior Manager	E2	20	CIDB	/	
R3	Manager	E3	17	RISM	/	
Total Responds					3	

From Table 5.1, the experts identified are from top management levels including general director, senior manager and manager. All three experts possess more than 15 years of experience. This suggests that the data collected are appropriate as all experts are having more than 10 years in handling and experiencing construction projects and can be considered a highly experienced as suggested by Nordin (2015). Besides, all three experts are familiar with the issued at hand as suggested by Hamid (2014).

b) Segment B – Experts from Resilient Non-Construction Organizations

For Segment B involved experts from high-performing non-construction organisations recognised for their crisis resilience during Covid-19. Based on IPSOS Malaysia findings identifying PETRONAS and EPF among the top crisis-ready organisations, besides MacDonalds, Perodua and Maybank, both were approached to share their experience. These organisations agreed to participate and provided valuable perspectives on continuity planning, organisational agility, and strategic decision-making under crisis conditions. Their insights serve as benchmarks for strengthening crisis preparedness in the construction sector, complementing the findings from Segment A.

Table 5.2

Segment B – Resilient Non-Construction Organizations: Experts' Profile

No	Experts	Ref	Experience	Organization	Participation	
			Years		Yes	No
R1	Head	E4	25	PETRONAS	/	
R2	Manager	E5	16	EPF	/	
Total Responds					2	

From Table 5.2, the experts identified are from top management levels including Head of Respond and Crisis Management and Respond and manager of strategic management. Both experts have more than 15 years of experience. Their seniority and direct involvement in steering their organisations through the Covid-19 crisis ensure that the data gathered reflects informed, experience-based perspectives on organisational resilience and continuity practices.

5.2.2 Historical Crisis Experiences: Economic Crises 1998 and 2008

The experts under Segment A were first asked to reflect on the 1998 Asian Financial Crisis and the 2008 Global Financial Crisis to contextualise the sector's historical vulnerabilities. Although the nature, duration and triggers of these crises differed, respondents reported remarkably similar patterns of disruption, suggesting that the Malaysian construction sector faces deep-seated structural weaknesses. Their reflections further indicate that many vulnerabilities exposed during Covid-19 were not

unprecedented, but rather recurring issues that the industry has not effectively addressed over the past decades.

Across both crises, experts consistently described sharp contractions in public and private development expenditure, resulting in widespread project delays, re-tendering exercises and cancellations. This observation aligns with earlier studies demonstrating that Malaysia's construction sector remains highly sensitive to macroeconomic shocks and government fiscal policy shifts (Bakar et al., 2011; Zainul Abidin, 2015).

Material price volatility was also highlighted as a critical pressure point in both crises. Experts noted that fluctuations in steel, cement and imported materials created substantial uncertainty in project cost planning, echoing literature suggesting that the sector remains vulnerable to global commodity markets due to high import dependency (CIDB, 2019).

Labour-related impacts constituted another major theme. Respondents recalled widespread retrenchment, wage suppression and reduced hiring activities as organisations attempted to minimise operational costs. These narratives mirror findings by Awang and Rahman (2014), who reported that labour instability intensifies during economic downturns, particularly within construction due to its reliance on contract-based employment structures.

A critical insight mentioned across all respondents was the absence of structured crisis preparedness during both the 1998 and 2008 crises. Organisational responses were described as predominantly reactive, fragmented and dependent on external directives or government-led interventions. None of the organisations represented by the experts had Crisis Management Plans (CMPs) in place during those periods. This reinforces discussions in Chapter 2 that the Malaysian construction industry has historically lacked formalised resilience mechanisms, a gap repeatedly highlighted in studies such as ILO (2020), CIDB (2020), Salim (2020), and Kum and Yap (2024). These long-standing deficiencies continue to shape the sector's vulnerability during major disruptions.

Table 5.3 provides a thematic summary of these historical experiences. Detail of the experts' narrative responses are appended in Appendix 3.

Table 5.3

Section A – Thematic Summary of Historical Crisis Preparedness

Theme	Synthesised Finding	Evidence (Segment A)
Budget Cuts	Significant contraction in public and private sector projects	Delayed tenders, project cancellations, scope reductions
Material Escalation	Sharp increases in steel and imported materials	Severe cost uncertainty, re-estimation of budgets
Labour Impacts	Retrenchment and wage suppression across organisations	Staff reductions, hiring freezes
Weak Preparedness	Absence of structured crisis management systems	No CMP existed in 1998 or 2008; reactive responses

The experts' reflections on the 1998 and 2008 crises revealed recurring structural vulnerabilities within Malaysia's construction sector. Across both events, respondents highlighted significant project slowdowns, material price volatility, labour instability, and an absence of structured crisis preparedness. These patterns indicate that many challenges observed during Covid-19 were not new but part of a longstanding cycle of reactive crisis management. The findings reinforce the need for a comprehensive sector-wide Crisis Management Plan (CSCMP) to address persistent weaknesses.

5.2.3 Experience during Covid-19 Crisis

The experts highlighted Covid-19 as the most severe and complex crisis ever experienced by the Malaysian construction sector. Unlike previous financial crises that primarily affected economic demand, Covid-19 triggered simultaneous disruptions across labour, supply chains, governance, and business operations (Gamil & Alhagar, 2020), with profound personal, professional, and organisational consequences. The following subsections present a thematic synthesis of responses to the Covid-19 interview questions.

5.2.3.1 Personal and Professional Impacts

Segment A experts described Covid-19 as deeply disruptive both personally and professionally. Personally, respondents experienced heightened stress, anxiety, and uncertainty, driven by health risks, movement restrictions, and increased household

responsibilities (e.g., supporting children's online schooling). These findings reflect the broader literature emphasising the emotional and psychological strain on construction professionals during Covid-19 (ILO, 2021).

Professionally, experts reported substantial challenges adapting to remote work, digital communication, and new SOP requirements. Many construction processes remained highly physical and site-dependent, making the transition to digital platforms difficult. Respondents noted delays in decision-making, communication breakdowns, and reduced productivity. In contrast, Segment B experts reported smoother professional transitions due to pre-existing digital infrastructure, structured communication protocols, and established HR support systems. This highlights the moderating effect of organisational preparedness on professional disruption.

5.2.3.2 Impact and Business Challenges

Across Segment A, experts identified several major business challenges that significantly weakened the sector's operational and financial resilience:

- i. Severe supply chain disruptions, especially for imported materials
- ii. Escalating material prices, causing re-estimation and cashflow tension
- iii. Workforce shortages due to border closures, quarantine and SOP restrictions
- iv. Contractual disputes, including EOT claims, Variation Orders (VO), and cost-sharing disagreements
- v. Project suspensions and lack of new tenders, reducing the industry pipeline
- vi. Operational delays caused by SOP approvals, inspections, and staggered workforce systems
- vii. Administrative burden from compliance reporting and health screenings
- viii. Cashflow instability, particularly for SMEs, with some firms facing insolvency risks

These expert observations are consistent with sector reports and empirical studies documenting dramatic falls in construction activity, labour shortages, supply constraints, and liquidity problems during the pandemic. In 2020 the construction sector

in Malaysia experienced a large contraction in output and a sharp decline in on-site activity due to MCOs and related restrictions (CIDB, 2020).

Segment B organisations also faced challenges but were substantially buffered by stronger risk governance, diversified portfolios, early activation of business continuity mechanisms, and higher digital readiness as the core factors that reduced the depth and duration of disruption for those organisations. This benchmark behaviour (PETRONAS, EPF) has been documented in public crisis-management surveys (IPSOS, 2020)

Below is a consolidation of the main business challenges into nine vulnerable areas (mapped to your categories: finance & economic; organisation; labour; supply chain; contracts; communication; reputation; links to other industries; technical & planning). For each area summarise Segment A findings, Segment B findings, and the practical implication and tabulated in the analytical Table 5.4. Detailed of experts narrative is tabulated in Table 5.4 under Appendix 3.

Table 5.4
Challenges and Vulnerable Areas in the Malaysian Construction Sector Compared to Resilient Organizations

No	Vulnerable Area	Segment A Key Findings	Segment B Key Findings	Primary Implication
1	Finance & economic	Delayed payments, fewer tenders, SME insolvency risk	Reserves, liquidity planning, diversified revenue	Need sectoral payment protection & liquidity mechanisms (CIDB, 2020)
2	Organisation (governance)	No CMP/Business Continuity Plan (BCP); reactive decisions	ERM and BCP, crisis teams, scenario planning	Institutionalise crisis governance (CSCMP) (Petronas Global, 2021)
3	Labour	Heavy foreign worker dependency; absenteeism	Redeployment, cross-skilling, HR support	National/local workforce strategies required (CIDB, 2020)
4	Supply chain	Long lead times; imported M&E shortages	Supplier diversification; inventory buffers	Build supply-chain risk management & local sourcing (Gamil, 2020)
5	Contracts	EOT/VO disputes; force majeure ambiguity	Proactive contract management; clear policies	Standardise crisis clauses; faster dispute resolution
6	Communication	Fragmented client–contractor–regulator messaging	Centralised, transparent crisis communications	Formal communication protocols in CMP (IPSOS, 2020)
7	Reputation	Risk from delays, non-compliance	Maintained through proactive stakeholder engagement	Reputation strategy as part of continuity planning

No	Vulnerable Area	Segment A Key Findings	Segment B Key Findings	Primary Implication
8	Other industries (links)	Demand shock from other sectors; input shortages	Hedged via diversification	Cross-sector coordination & policy support (CIDB, 2020)
9	Technical & planning	Low digital maturity; limited contingency planning	High digital readiness; remote approvals	Invest in digital platforms & contingency modelling

From Table 5.4, analysis of the Covid-19 findings revealed nine overarching vulnerable areas that collectively weakened the Malaysian construction sector's ability to anticipate, absorb and recover from crisis impacts. Although Table 5.4 summarises the operational disruptions (labour, supply chain, cost escalation, delays, and productivity), the broader vulnerabilities extend beyond operational challenges and reflect deeper structural issues.

From Segment A, the vulnerabilities identified include:

- i. Financial fragility, driven by delayed payments, cost escalation and a sharp reduction in new projects;
- ii. Weak organisational preparedness, with most firms lacking CMPs or BCM structures;
- iii. Labour dependency, especially on foreign workers;
- iv. Fragile supply chain structures, heavily reliant on imported materials;
- v. Contractual ambiguity, which prolonged disputes and affected project relationships;
- vi. Fragmented communication, particularly with regard to SOP interpretation and stakeholder coordination;
- vii. Reputational risks, as delays and non-compliance affected client confidence;
- viii. Interdependence with other industries, where disruptions in manufacturing, logistics and transportation affected project continuity; and
- ix. Technical and planning limitations, including low digital readiness and weak scenario-based planning.

In contrast, Segment B organisations did not experience these vulnerabilities to the same extent. Their resilience was supported by established CMP and BCM frameworks, stronger liquidity positions, diversified supply strategies, clearer

communication channels and more advanced digital capabilities, enabling smoother operational continuity.

These differences indicate that the vulnerabilities observed in Segment A are systemic rather than crisis specific, many of which have persisted since the 1998 and 2008 crises. The findings provide strong justification for a sector wide CSCMP that addresses financial protection mechanisms, governance structures, supply chain resilience, digital transformation and improved dispute resolution and crisis communication.

In summary, although Table 5.4 captures the immediate operational disruptions, the Covid-19 interviews revealed nine deeper vulnerabilities in the construction sector covers financial fragility, weak crisis governance, labour dependency, supply chain fragility, contractual ambiguity, poor communication, reputational exposure, inter industry dependence and low digital readiness. Segment B organisations demonstrated stronger resilience across these areas, reinforcing the need for a structured CSCMP.

5.2.3.3 Existence of Crisis Management Plan

All Segment A experts confirmed that their organisations and the Malaysian construction organizations more broadly did not have formal CMPs frameworks following the 2008 financial crisis. Crisis responses remained largely reactive, relying on top down directives from government bodies or ad-hoc mitigation strategies. This absence of structured planning further exacerbated vulnerabilities during Covid-19, leading to operational paralysis and prolonged recovery periods.

Conversely, Segment B organisations had well established CMPs structures, allowing them to activate crisis governance immediately at the onset of the pandemic. This clear contrast underscores the critical need for a sector wide CSCMP for Malaysian construction. Therefore Table 5.5 shows the comparative analysis of interview for existence strategies.

Table 5.5
Comparative Analysis of Interview Responses on Existence CMP or Strategies

Thematic Focus	Segment A (Construction Sector)	Segment B (Resilient Organisations)
1. Personal Impact	High stress, uncertainty, family responsibilities, difficulty adapting to digital work.	Stress present but buffered by HR support, clear communication and strong digital readiness.
2. Professional Impact	Remote work challenges, communication breakdowns, slow digital adoption, reduced productivity.	Smooth transition due to established digital systems, crisis protocols and remote-working culture.
3. Main Business Challenges	Supply chain breakdowns, site shutdowns, SOP burdens, EOT/VO disputes, cashflow pressure, lack of new tenders.	Disruptions occurred but were manageable through diversified operations, stronger governance and early risk response.
4. Crisis Preparedness (CMP)	No CMP: responses reactive, fragmented and heavily reliant on government directives.	Formal CMP structures: crisis teams activated early with coordinated decision-making.
5. Organisational Learning & Key Lessons	Need for structured governance, digital capability enhancement, clearer communication channels and sector-wide coordination.	Importance of institutionalised resilience, scenario planning and continuous improvement.
6. Supply Chain & Market Exposure	High dependency on imported materials, vulnerable to cross-border disruptions.	Mitigated impact through diversified suppliers and inventory buffers.
7. Contractual & Legal Issues	Frequent disputes (EOT/VO); unclear risk allocation during crisis.	Proactive contract management; clearer internal escalation mechanisms.
8. Stakeholder Communication	Fragmented client, contractor regulator communication; SOP confusion.	Centralised communication protocols-maintained alignment and trust.
9. Strategic Resilience Capability	Lacked digital tools, scenario planning and continuity frameworks.	Strong CMP maturity enabling rapid adaptation and continuity.

From Table 5.4 and Table 5.5 above, the responses from Experts E1, E2 and E3 consistently indicate that no formal Crisis Management Plan (CMP) has been developed within the Malaysian construction sector since the 2008 financial crisis. Instead, construction organisations have continued to rely heavily on government directives and ad-hoc internal measures, with crisis responses centred predominantly on short-term cost rationalisation rather than structured preparedness. This observation aligns with the arguments established in Chapter 2, which identified persistent gaps in institutionalised crisis governance, risk structures and continuity planning within the sector (Gara & Zakaria, 2022). Although initiatives such as the Construction Industry Transformation

Programme (CITP, 2016) introduced elements of risk management and sustainability, these measures did not constitute a complete crisis management cycle and therefore did not address the preparedness deficits highlighted in earlier crises.

These findings also strengthen the research gap outlined in Chapter 3. The construction sector continues to face difficulties in anticipating, absorbing and recovering from crisis events due to fragmented risk ownership, low organisational resilience and the absence of a sector-wide crisis framework. The lack of CMPs across construction authorities empirically reinforces this gap and validates the need for a dedicated Construction Sector Crisis Management Plan (CSCMP).

In contrast, Experts E4 and E5 described mature, institutionalised crisis and continuity systems that have strengthened significantly since 2008. E4 integrates Enterprise Risk Management (ERM), Crisis Management (CM) and Business Continuity Management (BCM) into a unified resilience architecture supported by scenario planning, technical guidelines, cross-functional crisis teams and proactive health and safety protocols. E5 similarly embeds Operational Risk Management (ORM), ESG-aligned risk governance and Business Continuity Management (BCM), covering workforce readiness, infrastructure preparedness, and continuous evaluation. These governance features reflect the attributes of high crisis-readiness described in contemporary literature, including integrated risk systems, strong leadership, early-warning capability and institutionalised organisational learning (Kwak et al., 2021; Alharbi & Fernando, 2024).

The contrast between Segment A and Segment B reinforces the need for a structured, sector-specific CSCMP. To operationalise this comparison, Table 5.6 maps each expert's organisational actions and observations (E1–E5) to the proposed phases of the CSCMP developed in this research.

Table 5.6
Summary of Crisis Strategies Mapped to CSCMP Phases

Expert	Prepare	Prevent	Respond	Recover	Redesign
E1 (JKR)	X	X	✓	X	X
E2 (CIDB)	X	X	✓	X	X
E3 (RISM)	X	X	✓	X	X
E4 (PETRONAS)	✓	✓	✓	✓	✓
E5 (EPF)	✓	✓	✓	✓	✓

Table 5.6 illustrates a clear and systematic difference in crisis management practices between construction-sector experts (E1–E3) and resilient non-construction organisations (E4–E5). Experts from Segment A demonstrated actions concentrated almost exclusively in the Respond phase. This pattern reinforces earlier findings that the construction sector operates without structured CMP frameworks, resulting in reactive crisis behaviour, fragmented decision-making, and an absence of pre-crisis planning mechanisms.

In contrast, E4 and E5 (Segment B) activated measures across all five CSCMP phases of Prepare, Prevent, Respond, Recover, and Redesign. Their organisations demonstrated mature CMP integration, scenario planning, proactive health and safety management, and continuous evaluation, all of which align with the crisis governance principles discussed in Chapters 2 and 3. These findings echo resilience characteristics identified in the literature, where crisis-ready organisations adopt cyclical and iterative preparedness models supported by institutional learning, decentralised decision-making and strong leadership.

The contrast between E1–E3 and E4–E5 provides empirical validation for the core argument of this research: the Malaysian construction industry lacks a structured, sector-wide crisis management framework, whereas resilient organisations demonstrate formalised, tested and comprehensive systems that support crisis anticipation, absorption and recovery. This gap confirms the need for the CSCMP proposed in this study. The CSCMP is designed to address weaknesses identified across the nine vulnerable areas, strengthen governance and communication, and embed continuous learning into sector-wide practice.

The findings from Table 5.6 therefore complete the logic chain between Chapters 2, 3 and 5, linking theoretical gaps, empirical evidence, and the practical need for a construction-specific crisis management framework.

In summary, the Covid-19 findings reveal that while Table 5.4 and Table 5.5 capture the immediate operational disruptions, the deeper analysis shows nine structural vulnerabilities across financial, organisational, labour, supply chain, contractual, communication, inter-industry, reputational, and technical and planning dimensions. Segment A struggled across all nine areas, whereas Segment B organisations displayed stronger resilience due to institutionalised crisis governance, diversified resources, and higher digital maturity. This resilience gap confirms the core problem identified in Chapters 2 and 3 and provides empirical justification for the development of the

Construction Sector Crisis Management Plan (CSCMP) after conducting a synthesis illustrates in Table 5.6.

5.2.4 Proposed Steps for CMP and Business Continuity

The interview findings also sought to test the relevance, practicality and perceived adequacy of the proposed five-step Construction Sector Crisis Management Plan (CSCMP), comprising Prepare, Prevent, Respond, Recover, and Redesign, and their ability to enhance business performance and business continuity within the Malaysian construction sector. Table 5.7 summarises expert views (E1–E5) in relation to the proposed CSCMP phases and their implications for organisational resilience, and detail narrative of Table 5.7 is appended under Appendix 3.

Table 5.7

Experts Views on CSCMP and Business Continuity

Theme / Question	Segment A (E1–E3)	Segment B (E4–E5)	Emerging Insight / Interpretation
1. Relevance of the five-step CSCMP (Prepare, Prevent, Respond, Recover, Redesign)	Agree the framework is highly relevant; fills long-standing gaps; could have mitigated impacts of past crises (1998, 2008, Covid-19). Stress need for leadership and coordination.	Strong alignment with existing ERM–BCM systems; all five phases already institutionalised. Demonstrate maturity in crisis governance (scenario planning, crisis teams, digital readiness).	The CSCMP is validated by both segments. Segment A sees it as corrective; Segment B sees it as reflective of current best practice.
2. How organisations can build resilience and ensure business continuity	Shift from reactive responses to structured CMP needed; emphasise preparedness, capacity building and value-chain resilience.	Resilience seen as a cultural and organisational attribute supported by integrated systems, resources, digital capability and continuous improvement.	Segment B models industry best practice; Segment A identifies gaps requiring institutional reforms.
3. Applicability of CSCMP phases to real crisis situations	Mostly operate in Respond phase; rarely Prepare or Prevent; no structured approach for Recover or Redesign.	Actively operate across all five CSCMP phases; regular simulations, continuity plans and crisis learning cycles.	Confirms structural differences: reactive vs cyclical-proactive crisis management.
4. Effectiveness of CMP/BCP since 2008	No CMP/BCP implemented; reliance on government directives and ad hoc survival strategies.	Comprehensive ERM–BCM frameworks strengthened over time; multi-layered governance enables early warning and rapid response.	Reinforces research gap: construction lacks institutionalised crisis governance.

Theme / Question	Segment A (E1–E3)	Segment B (E4–E5)	Emerging Insight / Interpretation
5. Most affected stakeholders in crisis	Contractors and consultants most exposed due to labour, supply chain, cashflow and fee disruptions.	Same conclusion: contractors & consultants bear highest operational and financial impact.	Confirms cross-segment consensus on vulnerability of project delivery actors.

Across both segments, there is strong consensus that the proposed CSCMP phases are highly relevant, practical, and aligned with the real crisis challenges previously experienced by the sector. Segment A respondents (E1, E2, E3) emphasised that past crises including the 1998 Asian Financial Crisis, 2008 Global Financial Crisis, and Covid-19 were managed through reactive, ad hoc measures, mainly cost-cutting, retrenchments and project slowdown. The absence of formal crisis management structures, dedicated task forces, or cross-agency coordination meant that organisations were largely unprepared and heavily dependent on government intervention for survival. These observations affirm long-standing concerns documented in Chapter 2, where studies highlighted the sector’s fragmented preparedness, low organisational resilience and insufficient crisis governance capacity (Lai et al., 2014; Gamil et al., 2020; Bakar, 2020).

Segment A views also reinforce the need for the Prepare and Prevent phases of the CSCMP. Respondents agreed that had such structures existed earlier, the industry would have been better positioned to anticipate disruptions, implement safeguards, and reduce operational paralysis during crises. Their feedback therefore provides empirical confirmation of the gaps previously identified in Chapter 3 regarding the sector’s inability to anticipate, absorb and recover from crises due to weak governance, poor risk structures, and a lack of formal continuity planning.

In contrast, Segment B respondents (E4, E5) provided detailed accounts of mature and institutionalised crisis governance systems that mirror all five CSCMP phases. Both organisations integrate ERM, BCM and crisis management functions as part of a unified operational resilience architecture. Their practices including scenario planning, crisis simulations, strong digital infrastructure, coherent communication strategies, and continuous plan evaluation demonstrate how a well-designed crisis framework can maintain business continuity and safeguard stakeholder confidence even during severe disruptions. These features map directly onto the CSCMP phases and reflect resilience principles highlighted in crisis management literature (Herbane, 2022;

Bundy et al., 2017; Duchek, 2020; ISO 22301:2019). Importantly, Segment B's emphasis on post-crisis learning, digital transformation and organisational redesign illustrate the practical significance of the CSCMP's Redesign phase. Their experience aligns with strategic crisis management models reviewed in Chapter 3 (e.g., Mitroff's crisis learning cycle and resilience capability frameworks), underscoring the importance of institutionalised learning and long-term adaptation.

In relation to business continuity, the interviews indicate broad agreement across both segments that strengthening business continuity in the Malaysian construction sector requires moving beyond short-term cost cutting measures toward the institutionalisation of structured crisis management practices. Experts emphasised the need to enhance crisis preparedness across the construction value chain, develop stronger digital and communication capabilities, embed resilience principles into professional and industry standards, and ensure adequate resourcing in terms of people, technology and leadership. Equally important is the adoption of frameworks that support proactive decision-making and rapid organisational adaptation during disruptions. Segment B further stressed that resilience should be treated as a strategic, continuous organisational commitment, reinforced by leadership endorsement, cross-functional coordination and regular capability testing to ensure readiness for evolving crisis scenarios.

Across all interviews, contractors and consultants were consistently identified as the most affected stakeholder groups during crises. Segment A respondents highlighted that contractors experienced acute labour dependency, supply-chain disruptions, volatility in material prices, and severe cashflow instability, leaving many firms vulnerable to financial distress. Consultants, on the other hand, faced reduced fee income, project cancellations and heightened pressure to provide advisory services under uncertain and rapidly changing conditions. These findings align with the literature discussed in Chapter 2, which identifies both contractors and consultants as structurally exposed actors within the project delivery chain, making them particularly vulnerable during large-scale disruptions (Olanrewaju & Tan, 2021). Overall, the combined interview findings from Segment A and Segment B confirm that the proposed CSCMP provides a sector-specific, evidence-based and theoretically grounded framework that directly addresses the weaknesses highlighted in both the interviews and the literature. Segment A demonstrates the urgent need for structured crisis governance, while Segment B provides tested real-world models illustrating how proactive crisis cultures

and integrated resilience systems enable organisations to sustain performance and safeguard continuity during disruptions. These insights collectively reinforce the rationale for adopting the CSCMP as a robust approach for institutionalising crisis readiness, strengthening business continuity and enhancing long-term resilience within the Malaysian construction industry.

5.3 Findings from Document Analysis

Document analysis was conducted to examine empirical evidence relating to crisis impacts and organisational responses within the Malaysian construction sector. The documents reviewed included industry reports, government publications, and international agency reports such as CIDB, DOSM, World Bank, and WHO. These sources provide reliable and context-specific insights into the effects of major crises, particularly the COVID-19 pandemic, on construction activities.

In addition to construction sector documents, selected reports and publicly available information from high-performing organisations such as PETRONAS and EPF were reviewed to provide benchmarking insights. These organisations are recognised for their structured crisis management and organisational resilience practices.

The analysis indicates that, unlike construction organisations, these entities demonstrate proactive planning, integrated risk management systems, and established business continuity frameworks. These practices highlight key gaps within the construction sector and provide reference points for the development of the CSCMP framework.

5.3.1 Vulnerable Areas Identified

The document analysis indicates that both government and industry stakeholders implemented a range of response strategies during crisis periods. These include government stimulus packages and financial assistance, the enforcement of Standard Operating Procedures (SOPs), the adoption of remote working arrangements and digital tools, as well as adjustments to project timelines and contractual obligations. These measures were primarily designed to ensure short-term operational continuity and mitigate immediate disruptions within the construction sector.

However, a deeper analysis reveals that these responses were largely reactive and operational in nature, addressing immediate symptoms rather than underlying structural vulnerabilities. When examined against the nine vulnerable areas identified in this study, namely finance, labour, supply chain, materials and equipment, organisational management, contractual and legal aspects, time and scheduling, technical and planning, and communication, it becomes evident that most interventions were unevenly distributed and lacked integration across these critical domains.

For instance, financial stimulus packages and wage support mechanisms primarily addressed financial vulnerability, providing temporary relief for cash flow constraints but without establishing long-term financial resilience strategies. Similarly, the enforcement of SOPs and health protocols targeted labour-related vulnerabilities, particularly workforce safety and site compliance, yet did not adequately address issues such as labour dependency and workforce sustainability. Disruptions in supply chain and materials and equipment were partially mitigated through alternative sourcing and logistical adjustments; however, these responses remained reactive and did not establish robust contingency planning mechanisms.

From an organisational perspective, the shift towards remote working and digital tools reflects initial efforts to address organisational management and communication vulnerabilities, yet adoption was inconsistent and limited by the industry's relatively low digital maturity. In addition, adjustments to project timelines, extensions of time (EOT), and contractual negotiations addressed time and scheduling as well as contractual and legal vulnerabilities, but these measures often led to disputes and highlighted the absence of standardised crisis-related contractual provisions. Furthermore, disruptions in technical and planning processes, including delays in design approvals and coordination challenges, were managed on an ad hoc basis, indicating a lack of integrated planning resilience.

When these findings are further examined in relation to national strategic initiatives such as the Construction 4.0 Strategic Plan (2021–2025) and the Twelfth Malaysia Plan (12MP), a clear disconnect emerges. While the Construction 4.0 Strategic Plan emphasises digital transformation, innovation, and long-term capability development, and the 12MP promotes resilience, sustainability, and adaptive capacity, the observed industry responses remain largely short-term, fragmented, and operationally focused. This misalignment highlights a gap between policy-level aspirations and actual implementation at the organisational level.

Overall, the document analysis demonstrates that although multiple response measures were implemented across the nine vulnerable areas, these efforts were not systematically integrated or strategically aligned to enhance long-term resilience. The predominance of reactive and short-term responses underscores the absence of a structured crisis management framework within the construction sector. This finding provides strong justification for the development of the CSCMP, which aims to address these vulnerabilities holistically through its five phases of Prepare, Prevent, Respond, Recover, and Redesign, ensuring a more proactive, coordinated, and resilient approach to crisis management.

5.3.2 Organizational and Government Responses

The document analysis indicates that both government and industry stakeholders implemented a range of response strategies during crisis periods. These include government stimulus packages and financial support, the implementation of Standard Operating Procedures (SOPs), the adoption of remote working and digital tools, as well as adjustments to project timelines and contractual arrangements. These measures were primarily aimed at ensuring operational continuity and mitigating immediate disruptions across construction activities.

However, further analysis reveals that these responses were largely reactive and short-term in nature, focusing on immediate recovery rather than long-term resilience building. This observation is further reinforced when contrasted with national strategic initiatives such as the Construction 4.0 Strategic Plan (2021–2025) and the Twelfth Malaysia Plan (12MP). The Construction 4.0 Strategic Plan outlines a forward-looking framework emphasising digital transformation, technological adoption, and the development of a future-ready construction ecosystem through strategic thrusts such as capacity building, innovation, and smart integrated technologies. Similarly, the 12MP introduces comprehensive policy responses aimed at strengthening economic resilience, sustainability, and crisis preparedness in response to the COVID-19 pandemic and future uncertainties (CIDB, 2025).

Despite the presence of these strategic frameworks, the findings suggest a gap between policy direction and actual industry practices. While national plans promote proactive, technology-driven, and resilience-oriented transformation, the observed industry responses remain largely operational, fragmented, and short-term. This

disconnect highlights the limited institutionalisation of structured crisis management practices within the construction sector and underscores the need for an integrated and sector-specific framework such as the CSCMP.

5.3.3 Key Patterns and Insights

Several key patterns emerge from the document analysis that provide important insights into the structural weaknesses of the construction sector in managing crises.

First, the construction sector consistently demonstrates a high degree of vulnerability to external shocks, largely due to its inherent characteristics, including heavy reliance on labour, complex and often globalised supply chains, and the need for continuous physical site operations. These dependencies make construction activities particularly sensitive to disruptions such as movement restrictions, material shortages, and workforce constraints, thereby amplifying the impact of crisis events across multiple operational dimensions.

Second, the analysis reveals that crisis responses within the sector are predominantly reactive and short-term in nature. Most measures implemented by organisations and authorities are designed to address immediate disruptions, such as project delays and workforce limitations, rather than anticipating or mitigating risks in advance. There is limited evidence of structured, proactive crisis management planning or the existence of formalised crisis management systems within construction organisations.

Third, there is a noticeable lack of integration between crisis management strategies and long-term business continuity planning. While certain measures aim to sustain operations during crisis periods, these efforts are often implemented in isolation and are not embedded within a broader organisational resilience framework. As a result, organisations struggle to transition from immediate response to sustained recovery and long-term adaptation.

Collectively, these patterns indicate systemic gaps in preparedness, coordination, and strategic alignment within the construction sector. The absence of an integrated and proactive approach to crisis management highlights the need for a structured, sector-specific framework such as the CSCMP, which addresses vulnerabilities holistically and supports both immediate response and long-term organisational resilience. Table 5.8 summarised the findings.

Table 5.8
Document Analysis Findings to CSCMP Phases

Finding	Implication	CSCMP Phase
Lack of preparedness	Need proactive planning	Prepare
Weak risk mitigation	Need preventive strategies	Prevent
Reactive response	Need structured response	Respond
Slow recovery	Need recovery planning	Recover
Repeated issues	Need system improvement	Redesign

5.3.4 Link to CSCMP Development

The findings from the document analysis provide strong justification for the development of the CSCMP framework. The identified vulnerabilities and gaps in existing practices directly inform the five-phase structure of the CSCMP, namely Prepare, Prevent, Respond, Recover, and Redesign.

Specifically, the absence of proactive planning supports the need for the Prepare and Prevent phases, while the reactive nature of current strategies reinforces the importance of structured Response and Recovery mechanisms. Furthermore, the recurring nature of crisis impacts highlights the necessity of the Redesign phase to embed long-term resilience within construction organisations.

5.4 Discussion of Findings for Preliminary Study - Exploratory Interview

The exploratory interviews were undertaken to deepen understanding of how crises, including the Covid-19 pandemic affected the Malaysian construction sector (Segment A) and to examine the resilience strategies employed by high-performing non-construction organisations (Segment B). Together, these findings provide empirical grounding for the development and validation of the proposed Construction Sector Crisis Management Plan (CSCMP).

a) Segment A: Impact of Crises on the Malaysian Construction Industry

Findings from Segment A reveal a consistent pattern: the Malaysian construction industry has historically experienced significant disruptions during major crises, yet its crisis responses have remained largely reactive and fragmented. Experts

referred to the 1998 Asian Financial Crisis and the 2008 Global Financial Crisis as periods marked by material price escalation, reduced project awards, cashflow instability and widespread retrenchments. Despite these severe consequences, no formal Crisis Management Plan (CMP) was introduced at industry or organisational level.

Experts emphasised that lessons from past crises were not institutionalised, resulting in minimal structural reform and persistent vulnerabilities. This observation aligns with prior studies in Chapters 2 and 3, which highlight the sector's fragmented crisis learning, inadequate risk governance and limited strategic readiness (Bakar, 2020; Lai, 2016; Bakar & Awang, 2011).

Covid-19 magnified these longstanding weaknesses. Interviewees described severe supply-chain breakdowns, acute labour shortages linked to foreign worker dependency, project suspensions, contract disputes, and heavy financial strain, particularly among contractors and SMEs. Consultants were similarly affected through reduced fee income, project cancellations and increased advisory demands under uncertain conditions. These findings directly reinforce literature identifying contractors and consultants as structurally vulnerable actors within the project delivery chain (Olanrewaju & Tan, 2021).

Experts repeatedly highlighted that the construction sector lacked structured preparedness mechanisms, technical crisis-management expertise, and financial resilience. In the absence of CMPs, organisations relied heavily on government directives. This stagnation, despite decades of crisis exposure mirrors the literature's conclusion that crisis preparedness in the Malaysian construction sector has not meaningfully evolved over time.

b) Segment B: Resilience Strategies of Non-Construction Organisations

Segment B findings provide a sharp contrast. Experts E4 and E5, representing high-performing resilient organisations, demonstrated how institutionalised crisis governance systems enable continuity and adaptability during large-scale disruptions.

Drawing on credible public reports (IPSOS, 2020; PETRONAS, 2020; EPF, 2020), both organisations described comprehensive CMP and BCM systems encompassing: (1) enterprise-wide risk assessments; (2) proactive mitigation strategies; (3) clear communication protocols; (4) digital transformation initiatives; (5) structured

cross-functional coordination; and (6) scenario planning, crisis simulations and continuous improvement.

Despite facing challenges such as operational complexity, coordination demands, and pressure to maintain staff and stakeholder confidence, both organisations sustained operations, protected employment, and responded rapidly to evolving conditions.

Their approaches align closely with established crisis management frameworks reviewed in Chapter 3, including Fink (1986), Mitroff (1994), Petak (1985), Moore (1985) and Boin & t'Hart (2003). Importantly, they operated across all five CMP phase covering Prepare, Prevent, Respond, Recover and Redesign has demonstrated the maturity and cyclical nature of their crisis governance.

In contrast to Segment A, Segment B demonstrates that resilience is not an incidental capacity but a result of formalised systems, leadership commitment and institutional learning. These organisations provide practical models for how the construction sector might strengthen its own crisis readiness.

c) Experts' Agreement on the Proposed CSCMP

A key A key outcome from all interviews is the strong support for the proposed five-phase CSCMP. Across both segments, experts agreed that:

- The five phases (Prepare, Prevent, Respond, Recover, Redesign) accurately reflect the gaps and needs highlighted in crisis experiences.
- The construction industry lacks structure and requires a systematic, repeatable approach to crisis management.
- The CSCMP is suitable for both contractors and consultants, acknowledging that each group faces different but significant vulnerabilities.
- The design of the CSCMP is consistent with best practices demonstrated by E4 and E5, making it both feasible and grounded in real organisational behaviour.
- Adopting the CSCMP would reduce dependency on government assistance, strengthen internal crisis readiness and institutionalise learning, continuity, and resilience.

This consensus confirms that the CSCMP is both theoretically valid and practically implementable within the Malaysian construction environment. Table 5.9 presents a synthesis of how expert findings from both segments map onto the CSCMP phases.

Table 5.9
Mapping Experts' Findings to CSCMP Phases

CSCMP Phase	Key Findings from Interviews (Segment A & B)	Interpretation / Implications	Supporting Literature
Prepare	- Segment A lacked structured planning during 1998, 2008 and Covid-19; no CMP/BCP in place. - Segment B (E4, E5) implemented enterprise-wide risk assessments, readiness planning, and digital preparedness.	The construction sector must formalise crisis readiness structures to anticipate disruptions. Segment B demonstrates that preparedness significantly reduces shock impact.	Bakar (2020); Lai (2016); IPSOS (2020); PETRONAS (2020); EPF (2020)
Prevent	- No proactive mitigation mechanisms in Segment A; responses remained ad hoc. - Segment B demonstrated preventive controls through ESG strategies, digitalisation, health protocols, and risk monitoring.	Preventive measures are weak across the construction industry and must be institutionalised to reduce crisis escalation.	Bakar & Awang (2011); IPSOS (2020)
Respond	- Segment A relied on reactive actions (cost-cutting, waiting for directives, SOP confusion). - Segment B executed integrated response strategies—cross-functional coordination, clear communication, and continuity activation.	Construction needs structured response protocols to avoid delays, disputes and operational paralysis.	Olanrewaju & Tan (2021); IPSOS (2020)
Recover	- Segment A faced prolonged recoveries due to financial strain, supply chain disruptions, labour shortages and unclear recovery pathways. - Segment B embedded recovery through digitalisation, sustainability, and workforce restructuring.	Recovery planning is largely absent in construction and must be formalised to restore operational stability quickly.	PETRONAS (2020); EPF (2020)
Redesign	- Segment A showed minimal evidence of applying lessons from 1998 & 2008 during Covid-19; limited organisational learning. - Segment B institutionalised learning through continuous improvement, capability testing and long-term transformation initiatives.	Redesign is the most underdeveloped phase in construction; embedding learning is crucial for organisational resilience.	Lai (2016); Boin & t'Hart (2003); Mitroff (2005); PETRONAS (2020)

Overall, the exploratory interviews reveal a clear divide between the reactive, fragmented crisis responses of the construction sector and the proactive, structured, and institutionally embedded practices of resilient organisations. Segment A findings highlight systemic vulnerabilities such as financial, organisational, labour, supply chain and governance-related that remain unaddressed despite repeated crises. Segment B findings illustrate how integrated crisis governance systems enable continuity and organisational agility even under extreme disruption.

Together, these insights reinforce the necessity of a sector-specific, structured CSCMP to strengthen crisis preparedness, embed resilience practices and enhance long-term business continuity across the Malaysian construction industry.

5.5 Summary of Chapter

This chapter presented the findings from exploratory interviews with experts from key construction authorities (JKR, CIDB, RISM) and leaders from resilient non-construction organisations (PETRONAS and EPF). The purpose of this preliminary phase was to understand historical and current crisis experiences, assess existing crisis preparedness, and identify resilience practices that could inform the development of the proposed Construction Sector Crisis Management Plan (CSCMP).

Findings from Segment A show that the Malaysian construction industry has repeatedly faced severe disruptions during the 1998 Asian Financial Crisis, the 2008 Global Financial Crisis, and Covid-19, yet has not institutionalised crisis learning. Experts confirmed that no formal CMP was in place, resulting in reactive responses such as retrenchment, cost cutting, and heavy reliance on government directives. Covid-19 further exposed weaknesses across nine vulnerable areas, including financial fragility, labour dependency, supply chain disruptions, contractual ambiguity, and low digital readiness. Contractors and consultants were consistently identified as the most affected groups, reflecting their structural exposure within the project delivery chain.

In contrast, Segment B demonstrated how PETRONAS and EPF maintained operational continuity through mature CMP systems, proactive risk mitigation, digital capability, coordinated communication, and continuous improvement. Their responses aligned with all five phases of the CMP cycle of Prepare, Prevent, Respond, Recover, and Redesign, providing practical models of resilience that the construction sector currently lacks.

A key outcome of the exploratory interviews was the unanimous expert support for the proposed CSCMP. All respondents agreed that the CSCMP's five phases effectively address the gaps observed in past and current crises and offer a structured, practical framework to strengthen industry-wide preparedness and continuity. The alignment between the CSCMP and the practices of resilient organisations further validates its feasibility and contextual relevance.

Overall, the exploratory findings highlight the urgent need for a formal crisis management framework within the Malaysian construction industry. These insights, together with variables identified in Chapters 2 and 3, form the foundation for the quantitative phase presented in the next chapter, which further evaluates and validates the components required for developing the proposed CSCMP.

CHAPTER 6

QUANTITATIVE ANALYSIS: QUESTIONNAIRE SURVEY AND CSCMP FRAMEWORK VALIDATION

6.1 Introduction

This chapter presents the analysis and findings from the questionnaire survey, conducted as Phase 2 of this research as outlined in Chapter 4. The survey was designed to verify and strengthen the exploratory interview results, particularly the crisis impacts, existing strategies, and challenges faced by Malaysian construction organisations. These findings support the development of the proposed Construction Sector Crisis Management Plan (CSCMP).

Three stages of analysis were carried out. First, Exploratory Data Analysis (EDA) was conducted to examine data quality and suitability. Second, descriptive analysis was used to summarise respondent profiles and key characteristics. Third, inferential analysis was performed to further interpret relationships within the data and draw conclusions relevant to the industry.

The questionnaire was developed based on insights from the literature review and the preliminary study, focusing on the four research objectives related to crisis impacts, existing strategies and challenges, and the formulation of the CSCMP. Respondents consisted of contractors and consultants from various disciplines, as detailed in Chapter 4. All analyses were conducted using SPSS Version 29, and the results are presented in the subsequent sections.

6.2 Respondent Profile and Data Overview

This section presents an overview of the survey data, including the response rate and demographic characteristics of the respondents. The purpose is to establish the adequacy, representativeness, and reliability of the dataset used for subsequent analysis. The respondents comprise contractors and consultants operating within the Malaysian construction sector, particularly in the Klang Valley.

6.2.1 Response Rate

Table 6.1
Response Rate

Respondents	Sent	Return	Percentage (%)	Cumulative (%)
Contractors	97	38	28.6	28.6
Consultants	200	95	71.4	71.4
	297	133	100	100

Table 6.1 presents the response rate obtained from the questionnaire survey. A total of 97 CIDB G7 contractors with 4- and 5-star scores (CIDB, 2022) and 200 consultants from engineering, architecture, and quantity surveying firms in the Klang Valley (JKR, 2022) were identified as the target population. Accordingly, 297 questionnaires were distributed to these two groups. Of these, 133 completed questionnaires were returned, yielding a response rate of 44.8% over the six-month data collection period.

A response rate of 44.8% is considered highly acceptable within construction management research, where survey participation is often low due to industry workload, project schedules, and organisational constraints. Earlier studies reported typical postal or online response rates ranging from 20–30% (Hair et al., 2010). More recent construction-related surveys show similar trends, with response rates of 30% (Musarat et al., 2024), 35% (Kineber & Oke, 2024), and 40.5% (Lin, 2022). Thus, the 44.8% achieved in this study is comparatively strong and provides a robust basis for subsequent analysis.

6.2.2 Demographic Profile of Respondents (N = 133)

Table 6.2
Demographic Profile of Respondents (N = 133)

Category	Sub-category	Percentage (%)	Ranking
A1. Role in Organisation	Senior Officer	44.4	1
	Manager	29.3	2
	Above Senior Manager	15.5	3
	Senior Manager	11.3	4

Category	Sub-category	Percentage (%)	Ranking
A2. Academic Qualification	Bachelor's Degree	72.2	1
	Master's Degree	21.8	2
	Diploma	3.8	3
	PhD	2.3	4
A3. Type of Organisation	Consultant – Engineering	30.1	1
	Contractor – CIDB G7	28.5	2
	Consultant – Architecture	21.1	3
	Consultant – Quantity Surveyor	20.3	4
A4. Years in Construction Industry	10–15 years	35.5	1
	More than 15 years	32.2	2
	5–10 years	18.0	3
	Less than 5 years	14.3	4
A5. Tenure in Current Organisation	Less than 5 years	39.1	1
	5–10 years	30.8	2
	10–15 years	17.3	3
	More than 15 years	12.8	4
A6. Awareness of Crisis Impacts	Yes	95.5	1
	No	4.5	2
A7. Awareness Impact of 2008 Crisis	Agree	88.7	1
	Disagree	11.3	2
A8. Recovery from 2008 Crisis	Agree	94.0	1
	Disagree	6.0	2
A9. Impact Covid19 on Organisation	Agree	93.2	1
	Disagree	6.8	2
A10. Need for a CSCMP	Agree	98.5	1
	Disagree	1.5	2

As presented in Table 6.2, the demographic distribution reflects a well-balanced representation of professionals across the Malaysian construction sector. A substantial proportion of respondents occupy senior operational and managerial roles, with Senior Officers representing 44.4% and Managers 29.3%, indicating that the survey successfully engaged individuals with significant decision-making authority and organisational insight. Academically, 72.2% of respondents hold a bachelor's degree, while a further 21.8% possess a master's degree, demonstrating strong professional qualifications aligned with industry competency requirements.

The respondents also represent key organisational categories, including engineering consultancies (30.1%), CIDB G7 contractors (28.5%), architectural firms (21.1%), and quantity surveying firms (20.3%), providing comprehensive coverage of the core professional groups involved in construction project delivery. Their depth of experience further reinforces the credibility of the dataset: 35.5% have 10–15 years of industry experience, while 32.2% have more than 15 years, indicating that over two-thirds of respondents possess long-term exposure to project cycles and crisis-related challenges. A similar pattern is observed in organisational tenure, where nearly half (48.1%) have served their organisations for more than five years, suggesting familiarity with internal processes, risk structures, and management practices.

Awareness levels were consistently high across all crisis-related dimensions. An overwhelming 95.5% acknowledged that external crises impact the construction sector, 93.2% recognised the effects of Covid-19, and 88.7% reported awareness of the 2008 Global Financial Crisis impact. Notably, 98.5% agreed that organisations should have a CSCMP, demonstrating strong industry-wide recognition of the importance of structured preparedness and resilience.

Collectively, these demographic characteristics are supported by strong representation, extensive experience profiles, and high crisis awareness, affirm that the respondents possess the requisite knowledge, expertise, and organisational insight to provide reliable and meaningful contributions to this study.

6.2.3 Data Analysis Method and Flow

This study adopts a structured data analysis approach comprising both descriptive and inferential statistical methods. Descriptive analysis was first conducted to summarise respondent characteristics and examine the level of agreement across key constructs, including vulnerable areas, existing strategies, CSCMP components, and business continuity. This was followed by inferential analysis to examine differences between groups and relationships among variables.

Specifically, the independent samples T-test was employed to compare contractors and consultants across the four key constructs, while Spearman's rank-order correlation was used to analyse the relationships among variables. The selection of Spearman's Correlation was based on the non-normal distribution of the data, as indicated by Shapiro–Wilk test results and skewness and kurtosis values. This stepwise

analytical process ensures that both patterns and underlying relationships within the data are systematically examined. Figure 6.1 walks through the analysis flow.

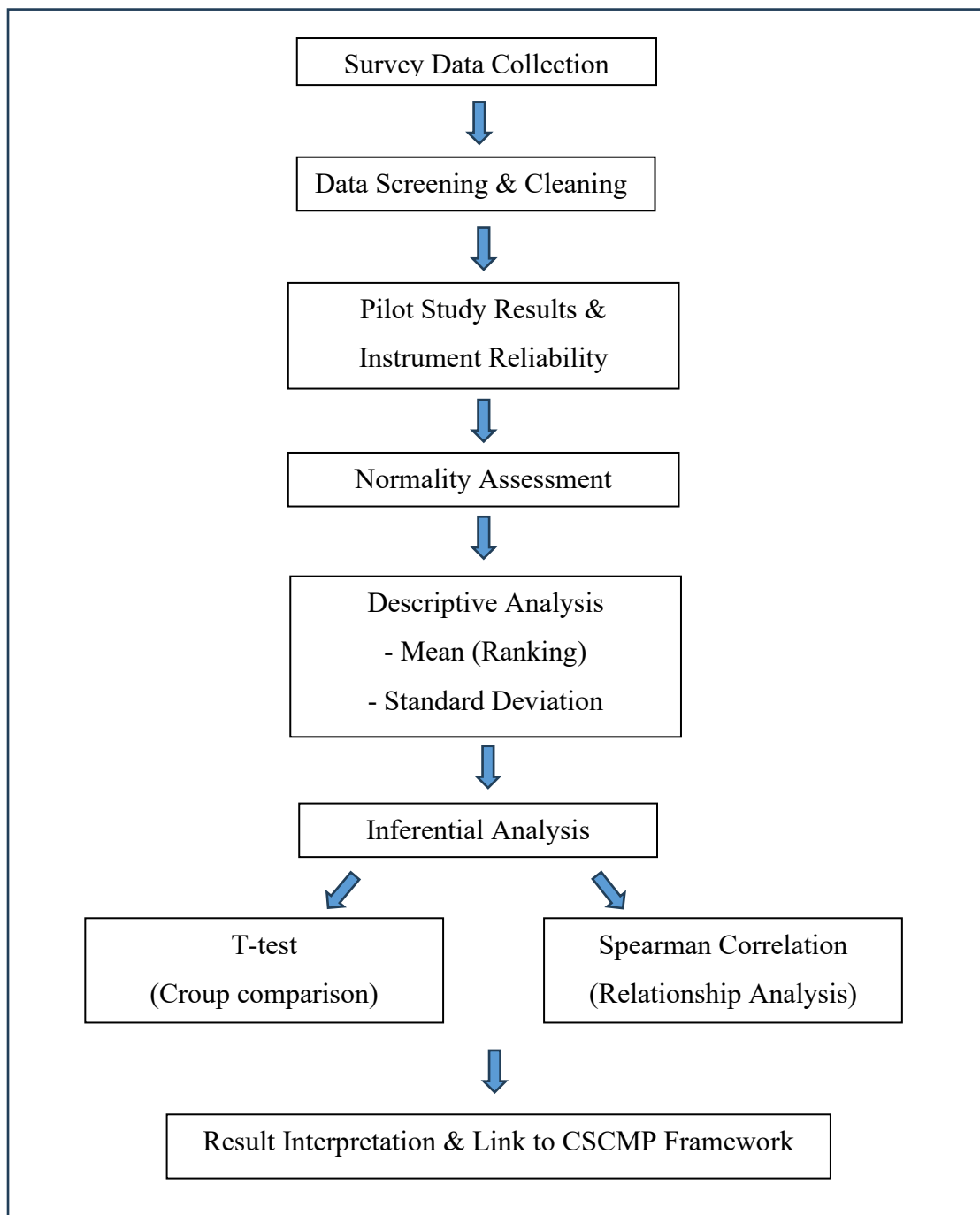


Figure 6.1 Data Analysis Flow and Selection of Statistical Methods

6.3 Instrument Validation and Pilot Study Results

This section presents the results of the instrument validation process, including pilot study outcomes and reliability assessment, to ensure that the questionnaire is suitable for full-scale data collection and subsequent analysis. While the development and implementation of the pilot study were described in Chapter 4, this section focuses on evaluating the performance of the instrument based on empirical evidence obtained from the pilot testing.

The pilot study was conducted to assess the clarity, structure, and overall usability of the questionnaire, while reliability analysis was performed to examine the internal consistency of the measurement scales. Together, these processes provide assurance that the instrument is both valid and reliable, thereby establishing a sound basis for the descriptive and inferential analyses presented in the subsequent sections.

6.3.1 Reliability and Validity of the Instrument

The reliability and validity of the data collection instrument are essential to ensure that the findings are trustworthy and accurately reflect the constructs being measured. Reliability refers to the instrument's ability to produce consistent results when repeated under similar conditions. In this study, Cronbach's Alpha was employed to assess internal consistency, as it remains one of the most widely used reliability indicators in social science research (Tavakol & Dennick, 2011; Taber, 2018). Generally, alpha values of 0.60 and above are acceptable for exploratory or pilot studies, while values of 0.70 and above indicate satisfactory reliability for main data collection (Hair, 2019; Henseler, 2021). Higher alpha values, approaching 1.0, suggest stronger internal consistency among items.

Validity concerns whether the instrument measures what it is intended to measure. In this research, face validity was ensured as the survey items were adapted from established studies and refined using insights obtained from the exploratory interviews discussed in Chapter 4. Face validity requires that items appear to appropriately represent the intended constructs (Sekaran & Bougie, 2019).

Content validity was also established by ensuring that the questionnaire sufficiently covered all relevant dimensions of the concepts being examined. To achieve this, the instrument was reviewed by a panel of academic and industry experts,

consistent with best practices in instrument development (Boateng et al., 2018; Taherdoost, 2016). Based on their feedback, revisions were made to clarify terminology, remove ambiguous items, and strengthen the alignment between the questions and the study's objectives.

In line with these conventions, this study adopted Cronbach's Alpha values of 0.70 and above as the minimum acceptable threshold for the main data collection, while values of 0.60 and above were considered adequate for the pilot phase. This decision reflects the exploratory nature of the research and aligns with recommendations for studies developing new or context-specific constructs (Hair, 2019; Henseler, 2021). Therefore, the reliability assessment in this chapter is interpreted based on these thresholds.

6.3.2 Pilot Survey Results and Instrument Reliability

A pilot study was conducted prior to the main data collection to evaluate the clarity, reliability, and overall suitability of the questionnaire instrument. While the design and procedure of the pilot study were outlined in Chapter 4, this section presents the outcomes of the pilot testing to justify the readiness of the instrument for full-scale deployment.

The pilot survey involved 32 respondents comprising contractors and consultants in the Klang Valley, representing approximately 10% of the minimum required sample size. This sample size is consistent with commonly recommended ranges for pilot testing in social science research (Hulley et al., 2013; van Teijlingen & Hundley, 2010). The pilot aimed to assess key aspects of the instrument, including item clarity, question sequencing, layout, completion time, and overall respondent comprehension.

The results of the pilot study indicated that the questionnaire was generally well understood by respondents, with no major issues identified in terms of ambiguity or structure. Minor refinements were made to improve wording clarity and logical flow based on respondent feedback. These adjustments enhanced the overall coherence and usability of the instrument.

In addition, preliminary reliability analysis was conducted to assess the internal consistency of the measurement scales. The results demonstrated acceptable levels of reliability, indicating that the instrument was suitable for subsequent quantitative

analysis. The pilot study therefore confirmed that the questionnaire was valid, reliable, and appropriate for use in the main survey.

a) Questionnaires Distribution

Table 6.3
Pilot Survey – Questionnaire Distribution

Questionnaire Distribution (May 2022 – Jul 2022)	Response Rate
Questionnaires distributed (Pilot survey)	32
Question return	32
Returned and usable	32
Not returned	0
Response rate	100%

Table 6.3 illustrates the distribution of the pilot questionnaires to the selected target group comprising consultants and contractors from G7 companies registered with CIDB and rated 4-star or 5-star in the Klang Valley. These firms were chosen because they typically manage large and critical construction projects and are therefore more inclined to prioritise crisis preparedness and business continuity. The pilot data were collected between May 2022 and July 2022.

b) Feedback from Respondents

Feedback from the pilot respondents indicated that the questionnaire was generally clear and comprehensible. Only minor issues were identified, primarily spelling errors and wording improvements to enhance clarity. No items were removed or substantially revised, as all questions were deemed conceptually relevant and aligned with the study constructs. The refinements made ensured that the final instrument was linguistically precise and ready for main data collection.

c) Initial Data Analyses and Findings

Data analyses were performed using IBM SPSS Statistics Version 29. Cronbach's Alpha was employed to assess the internal consistency of the questionnaire, as it is the most widely used measure for evaluating reliability in instruments containing

multiple Likert-type items. The pilot results indicated that all three main variable constructs demonstrated satisfactory internal consistency, supporting the suitability of the instrument for full-scale administration. Consequently, the questionnaire proceeded to the main data collection phase, which is detailed in Chapter Six. The subsequent sub-chapters present the analyses and findings related to the three core variables investigated in this study. Given that all constructs exceeded the predetermined reliability threshold of $\alpha \geq 0.70$ for main studies, the instrument was assessed as sufficiently robust to proceed to the full survey phase.

d) Checking Reliability of Data

Reliability statistics for the variables underpinning the four research objectives were assessed using Cronbach's Alpha, and the coefficients obtained are presented in Table 6.2. Cronbach's Alpha is the most widely applied indicator of internal consistency for multi-item scales and represents the average reliability coefficient derived from all possible split-half combinations of the items (Tavakol & Dennick, 2011). Alpha values range between 0 and 1, with values closer to 1 indicating stronger internal consistency (Taber, 2018).

However, it is important to interpret alpha cautiously. As noted in recent methodological literature, inflated alpha values can result from many items rather than true internal consistency (Hoekstra et al., 2022; Tavakol & Dennick, 2011). Moreover, there is no universally fixed threshold for acceptable reliability; instruments with lower alpha values may still be conceptually meaningful and practically useful depending on the construct and context (Schmitt, 1996; Hinton et al., 2014). Therefore, alpha is best used as one indicator among several to evaluate the robustness of a measurement scale.

Table 6.4
Cronbach Alpha

Research Objective	Variable	Number of Items	Reliability Cronbach's Alpha (α)	Comment
RO 1	Vulnerable areas	29	0.834	Good
RO 2	Strategies (Macro)	27	0.927	Excellent
	Strategies (Micro)	25	0.895	Good
	Strategies (Efficacy)	27	0.969	Excellent
RO 3	CSCMP	63	0.984	Excellent

Research Objective	Variable	Number of Items	Reliability Cronbach's Alpha (α)	Comment
RO 4	Business Continuity	13	0.900	Good

Table 6.4 presents the Cronbach's Alpha coefficients for all variables measured under the four research objectives. The reliability values range from 0.834 to 0.984, indicating good to excellent internal consistency across the constructs, including vulnerable areas, crisis management strategies (macro, micro, and efficacy levels), the CSCMP components, and business continuity. These results demonstrate that the items within each scale are highly interrelated and psychometrically sound, providing sufficient confidence to proceed with subsequent analyses.

e) Assessing Normality of Research Data

The normality assessment indicated that the dataset does not follow a normal distribution. This conclusion was based on several indicators. All variables demonstrated negative skewness, reflecting a clustering of responses toward higher values, and positive kurtosis, suggesting heavier tails and the presence of extreme scores. The Shapiro–Wilk test returned significance values below 0.05 for all variables, confirming that the assumption of normality is violated. Visual inspection of the histogram showed a left-skewed pattern, while the Q–Q plot displayed clear deviations from the reference line, further supporting non-normality.

To summarise the normality results, Table 6.5 presents the qualitative distribution characteristics across the main variables.

Table 6.5
Summary of Normality Assessment

Variable Group	Skewness	Kurtosis	Shapiro–Wilk	Histogram	Q–Q Plot	Conclusion
Vulnerable Areas	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal
Strategies (Macro)	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal
Strategies (Micro)	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal

Variable Group	Skewness	Kurtosis	Shapiro–Wilk	Histogram	Q–Q Plot	Conclusion
Strategies (Efficacy)	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal
CSCMP	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal
Business Continuity	Negative	Positive	$p < 0.05$	Not normal	Deviates from line	Not normal

Given these statistical and visual indicators, parametric assumptions are not met. Therefore, Spearman’s rank-order correlation, a non-parametric technique that does not require normally distributed data was selected as the most appropriate method for analysing relationships among the variables. Spearman’s Correlation is also robust to skewed distributions and outliers, making it suitable for the characteristics of the dataset in this study.

6.4 Descriptive Analysis

Descriptive analysis provides an overview of the dataset by summarising key characteristics of the variables and identifying basic patterns before inferential testing. It is widely used as an initial step in quantitative research to assess data quality, detect anomalies, and support the interpretation of later analyses (Saunders et al., 2019; Hair et al., 2019). In SPSS, descriptive procedures are commonly applied due to their simplicity and ability to generate both numerical summaries and graphical outputs (Pallant, 2020).

In this study, descriptive statistics were used to compute measures of central tendency (mean) and dispersion (standard deviation), providing essential insights into respondent characteristics and variable distributions.

In addition to mean values used for ranking the importance of variables, standard deviation values were examined to assess the level of agreement among respondents. A lower standard deviation indicates a higher level of consensus, suggesting that respondents share similar views on a particular item. Conversely, a higher standard deviation reflects greater variability in responses, indicating differing perceptions among respondents. Therefore, both mean and standard deviation values were considered in interpreting the results to provide a more comprehensive understanding of the findings.

6.4.1 Vulnerable Areas in the Malaysian Construction Industry (N = 133) (RO1)

Table 6.6
Impact Towards Construction Industry During Crisis

No.	Variables	Sum Mean Value	SD	Ranking
1.	Technical & Planning	4.38	0.67	1
2.	Supply Chain	4.27	0.64	2
3.	Contracts	4.14	0.69	3
4.	Financial & Economic	4.11	0.73	4
5.	Other Industries	4.01	0.67	5
6.	Labour	3.95	0.79	6
7.	Organization	3.88	0.86	7
8.	Communication	3.65	0.93	8
9.	Reputation	3.52	0.88	9

Section Table 6.6 presents the descriptive analysis of the adverse impacts on vulnerable areas within construction organisations during extreme external crises. This assessment directly addresses Research Objective 1 (RO1), to explore the critical areas of vulnerability within construction organizations that are adversely affected during a crisis and responds to Research Question 1 (RQ1) concerning the extent to which economic shocks and pandemics affect key operational domains. The nine vulnerable areas analysed in Section B were derived from the literature (Chapter 2) (Bakar, 2020; Olanrewaju & Tan, 2021) and supported by insights from the exploratory interviews (Chapter 5) (Bakar & Awang, 2011; CIDB, 2022).

The results indicate that crises most severely affect technical and planning functions (mean = 4.38, SD = 0.67), followed by supply chain disruptions (mean = 4.27, SD = 0.64) and contractual matters (mean = 4.14, SD = 0.69). These findings align with Chapter 2, which highlighted planning uncertainties, material shortages, and contractual disputes as dominant crisis manifestations in previous global and local shocks (Lai, 2016; Olanrewaju & Tan, 2021). The high means confirm that these areas remain structurally vulnerable within the Malaysian construction industry.

Financial and economic impacts were also substantial (mean = 4.11, SD = 0.73), supporting findings from the literature and preliminary interviews (Chapter 5) that construction organisations are highly sensitive to macroeconomic volatility, cash flow disruptions, and rising operational costs (Bakar, 2020; IMF, 2020). Moderate impacts

on related industries (mean = 4.01), labour availability (mean = 3.95), and organisational challenges (mean = 3.88) further highlight the multifaceted and interconnected nature of crisis effects on the sector.

Conversely, communication (mean = 3.65, SD = 0.93) and organisational reputation (mean = 3.52, SD = 0.88) recorded the lowest impact levels, indicating that crises affect these areas less severely than operational and financial functions. This may reflect improved digital communication practices post-pandemic or a tendency for organisations to prioritise operational continuity over reputational concerns during crisis periods (Petronas, 2020; EPF, 2020). These findings confirm Chapter 5's evidence that crisis vulnerabilities in construction are mainly operational and financial. They highlight the need for a sector-wide CSCMP and targeted strategies across Prepare, Prevent, and Respond phases. Strengthening planning resilience, supply chain stability, and financial risk management is key to improving preparedness for future crises.

The findings in Table 6.6 directly support Research Objective 3 (RO3) by identifying the specific vulnerable areas that must be addressed in the proposed CSCMP. High-impact areas such as planning, supply chain, contracts and financial stability provide essential input for shaping the Prepare, Prevent, and Respond phases of the framework, while moderate impacts on labour, organisational performance, and communication guide the Recover and Redesign components. Thus, this vulnerability assessment not only answers RQ1 but also forms a crucial evidence base for ensuring that the CSCMP is precise, industry-responsive, and aligned with the actual crisis exposures identified in Chapter 6.

6.4.2 Existing Strategies by the Government (Macro) (N = 133) (RO2)

This section examines the government's crisis management strategy—which aligns with Research Objective 2 (RO2) and Research Question 2 (RQ2) by identifying sector-level strategies adopted during crises and complements the policy discussions in Chapter 2 and the expert insights presented in Chapter 5. The government's response typically encompasses fiscal policy, monetary policy, and a coordinated national action plan, consistent with crisis governance literature (IMF, 2020; OECD, 2021).

a) Fiscal Policy (Government Spending Method)

The analysis of fiscal policy strategies presented in Table 6.7 directly supports RO2 and addresses RQ2 by identifying macro-level government interventions utilised during crises and their perceived effectiveness. These findings reinforce the crisis management literature discussed in Chapter 2 (IMF, 2020; OECD, 2021) and align with expert perspectives highlighted in Chapter 5, which emphasized the importance of strong government intervention in stabilising the construction sector during economic disruptions.

Table 6.7
Macro - Fiscal Policy

No.	Variables	Mean Value	SD	Ranking
1.	Increase public project	3.89	0.86	1
2.	Sector specific initiatives	3.86	0.83	2
3.	Secure employment protection	3.86	0.84	3
4.	Provide support to business	3.85	0.89	4
5.	Provide fiscal stimulus	3.84	0.88	5
6.	Provide financial aid	3.78	0.99	6
7.	Increase employability	3.77	0.91	7
8.	Increase country response	3.70	0.83	8
9.	Allow waiver to social security	3.66	0.95	9
10.	Group specific initiatives	3.63	0.88	10
11.	Provide social protection	3.52	0.99	11

The results show that the highest-ranked fiscal measure is increasing public projects (mean = 3.89, SD = 0.86), followed by sector-specific initiatives (mean = 3.86, SD = 0.83) and employment protection schemes (mean = 3.86, SD = 0.84). These findings mirror Malaysia's historical reliance on public infrastructure spending to stimulate economic activity and maintain project pipelines during downturns, as seen during the Global Financial Crisis and Covid-19 economic stimulus packages (MOF, 2021). They also align with the literature showing that public investment plays a counter-cyclical role in sustaining the construction industry during crises (Bakar, 2020).

Other key measures such as business support programmes (mean = 3.85, SD = 0.89), fiscal stimulus packages (mean = 3.84, SD = 0.88), and financial aid (mean =

3.78, SD = 0.99) has further demonstrate the sector's dependence on direct government intervention to buffer cash-flow pressures and maintain operational continuity. This aligns with the organisational resilience theories in Chapter 3, which underline the role of external support systems in mitigating vulnerability and supporting business recovery (Boin & t'Hart, 2007).

Lower-ranking items, such as social security contribution waivers (mean = 3.66, SD = 0.95), group-specific initiatives (mean = 3.63, SD = 0.88), and social protection measures (mean = 3.52, SD = 0.99), suggest that while these policies are beneficial, they are perceived as supplementary rather than central to crisis stabilisation. This pattern corresponds with insights from Chapter 5, where industry experts noted that construction firms prioritised operational continuity and liquidity support over broader social protection mechanisms.

Overall, the fiscal policy results indicate that the construction industry perceives infrastructure investment, sector-focused support, and employment protection as the most critical government interventions during crises. These findings not only strengthen the empirical basis for RO2, but also provide important input for RO3 and RO4, ensuring that the proposed CSCMP is aligned with the macro-level fiscal instruments that shape organisational resilience and crisis survival.

b) Action Plan (Strategic and Operational Interventions)

The analysis of government action plan strategies in Table 6.8 directly supports Research Objective 2 (RO2) and addresses Research Question 2 (RQ2) by identifying the strategic and operational interventions prioritised at the national level to manage and mitigate crises. These findings align with the crisis governance literature reviewed in Chapter 2 (IMF, 2020; OECD, 2021), the organisational resilience frameworks discussed in Chapter 3, and the expert insights from the exploratory interviews in Chapter 5, which highlighted the growing importance of technological adaptation, health security and cross-border coordination during crisis events.

Table 6.8
Macro - Action Plan

No.	Variables	Mean Value	SD	Ranking
1.	Strengthen international trade	3.81	0.91	1
2.	Increase country response	3.81	0.98	
3.	Promote & invest in artificial intelligence	3.80	0.98	3
4.	Provide vaccination program	3.72	1.01	5
5.	Develop responds plan	3.70	0.88	6
6.	Maintain good diplomatic relationship	3.70	0.95	
7.	Establish new SOP	3.46	1.00	7

Form Table 6.8, the highest-ranked strategies include strengthening international trade (mean = 3.81, SD = 0.91) and enhancing national crisis response capacity (mean = 3.81, SD = 0.98). These results reflect the necessity of maintaining global supply chain linkages and developing institutional readiness and both critical themes emphasised in Chapter 5, where experts stated that crisis impact was amplified by border restrictions and limited response coordination.

The prominence of promoting and investing in Artificial Intelligence (AI) (mean = 3.80, SD = 0.98) highlights the increasing recognition of technology and digital transformation as key enablers of resilience. This aligns with the technological resilience models in Chapter 3, which argue that automation, digital monitoring, and data-driven decision-making strengthen organisational adaptability during uncertainty. Respondents also rated public health measures, such as vaccination programmes (mean = 3.72, SD = 1.01) and crisis response planning (mean = 3.70, SD = 0.88), as highly important, reinforcing the interconnectedness between health security and national economic stability, a relationship extensively discussed during the Covid-19 pandemic (Petronas, 2020; EPF, 2020).

Maintaining good diplomatic relations (mean = 3.70, SD = 0.95) further underscores the importance of international cooperation in accessing medical supplies, labour mobility, and economic aid as the issues consistently raised in global crisis management studies and echoed in Chapter 5's interview findings.

Lower-ranked strategies, such as establishing new SOPs (mean = 3.46, SD = 1.00), suggest that while regulatory adjustments remain relevant, respondents view broader economic, technological and health-oriented measures as more urgent and impactful during crises. This supports the argument in Chapter 2 that macro-level

recovery depends more on structural policy interventions than administrative procedures alone.

Overall, the findings suggest that Malaysia's crisis action plan prioritises economic resilience, technological advancement, and public health protection as central pillars of national crisis management. Strengthening international trade and leveraging AI support long-term resilience, whereas vaccination efforts and coordinated response planning provide immediate safeguards. These results contribute directly to RO2 and also inform RO3 by providing essential macro-strategic inputs for the development of the proposed CSCMP, ensuring alignment between organisational-level planning and national crisis governance.

c) Monetary Policy (Financial Relief & Liquidity Tools)

The monetary policy findings in Table 6.9 form a key part of Research Objective 2 (RO2) and respond to Research Question 2 (RQ2) by identifying the financial relief mechanisms perceived as most effective in stabilising organisations during crises. These results are consistent with macroeconomic crisis responses discussed in Chapter 2 (IMF, 2020; OECD, 2021; BNM, 2020) and the industry insights reported in Chapter 5, where experts highlighted liquidity pressure, loan access, and cash-flow instability as major challenges during Covid-19 and previous economic downturns.

Table 6.9
Macro - Monetary Policy

No.	Variables	Mean Value	SD	Ranking
1.	Tax relief/incentive	4.20	0.80	1
2.	Lower utility billing	4.02	0.94	2
3.	Reduce/lower bank interest	4.01	0.89	3
4.	Soft loan availability	3.99	0.86	4
5.	Continuous access to financing	3.95	0.82	5
6.	Rescheduled credit financing	3.88	0.89	6
7.	Debt restructuring	3.86	0.97	7
8.	Provide moratorium	3.76	1.10	8

Table 6.9 presents the highest-ranked measure is tax relief and incentives (mean = 4.20, SD = 0.80), indicating that easing tax burdens is viewed as the most impactful

monetary intervention. This finding aligns with the Malaysian government's fiscal–monetary support under PRIHATIN, PENJANA and PEMERKASA, and with international evidence showing that tax incentives can help stimulate investment and maintain business continuity during economic shocks (IMF, 2020).

This is followed by lower utility billing (mean = 4.02, SD = 0.94) and reducing bank interest rates (mean = 4.01, SD = 0.89), both of which reflect the industry's need to minimise fixed financial obligations during crises. Such measures are consistent with Bank Negara Malaysia's monetary easing strategies implemented during the pandemic (BNM, 2020), aimed at sustaining liquidity and supporting vulnerable industries.

Similarly, soft loan availability (mean = 3.99, SD = 0.86) and continuous access to financing (mean = 3.95, SD = 0.82) highlight the critical importance of affordable credit, especially for construction firms experiencing cash-flow volatility, supply chain delays, and payment backlogs—issues widely documented in Chapter 5 and in sectoral studies (Bakar, 2020; Olanrewaju & Tan, 2021). Measures such as rescheduled credit financing (mean = 3.88, SD = 0.89) and debt restructuring (mean = 3.86, SD = 0.97) also scored highly, demonstrating the need for long-term financial sustainability strategies rather than merely short-term relief.

The lowest-ranked measure, although still relevant, is loan moratorium (mean = 3.76, SD = 1.10). This suggests that while payment deferrals provided essential temporary relief during Covid-19, respondents view other financial tools—such as tax incentives, soft loans, and interest rate reductions—as more effective for long-term financial resilience. This echoes findings from Petronas (2020) and EPF (2020), which emphasised structured financial planning and proactive risk mitigation over temporary relief measures.

Overall, the monetary policy findings indicate strong sectoral support for tax incentives, lower financial burdens, and accessible credit mechanisms as the most effective strategies for monetary stabilisation during crises. These insights strengthen the empirical basis for RO2 and contribute to RO3 by informing the financial dimensions of the proposed CSCMP. Ensuring liquidity, minimising financial strain, and enabling flexible credit restructuring are therefore essential components for enhancing organisational resilience within the Malaysian construction industry.

Collectively, the fiscal, action plan and monetary strategy findings provide a comprehensive understanding of Malaysia's macro-level crisis response, directly addressing RO2 and RQ2. The results reinforce the crisis governance patterns discussed

in Chapter 2 (IMF, 2020; OECD, 2021) and align with the resilience models in Chapter 3, which emphasise the importance of coordinated financial, operational and institutional interventions during systemic disruptions. Consistent with the expert insights in Chapter 5, the findings show that fiscal strategies, particularly public projects, sector-specific support and employment protection act as immediate stabilisers for the construction sector. Meanwhile, action plan strategies such as strengthening international trade, enhancing crisis response capacity and accelerating technological adoption (particularly AI) indicate a shift toward long-term structural resilience and preparedness. Monetary strategies complement these efforts by maintaining liquidity through tax relief, reduced interest rates and flexible financing mechanisms, addressing the cash-flow challenges frequently highlighted by industry practitioners. When synthesised, these results demonstrate that effective crisis management requires an integrated approach combining government spending, strategic planning and financial relief measures. These macro-level insights not only validate RO2 but also directly inform RO3 by providing the external policy environment that the proposed CSCMP must align with. Ensuring coherence between organisational-level crisis planning and national strategies is therefore essential for strengthening resilience within the Malaysian construction industry.

6.4.3 Existing Strategies by Construction Organizations (N = 133) (RO2)

Section C examines the micro-level crisis management strategies currently practiced by construction organisations, directly addressing RO2 and RQ2, which aim to identify crisis response approaches adopted within the industry. The findings also complement discussions in Chapter 2, which emphasised the sector's historical reliance on reactive crisis management (Bakar, 2020; Lai, 2016), and align with expert insights in Chapter 5, where JKR, CIDB and RISM confirmed that most construction firms lacked formal preparedness measures before Covid-19. This section is presented in three segments: (i) Pre-Crisis Preparedness; (ii) Response During and Post-Crisis; and (iii) Efficacy of Current Response Strategies.

a) Segment i: Pre-Crisis Preparedness

Table 6.10
Segment i: Pre Crisis Preparedness

No.	Variables	Mean Value	SD	Ranking
1.	Focus on reactive instead of proactive	3.74	0.90	1
2.	Have long term assumptions on threats	3.73	0.95	2
3.	Explore digitalization	3.71	0.97	3
4.	Have contingencies plan	3.65	0.93	4
5.	Allocate budget	3.64	1.08	5
6.	Have a crisis plan	3.54	1.04	6
7.	Have a strategic planning	3.53	1.06	7
8.	Have a business continuity plan	3.29	1.13	8
9.	Organization in denial	3.34	1.14	9
10.	Organization remains ignorant	3.00	1.19	10

Table 6.10 shows that the construction industry remains largely reactive rather than proactive in preparing for crises as a pattern repeatedly highlighted in the literature (Olanrewaju & Tan, 2021) and reinforced by findings in Chapter 5. The highest-ranked item, “focus on reactive instead of proactive approaches” (mean = 3.74, SD = 0.90), reflects a long-standing sectoral behaviour of responding only when disruptions occur rather than implementing preventive measures. Although organisations acknowledge long-term threats (mean = 3.73, SD = 0.95), this awareness does not translate into operational readiness.

There is growing interest in digitalisation (mean = 3.71, SD = 0.97), consistent with technological resilience trends discussed in Chapter 3 and exemplified by organisations such as Petronas (2020) and EPF (2020). However, essential preparedness measures such as contingency planning (mean = 3.65, SD = 0.93), budget allocation (mean = 3.64, SD = 1.08), crisis planning (mean = 3.54, SD = 1.04), strategic planning (mean = 3.53, SD = 1.06) and business continuity planning (mean = 3.29, SD = 1.13) remain insufficiently developed.

Alarmingly, some organisations still show denial (mean = 3.34, SD = 1.14) or ignorance (mean = 3.00, SD = 1.19) toward crisis risks. These findings echo Chapter 5 expert concerns that crisis planning culture remains weak across the industry. Overall,

segment (i) confirms that proactive crisis management is not yet institutionalised, underscoring a key gap that RO3 (CSCMP development) must address.

b) Segment ii: Response During and Post-Crisis

Table 6.11
Segment ii: Response During and Post-Crisis

No.	Variables	Mean Value	SD	Ranking
1.	Adhere with SOP	4.02	0.74	1
2.	Remote working	4.02	0.90	2
3.	Struggle to survive	4.00	0.74	3
4.	Innovation steering strategic responds	3.92	0.66	4
5.	Rely on government support	3.72	0.90	5
6.	Preserve status quo	3.50	0.89	6
7.	Reduce assets	3.35	0.95	7
8.	No salary increment	3.25	1.09	8
9.	Cost cutting measures	3.09	1.09	9
10.	Pressure employee	3.44	1.31	10
11.	Exit/Discontinue business	2.95	1.17	11

The results in Table 6.11 reveals that during crises, organisations prioritise compliance measures such as adherence to SOPs (mean = 4.02, SD = 0.74) and adoption of remote working (mean = 4.02, SD = 0.90). These align with strategies documented during Covid-19 across Malaysia and globally (IMF, 2020; OECD, 2021).

Despite these measures, many firms struggled to survive (mean = 4.00, SD = 0.74), reflecting the financial and operational pressures highlighted by Bakar (2020) and experts in Chapter 5. Some companies adopted innovation and strategic shifts (mean = 3.92, SD = 0.66), though this was not the dominant response. Reliance on government support (mean = 3.72, SD = 0.90) was significant, further demonstrating the industry's dependence on macro-level interventions, consistent with RO2 findings in Section B.

Cost-cutting measures, including asset reduction (mean = 3.35, SD = 0.95), salary freezes (mean = 3.25, SD = 1.09), and operational cost minimisation (mean = 3.09, SD = 1.09) were widely practiced, indicating attempts to stabilise operations under

financial strain. Meanwhile, employee pressure (mean = 3.44, SD = 1.31) also increased, suggesting internal organisational tension during crises.

Business exit or discontinuation (mean = 2.95, SD = 1.17) ranked lowest, showing that despite severe constraints, most organisations attempted to remain operational rather than shut down. Overall, segment (ii) shows that crisis responses were primarily defensive and compliance-oriented, with innovation and strategic adaptability emerging only among more resilient organisations.

c) Segment (iii): Efficacy of Response Strategies

Table 6.12
Segment iii: Efficacy of Strategies

No.	Variables	Mean Value	SD	Ranking
1.	Still looking for strategies	3.86	0.74	1
2.	CM is still untested/underexplored	3.78	0.80	2
3.	Lack of attention in preparation	3.74	0.83	3
4.	Rely on untested/fragile plan	3.37	1.09	4

As shown in Table 6.12, organisations report substantial uncertainty in their crisis strategies (mean = 3.86, SD = 0.74). Many acknowledge that their crisis management (CM) frameworks remain untested or underexplored (mean = 3.78, SD = 0.80), confirming findings in Chapter 2 that most construction firms have not institutionalised crisis drills or simulations (Boin & t'Hart, 2007; Mitroff, 2004).

Preparedness is also not prioritised (mean = 3.74, SD = 0.83), and organisations frequently rely on weak or fragile plans (mean = 3.37, SD = 1.09). This aligns with Chapter 2 and Chapter 5 expert observations that the industry lacked robust crisis structures and was overly dependent on government interventions during Covid-19 (Yahaya & Othman, 2023). Segment (iii) therefore reveals a significant gap in crisis strategy efficacy, highlighting a disconnect between awareness and preparedness (Kum & Yap, 2024).

Overall, the combined findings from pre-crisis preparedness, crisis response, and strategy efficacy reveal systemic weaknesses in the Malaysian construction industry's crisis management capability. Organisations remain predominantly reactive, lacking structured crisis plans, dedicated budgets, and tested business continuity frameworks as patterns consistent with earlier observations in the literature (Bakar,

2020; Lai, 2016; Olanrewaju & Tan, 2021; Yahaya & Othman, 2023; Kum & Yap, 2024) and expert insights in Chapter 5 (JKR, CIDB and RISM). During crises, responses are heavily centred on SOP compliance, remote working, and financial survival, with limited adoption of adaptive or innovative approaches, reflecting the sector's low crisis maturity compared with resilient organisations such as Petronas and EPF (Petronas, 2020; EPF, 2020).

Post-crisis reflections further indicate that many existing crisis plans are untested, inconsistent, and insufficiently prioritised, signalling a deeper structural vulnerability that aligns with crisis management theory emphasising the dangers of untested plans and institutional complacency (Boin & t'Hart, 2007; Mitroff, 2004). These findings reinforce the expert recommendations in Chapter 5 that the industry must transition from reactive to proactive crisis management through institutionalising structured risk assessments, developing and testing Business Continuity Plans (BCP), strengthening financial contingency planning, leveraging digitalisation and predictive analytics, conducting crisis simulations, and fostering innovation-driven responses.

Importantly, these micro-level gaps provide direct empirical grounding for RO3, which aims to develop a Construction Sector Crisis Management Plan (CSCMP). The data clearly show where organisations fail (reactivity, weak BCPs), what strategies they currently rely on (SOPs, government dependence, cost-cutting), why these strategies are ineffective (lack of testing, fragmentation, and limited adaptability), and what improvements are required (digitalisation, structured planning, financial preparedness, and resilience-building mechanisms). These insights form a critical foundation for shaping the 5 phases including Prepare, Prevent, Respond, Recover and Redesign of the CSCMP presented in this Chapter 6, ensuring the proposed framework is evidence-based, industry-responsive, and addresses the structural weaknesses highlighted through the quantitative analysis.

6.4.4 Proposing a Construction Sector Crisis Management Plan (CSCMP) (N = 133) (RO3)

The development of the CSCMP is grounded in the theoretical foundations established in Chapters 2 and 3, the methodological design in Chapter 4, and the qualitative insights from Chapter 5. This section directly contributes to Research Objective 3 (RO3) which to propose a CSCMP for Malaysian construction

organisations and answers Research Question 3 (RQ3) concerning the key components required for an effective crisis management framework. The five step crisis management model adopted (Prepare, Prevent, Respond, Recover, Redesign) is consistent with established crisis management theories (Fink, 1986; Mitroff, 2005; Boin & 't Hart, 2010) and will be adapted to the Malaysian construction sector based on empirical evidence presented in Chapter 6.

The quantitative findings from Sections A, B, and C (RO1 and RO2) establish clear patterns of industry vulnerability and weaknesses in existing practices, providing a strong empirical platform for the development of the CSCMP. These results complement the expert interviews in Chapter 5, which highlighted the absence of formal CMPs, limited crisis readiness, and a prevalent reliance on reactive measures. Section D therefore synthesises these insights to operationalise a comprehensive, evidence-based crisis management plan aligned with both theory and industry realities.

a) Step 1: Prepare – Organisational Level (Pre-Crisis)

Table 6.13
Step 1: Prepare Organisational (Pre-Crisis)

No.	Variables	Mean Value	SD	Ranking
1.	Ensure all divisions play role	4.21	0.60	1
2.	Develop system and action plan	4.20	0.60	2
3.	Ensure readiness & sufficiency procedure	4.17	0.57	3
4.	Form a crisis management team (CMT)	4.15	0.68	4
5.	Set long term plan/business strategy	4.13	0.69	5
6.	Develop strategic business partnership	4.11	0.60	7
7.	Explore lean business & digitalization	4.11	0.65	8
8.	Constantly engage with key crisis matters	4.11	0.62	9
9.	Develop knowledge & right skill set	4.10	0.64	10
10.	Create robust crisis practicing	4.09	0.62	11
11.	CMT to initiate context setting	4.02	0.70	12

The findings in Table 6.13 demonstrate exceptionally strong agreement on the importance of structured organisational preparation, directly supporting RO1 (identifying vulnerabilities), RO2 (understanding existing strategies), and informing RO3 (proposing the CSCMP). The highest ranked item is the “ensuring that all divisions

play a role” in crisis preparedness (Mean = 4.21, SD = 0.60) has reflects a clear recognition that crisis management requires whole organisation coordination. This aligns with the integrated crisis governance frameworks highlighted in Chapter 3, including Petak’s (1985) emergency management cycle, Moore’s (2002) hierarchical activation structure, and Mitroff’s (2005) holistic crisis lifecycle model, all of which emphasise cross functional alignment as a prerequisite for effective crisis response.

Similarly, strong agreement on the need to develop structured crisis systems and action plans (Mean = 4.20, SD = 0.60) and to ensure procedural readiness (Mean = 4.17, SD = 0.57) directly addresses the fragmentation and lack of systematisation highlighted by experts in Chapter 5. During the interviews, authorities such as JKR, CIDB, and RISM observed that crisis preparedness in Malaysia remained largely ad hoc and reactive served as an observation empirically validated by the quantitative results under RO2.

Leadership readiness also emerged as a key component, evidenced by strong support for the establishment of a Crisis Management Team (CMT) (Mean = 4.15, SD = 0.68). This finding aligns with organisational resilience literature reviewed in Chapter 3, where Duchek (2020) and Hu & Yun (2022) emphasise that leadership capability and crisis governance structures significantly influence an organisation’s ability to anticipate, absorb and adapt to disruptions. The emphasis on long-term strategic planning (Mean = 4.13, SD = 0.69) and the cultivation of strategic business partnerships (Mean = 4.11, SD = 0.60) further supports the argument presented in Chapter 2 that proactive external engagement and network resilience are critical determinants of crisis survival (CIDB, 2020).

Notably, respondents highlighted several forward-looking capabilities as essential preparedness tools, including digitalisation (Mean = 4.11, SD = 0.65), knowledge development (Mean = 4.10, SD = 0.64), and crisis simulations (Mean = 4.09, SD = 0.62). These align with emerging Malaysian construction sector initiatives discussed in Chapter 2 (CIDB, 2020; Tan, 2020), which stressed the importance of digital infrastructure, BIM-driven monitoring, and simulation-based forecasting as means of increasing crisis foresight and operational agility.

Interestingly, even the lowest-ranked item, the CMT involvement in context setting (Mean = 4.02, SD = 0.70) is still received strong agreement (>4.0), reinforcing the conclusion that practitioners broadly support a structured and formalised pre-crisis framework (Coombs (2007).

Overall, these findings validate the qualitative evidence presented in Chapter 5, where experts unanimously highlighted weaknesses in pre-crisis planning, fragmented decision-making, and limited preparedness culture across the sector. The strong endorsement of structured planning, leadership-driven crisis governance, digital transformation, and strategic collaboration indicates that industry players conceptually support the core elements of the Prepare phase proposed under the CSCMP. This aligns with international crisis management recommendations (Sahin & Ulubeyli, 2015) and national reports (The Star, 2020; JKR, 2022; CIDB, 2022), reaffirming the sector's recognition that a systematic, coordinated, and anticipatory approach is essential for strengthening crisis readiness.

b) Step 1: Prepare through Organizational Policies (Pre-Crisis)

Table 6.14

Prepare Through Organizational Policies (Pre-Crisis)

No.	Variables	Mean Value	SD	Ranking
1.	Ready for change	4.26	0.66	1
2.	Ready positive cashflow	4.24	0.62	2
3.	Vision the future	4.20	0.66	3
4.	Demonstrate good corporate ethic	4.20	0.63	4
5.	Innovation in sustainability	4.17	0.75	5
6.	Reduce material wastage	4.14	0.60	6
7.	Invest in risk management	4.10	0.63	7
8.	Secure additional fund	4.04	0.64	8

The findings in Table 6.14 for policy related preparedness further reinforce the crucial role of organisational governance and strategic policy alignment in building crisis resilience. The consistently high mean values across all variables indicate that respondents perceive policy readiness as a foundational element of the Prepare phase, directly informing RO3 and supporting the vulnerability evidence established under RO1. The strongest emphasis on organisational readiness for change (Mean = 4.26, SD = 0.66) reflects a recognition that adaptability and agility are essential preconditions for withstanding external shocks, an issue repeatedly highlighted by practitioners in Chapter 5, who noted that rigid structures and slow decision cycles contributed to crisis escalation during Covid-19.

Similarly, maintaining a positive cashflow position (Mean = 4.24, SD = 0.62) aligns with the financial vulnerability themes identified in RO1 and the literature in Chapter 2, which emphasised that liquidity constraints significantly impair crisis responsiveness (Olanrewaju & Tan, 2021; Bakar, 2020). These financial readiness indicators demonstrate an understanding that resilience is inseparable from strong fiscal governance, echoing crisis on finance principles emphasised by Pearson and Clair (1998).

Forward looking elements such as envisioning the future (Mean = 4.20, SD = 0.66) and ethical corporate behaviour (Mean = 4.20, SD = 0.63) correspond directly to the crisis ethics and organisational legitimacy frameworks reviewed in Chapter 2 (Seeger, Sellnow & Ulmer, 2003). Ethical governance becomes even more significant in crisis contexts, where trust, transparency, and stakeholder alignment determine the success of organisational responses as a pattern corroborated by expert interview findings in Chapter 5.

Sustainability driven policies, including innovation in sustainability (Mean = 4.17, SD = 0.75) and material waste reduction (Mean = 4.14, SD = 0.60), reflect increasing alignment with post-pandemic recovery trajectories (OECD, 2021; UNDRR, 2020). The convergence of sustainability and crisis resilience highlights an industry shift toward long-term operational efficiency and environmental responsibility, both of which have been demonstrated in resilient organisations such as PETRONAS and EPF (Chapter 5).

Investment in risk management systems (Mean = 4.10, SD = 0.63) further supports the risk governance models examined in Chapter 3 (Zang, 2025) and responds to RQ2, which identified inadequate risk monitoring as a major gap in current crisis practices. Although slightly lower, the importance placed on securing additional funding (Mean = 4.04, SD = 0.64) reinforces the liquidity related vulnerabilities identified earlier and signals the need for stronger financial buffers, particularly for contractors who experienced acute cashflow disruptions during Covid-19.

Collectively, these findings confirm that policy readiness, encompassing agility, fiscal stability, ethical governance, sustainability, and risk management is regarded by practitioners as an essential pillar of pre-crisis resilience. This directly supports the structuring of the Prepare phase in the CSCMP and provides empirical justification for embedding policy driven mechanisms into the final framework presented in this Chapter 6.

c) Step 2: Prevent (Pre-Crisis)

Table 6.15
Prevent (Pre-Crisis)

No.	Variables	Mean Value	SD	Ranking
1.	Implement action plan	4.20	0.60	1
2.	Early warning signal detection	4.14	0.59	2
3.	Improve and mitigate crisis	4.14	0.63	3
4.	Aim to reduce destructive effect	4.14	0.63	4
5.	CMT identify principal of crisis	4.11	0.57	5
6.	Correctly detect impending crisis	4.11	0.65	6
7.	Manage and curb transmission	4.04	0.61	7
8.	Constantly review crisis profile	4.04	0.64	8
9.	Report & monitor crisis	4.02	0.73	9
10.	Apply master cyclist approach	4.01	0.68	10
11.	Remove unnecessary obstacle	3.98	0.72	11
12.	Focus on cost cutting measurement	3.92	0.76	12

The findings for the Prevent phase in Table 6.15 demonstrates strong sector-wide recognition of the importance of early intervention and risk mitigation, directly addressing RO1 (identifying crisis vulnerabilities) and RQ1 (understanding how crises affect key organisational domains). These results also contribute to RO3 by specifying the preventive mechanisms that must be embedded within the proposed CSCMP. The quantitative evidence aligns closely with the prodromal crisis stage described in Fink's (1986) crisis lifecycle model which was reviewed in Chapter 2, emphasises that early detection and timely intervention can significantly reduce the severity of crisis impacts.

From Table 6.15, the highest ranked item is implementing an action plan before a crisis materialises (Mean = 4.20, SD = 0.60), reflects a strong industry-wide consensus that structured pre-crisis protocols are essential to mitigate disruption. This confirms expert observations in Chapter 5, where government authorities (JKR, CIDB, RISM) highlighted that the absence of predefined crisis mitigation plans contributed to slow response and operational paralysis during Covid-19.

Equally strong support was recorded for early warning signal detection (Mean = 4.14, SD = 0.59), continuous crisis mitigation improvements (Mean = 4.14, SD = 0.63), and efforts to reduce destructive effects (Mean = 4.14, SD = 0.63). These findings reinforce the gap observed in qualitative interviews, where practitioners acknowledged

the lack of monitoring systems, predictive analytics, and scenario-based forecasting the mechanisms that could have helped anticipate labour shortages, supply chain disruptions, and financial volatility.

Leadership plays a similarly critical role in crisis prevention, with respondents agreeing that the Crisis Management Team (CMT) must identify crisis principles (Mean = 4.11, SD = 0.57) and detect impending crises accurately (Mean = 4.11, SD = 0.65). These results correspond with crisis detection and sense-making models reviewed in Chapter 3, where Boin, McConnell and 't Hart (2008) emphasised the importance of leadership-driven surveillance and coordination in strengthening early crisis recognition.

Operational and system-based monitoring mechanisms were also strongly endorsed. This includes the ability to manage and curb transmission (Mean = 4.04, SD = 0.61), regularly review crisis profiles (Mean = 4.04, SD = 0.64), and report and monitor crisis indicators (Mean = 4.02, SD = 0.73). These reflect the risk governance frameworks discussed in Chapter 3 (Singla, 2025), which emphasise continuous monitoring, updated risk profiles, and structured reporting as essential components of preventive crisis management.

The two lower-ranked items, the removing unnecessary obstacles (Mean = 3.98, SD = 0.72) and cost cutting as a preventive measure (Mean = 3.92, SD = 0.76) also offer particularly meaningful insights. Their comparatively lower ranking underscores that crisis prevention is perceived as requiring investment, rather than austerity driven constraints. This supports findings under RO2, Chapter 2 and Chapter 5, which showed that crisis prevention efforts in many Malaysian construction organisations were underdeveloped due to insufficient resource allocation, lack of risk management investment, and an over reliance on reactive crisis governance (World Bank, 2020; JKR, 2022; CIDB, 2022).

Collectively, the findings confirm that respondents strongly value structured mitigation plans, leadership driven crisis detection, early warning capabilities, and systematic monitoring as essential elements of the Prevent phase. These insights reinforce the argument that were developed in Chapters 2, 3, and 5, that strengthening early detection and mitigation is critical for reducing crisis severity and ensuring organisational continuity. The Prevent phase therefore forms a core pillar of the proposed CSCMP in Chapter 6, ensuring that organisations can anticipate disruptions, intervene early, and minimise operational and financial losses.

d) Step 3: Respond (During Crisis)

Table 6.16
Step 3: Responds (During Crisis)

No.	Variables	Mean Value	SD	Ranking
1.	Demonstrate good corporate ethic	4.19	0.60	1
2.	Continuously review people well being	4.17	0.68	2
3.	Carefully review contract terms	4.17	0.69	3
4.	Sharp & swift decision making	4.15	0.60	4
5.	Taking prudent and decisive measure	4.14	0.61	5
6.	Organize & manage crisis	4.14	0.64	6
7.	Concentrate on relationship with strategic partnership	4.12	0.63	7
8.	Careful review project risks	4.11	0.62	8
9.	Promote continuous improvement	4.11	0.68	9
10.	Monitor all responds	4.10	0.63	10
11.	Maintain good relationship with supplier	4.09	0.57	11
12.	Activate respond protocol	4.08	0.61	12
13.	Review action in line with positive cashflow	4.08	0.69	13
14.	Focus on lowest construction cost	4.08	0.71	14
15.	Testing & exercise	4.08	0.61	15
16.	Prioritize site management	4.06	0.65	16
17.	Focus on social responsibilities	4.06	0.60	17
18.	Activate crisis oversight structure	4.05	0.66	18
19.	Respond in timely manner	4.05	0.71	19
20.	Maintain corporate image	4.04	0.66	20

The findings for the Respond phase illustrate in Table 6.16 above demonstrates strong alignment with the crisis action models reviewed in Chapters 2 and 3, particularly in relation to ethical leadership, high velocity decision making and operational discipline. These results directly support RO2 (examining existing strategies) and inform RO3 by identifying the during-crisis mechanisms that must be embedded within the CSCMP.

The highest rated capability is demonstrating good corporate ethics (Mean = 4.19, SD = 0.60) which reflects the centrality of ethical legitimacy in crisis response, consistent with the renewal and ethical communication perspectives discussed by Sellnow & Seeger (2013). Ethical crisis behaviour is particularly critical in the

Malaysian construction context, where trust, compliance, and regulatory scrutiny shape organisational reputations (Chapter 5).

Strong emphasis on continuous monitoring of employee wellbeing (Mean = 4.17, SD = 0.68) and careful assessment of contract terms (Mean = 4.17, SD = 0.69) aligns with RO1 findings on workforce vulnerability, labour disruption, and contractual instability. These results further substantiate insights from Chapter 5, where industry experts reported severe challenges regarding worker welfare and contractual renegotiations during Covid-19.

Capabilities related to rapid decision-making (Mean = 4.15, SD = 0.60) and decisive action (Mean = 4.14, SD = 0.61) correspond with crisis improvisation and sense-making literature (Weick, 1993), demonstrating the industry's recognition that timely decisions reduce crisis escalation. Similarly, the strong endorsement of organised crisis management (Mean = 4.14, SD = 0.64), maintaining strategic partnerships (Mean = 4.12, SD = 0.63), and continuous improvement (Mean = 4.11, SD = 0.68) reflects the need for structural coordination and adaptive responses where this issues repeatedly highlighted by experts in Chapter 5.

Further elements such as nurturing supplier relationships, activating response protocols, ensuring positive cash flow, conducting testing and exercises, strengthening site management, and maintaining corporate image can reinforce the multidimensional challenges identified under RO1, particularly in supply chain disruption, financial fragility, and reputational risks (ILO, 2020; United Nations, 2020; CIDB, 2020).

Overall, these findings confirm that response during crisis in the Malaysian construction industry hinges on ethical leadership, rapid and structured decision making, and operational stability. This provides critical empirical input for the Respond phase of the CSCMP, addressing weaknesses identified in Chapter 5 and extending theoretical insights from Chapters 2 and 3.

e) Step 4: Recover (Post-crisis)

The Recover phase findings demonstrate strong alignment with renewal, resilience, and continuity theories discussed in Chapters 2 and 3, especially the post-crisis learning framework by Ulmer, Sellnow & Seeger (2011) and the business continuity standards (ISO 22301). These insights directly inform RO3 by clarifying the strategies needed to restore operations and build long-term resilience.

Table 6.17
Step 4: Recover (Post-Crisis)

No.	Variables	Mean Value	SD	Ranking
1.	Enhance human readiness	4.20	0.63	1
2.	Review crisis management mechanism for lesson learns	4.19	0.62	2
3.	Recover and restore business	4.18	0.66	3
4.	Find way for Proper plan for future crisis	4.17	0.62	4
5.	Evaluate the plan	4.15	0.61	6
6.	Keep stakeholders updated	4.14	0.64	7
7.	Ensure sufficient resources	4.14	0.69	8
8.	Leader to formulate long term strategies	4.11	0.71	9
9.	Cultivate & anticipate disruption	4.11	0.62	10
10.	Profiting from crisis	4.08	0.76	11
11.	Regularly review and refine plan	4.08	0.62	12

As summarised in Table 6.17, the highest ranked recovery action is enhancing human readiness (Mean = 4.20, SD = 0.63) which corresponds directly with RO1 findings on labour shortages and capability gaps (ILO, 2020), and with expert concerns in Chapter 5 (CIDB, 2022), where practitioners highlighted the lack of skilled personnel and resilience training during Covid-19. This reinforces the need for workforce development as a central component of post-crisis recovery.

Strong emphasis on reviewing crisis mechanisms for lessons learned (Mean = 4.19, SD = 0.62), restoring business operations (Mean = 4.18, SD = 0.66) mirrors the continuity principles discussed in Chapter 3 where business continuity frameworks were identified as essential yet underutilised (Bachtiar et al., 2023). These findings validate that post-crisis evaluation and operational restoration are understood as critical pathways to resilience.

Similarly, forward planning capabilities such as developing long-term strategies (Mean = 4.17, SD = 0.62), evaluating crisis plans (Mean = 4.15, SD = 0.61), and anticipating future disruptions (Mean = 4.11, SD = 0.62) have underscore the learning and adaptive components of resilience highlighted by Duchek (2020). These align directly with expert recommendations in Chapter 5 (PETRONAS, 2022) urging the industry to incorporate proactive learning cycles and scenario planning into post-crisis processes.

The importance placed on stakeholder communication (Mean = 4.14, SD = 0.64), ensuring resource sufficiency (Mean = 4.14, SD = 0.69), and leadership driven long-term strategy formulation (Mean = 4.11, SD = 0.71) further strengthens the case for integrated recovery governance, supporting RO3's objective of constructing a comprehensive CSCMP framework.

Overall, the evidence confirms that recovery in the construction sector is conceptualised as both an operational and strategic process involving workforce readiness, business continuity, structured reviews, and long-term planning. These results provide robust empirical grounding for the Recovery phase of the CSCMP developed in Chapter 6.

f) Step 5: Redesign (Post-Crisis)

Table 6.18
Step 5: Redesign

No.	Variables	Mean Value	SD	Ranking
1.	Analysis & reflection	4.15	0.61	3
2.	Produce young professional	4.15	0.67	4
3.	Follow up & record feedback	4.10	0.55	6
4.	Continuously invest in Crisis Management	4.09	0.60	7

Table 6.18 presents the findings for the Redesign phase, which focuses on post-crisis transformation, organisational learning, and long-term capability building. The consistently high mean values indicate strong industry recognition of the importance of long-term restructuring form as a core component of RO3, which seeks to develop a sector-wide Construction Sector Crisis Management Plan (CSCMP). These findings also reinforce the expert insights from Chapter 5, which emphasised the need for systemic renewal and futureproofing of the Malaysian construction sector.

The redesigned set of variables reflects the essence of the Redesign phase as conceptualised in crisis renewal and organisational resilience literature (Ulmer, Sellnow & Seeger, 2011; Ducheck, 2020). Each variable contributes to a forward-looking transformation approach that addresses the structural gaps identified in RO1, the limited strategic capabilities highlighted in RO2, and the expert concerns in Chapter 5 regarding the industry's reactive orientation.

The Redesign phase reflects strong consensus among respondents that long-term transformation requires structured learning, talent development, formalised documentation, and sustained investment. High agreement on analysis and reflection (Mean = 4.15, SD = 0.61) demonstrates recognition that systematic post-crisis review and lessons learnt processes are essential as the issue highlighted in Chapter 3's post-crisis learning models (Seeger et al., 2003) and reinforced by Chapter 5 experts who noted the industry's historical failure to translate crisis experience into improved preparedness. Similarly, nurturing young professionals (Mean = 4.15, SD = 0.67) is viewed as critical for building future resilience, addressing the competency and labour shortages identified under RO1 and in Chapter 5. The importance of follow up and feedback recording (Mean = 4.10, SD = 0.55) reflects the need for formalised knowledge retention, consistent with international governance recommendations (OECD, 2021) and the structured learning processes discussed in Chapter 3. Finally, continuous investment in crisis management (Mean = 4.09, SD = 0.60) highlights the shift toward institutionalised resilience noted in Chapter 2, echoing expert concerns in Chapter 5 that crisis planning in the industry often occurs only after disruptions. Together, these findings underscore that effective redesign requires ongoing capability building, systematic reflection, and sustained organisational commitment.

Overall, Section D provides the empirical foundation for developing the Construction Sector Crisis Management Plan (CSCMP), thereby fulfilling RO3 and addressing RQ3. By analysing the five phases of crisis management covers Prepare, Prevent, Respond, Recover, and Redesign and the findings integrate quantitative survey results with the expert insights from Chapter 5, while drawing on the crisis and resilience theories outlined in Chapters 2 and 3.

Overall, respondents showed consistently high agreement (Means ≥ 4.00) across all CSCMP components, indicating strong sector-wide support for a structured crisis management framework. The Prepare and Prevent phases highlight the importance of cross functional planning, financial readiness, digitalisation, early-warning systems, and risk monitoring. These results directly correspond to the vulnerabilities identified under RO1 and validate the preparedness and forecasting gaps reported in Chapter 5 and examined under RO2 (DOSM, 2020; CIDB, 2020; Harun & Razak, 2020; JKR, 2022; CIDB, 2022).

The Respond and Recover phases reinforce the need for ethical leadership, rapid decision making, contract and workforce management, business continuity, and structured post-crisis review as the elements that closely match the operational weaknesses and recovery difficulties described by practitioners in Chapter 5 (PETRONAS, 2022), and align with crisis response and continuity principles from Chapters 2 and 3 (Hu & Yun, 2022).

Finally, the strong endorsement of the Redesign phase demonstrates recognition that long-term resilience requires strategic transformation, capability development, and continuous investment in crisis management, echoing the calls for systemic change highlighted throughout the literature and expert interviews.

Taken together, the Section D findings show that while crisis management practices in the Malaysian construction sector remain fragmented and reactive (as identified in RO2), the industry exhibits strong readiness to adopt a formalised CSCMP. These results provide the evidence base for the CSCMP introduced in Chapter 6, ensuring the model directly addresses the vulnerabilities, strategic gaps, and resilience priorities identified across the entire study.

6.4.5 Ensuring Business Continuity (RO4)

Table 6.19
Ensuring Business Continuity

No.	Variables	Mean Value	SD	Ranking
1	Ensure survival and continuity of business	4.32	0.60	1
2	Remain relevant & resilient	4.20	0.62	2
3	Ensure business continuity	4.17	0.63	3
4	Set long term plan/business strategy	4.13	0.71	4
5	Staff training on the importance of business continuity	4.12	0.75	5
6	Response with business continuity plan	3.29	1.13	6

Table 6.19 presents respondents' perspectives on the elements required to ensure business continuity within the five step crisis management model proposed in this study. As evidenced throughout earlier sections of the analysis, the five phases of proposed CSCMP include Prepare, Prevent, Respond, Recover, and Redesign represent the backbone of a crisis management lifecycle, consistent with the crisis and resilience

frameworks discussed in Chapters 2 and 3 (Fink, 1986; Mitroff, 2005; Ulmer, Sellnow & Seeger, 2011). The findings in this section further consolidate the empirical grounding for RO3, which focuses on developing the CSCMP and reinforce the insights derived from RO1 and RO2 pertaining to organisational vulnerabilities and existing crisis practices.

The results in Table 6.19 shows that respondents place strong emphasis on business continuity within the five step CSCMP, with all but one variable scoring above 4.00. This reflects broad industry recognition of the need for long term resilience, strategic planning, and organisational capability, consistent with earlier analyses and the theoretical foundations in Chapters 2 and 3.

The highest priority is ensuring business survival and continuity (Mean = 4.32, SD = 0.60), confirming that continuity remains the central goal of crisis management. This aligns with the Redesign phase and with renewal models emphasised in the literature (Ulmer et al., 2011) and expert insights from Chapter 5. Strong agreement on remaining relevant and resilient (Mean = 4.20, SD = 0.62) further reinforces the sector's awareness of the need for innovation and adaptive capability, supporting RO3 and earlier observations under RO1 and RO2.

Ensure business continuity (Mean = 4.17, SD = 0.62) and long-term strategy development (Mean = 4.13, SD = 0.69) highlight the central role of the Recovery and Prepare phases, echoing vulnerabilities identified in RO1, particularly supply chain fragility and financial instability and aligning with continuity standards such as ISO 22301. Likewise, staff training (Mean = 4.12, SD = 0.70) underscores the importance of workforce capability building, consistent with resilience theory (Duchek, 2020) and the skills gaps highlighted in Chapters 2 and 5 (CIDB, 2020; CIDB, 2022).

However, the lowest-ranked variable, responding with a business continuity plan (Mean = 3.29, SD = 0.71) reveals a critical implementation gap. While organisations value continuity conceptually, many lack the ability to activate business continuity plan effectively during crises. This mirrors earlier findings in Section D and Chapter 5 regarding untested, generic, or incomplete crisis plans (Husein & Borisovich, 2021; CIDB, 2020).

Overall, the results confirm a clear divide between awareness and execution, providing strong evidence for RQ3 and RQ4 and reinforcing the need for a formalised, sector-wide CSCMP with practical implementation guidance to address persistent weaknesses in real-time crisis response.

6.5 Inferential Analysis

As outlined in Chapter 4, inferential analysis was employed to examine both differences between groups and relationships among the key constructs underpinning the proposed Construction Sector Crisis Management Plan (CSCMP), namely: Issues (vulnerable areas), Existing Strategies, CSCMP, and Business Continuity. Two statistical techniques were applied: the independent samples T-test and Spearman's rank-order correlation.

The independent samples T-test was used to determine whether there are statistically significant differences between two independent groups, namely contractors and consultants, across the four key constructs. This analysis provides insight into whether stakeholder groups differ in their perceptions and practices related to crisis management.

In addition, correlation analysis was conducted to examine the strength and direction of relationships among the key variables. Given the non-normal distribution of the data (Shapiro–Wilk $p < 0.05$, with skewness and kurtosis values outside the ± 1 range), Spearman's rank-order correlation was employed. This method is robust to non-normality and outliers and is appropriate for ordinal Likert-type data.

Normality was assessed separately for each group (contractors and consultants) using the Shapiro–Wilk test, together with skewness and kurtosis statistics. The results indicated that the data deviated from normality ($p < 0.05$), supporting the use of non-parametric correlation analysis (Spearman's rho). However, the independent samples T-test was retained for group comparison, as it is considered robust to moderate violations of normality, particularly with adequate sample sizes.

6.5.1 Independent Sample T-test (Contractor vs Consultant)

An independent samples T-test was employed in this study to determine whether there are statistically significant differences between two independent groups, namely contractors and consultants, across the four key constructs: RO1 (Vulnerable Areas), RO2 (Existing Crisis Management Strategies), RO3 (CSCMP Components), and RO4 (Business Continuity). The selection of this test is appropriate as the study involves comparing the mean responses of two distinct and unrelated groups on continuous

variables measured using Likert scales, which are commonly treated as interval data in social science research.

The independent samples T-test is widely used when the objective is to examine whether two groups differ significantly in their perceptions or responses. In this study, contractors and consultants represent two key stakeholder groups within the construction industry with different roles, responsibilities, and levels of involvement in crisis management. Therefore, the test enables the identification of whether these differences translate into statistically significant variations in their perceptions of vulnerabilities, strategies, and resilience practices.

Furthermore, the use of the T-test is justified as the data meet the key assumptions, including independence of observations and approximate normal distribution of responses, making it suitable for comparative analysis. The findings from this test provide important insights into whether a unified or differentiated approach is required in the development of the CSCMP framework.

Table 6.20
T-test Result

Construct	Mean (Contractor)	Mean (Consultant)	t-value	p-value	Significant
RO1 – Vulnerable Areas	3.953	3.963	−0.139	0.890	No
RO2 – Strategies	3.483	3.705	−2.342	0.022	Yes
RO3 – CSCMP	4.093	4.114	−0.248	0.805	No
RO4 – Business Continuity	3.809	3.945	−1.647	0.104	No

An independent samples T-test was conducted to compare contractors and consultants across the four key constructs: RO1 (Vulnerable Areas), RO2 (Existing Crisis Management Strategies), RO3 (CSCMP Components), and RO4 (Business Continuity). In this test, the t-value represents the magnitude and direction of the difference between group means, while the p-value indicates whether the observed difference is statistically significant. A p-value below 0.05 suggests a significant difference between groups, whereas a p-value above 0.05 indicates no statistically significant difference.

The results indicate that only RO2 (Existing Crisis Management Strategies) showed a statistically significant difference ($p < 0.05$), while RO1, RO3, and RO4 were not significant ($p > 0.05$). For RO1 (Vulnerable Areas), no significant difference was

observed ($t = -0.139$, $p = 0.890$), indicating that both contractors ($M = 3.953$) and consultants ($M = 3.963$) perceive crisis vulnerabilities in a similar manner. This suggests that vulnerabilities such as labour dependency, supply chain disruptions, and cost volatility are sector-wide issues affecting all stakeholders.

For RO2 (Existing Strategies), a significant difference was identified ($t = -2.342$, $p = 0.022$), with consultants reporting higher levels of strategic engagement ($M = 3.705$) compared to contractors ($M = 3.483$). This finding suggests that consultants tend to adopt more structured and proactive approaches to crisis management, likely due to their advisory and coordination roles. Importantly, this highlights a strategic capability gap within the industry, particularly among contractors.

For RO3 (CSCMP Components), no significant difference was found ($t = -0.248$, $p = 0.805$). Both contractors ($M = 4.093$) and consultants ($M = 4.114$) demonstrated strong agreement on the importance of the CSCMP components. The high mean scores indicate a shared recognition of the need for structured crisis management across all phases, including preparation, prevention, response, recovery, and redesign.

Similarly, for RO4 (Business Continuity), no significant difference was observed ($t = -1.647$, $p = 0.104$). Although consultants ($M = 3.945$) scored slightly higher than contractors ($M = 3.809$), both groups showed moderate levels of awareness, indicating recognition of business continuity principles but inconsistent implementation in practice.

Overall, the T-test results suggest that contractors and consultants share similar perspectives on vulnerabilities, CSCMP components, and business continuity, reinforcing the need for a unified, industry-wide crisis management framework. The significant difference observed in RO2 provides valuable insight into disparities in strategic readiness, highlighting the need for targeted capacity-building initiatives, particularly for contractors. This finding further supports the relevance and applicability of the proposed CSCMP in harmonising crisis management practices across the Malaysian construction sector.

6.5.2 Correlation

As discussed in section 6.3 above, Spearman's rank correlation is preferred for this study due to non-normal distribution and potential outliers, Spearman's Correlation should be used to ensure a more reliable and meaningful interpretation of the

relationship between variables. For this research, correlation is performed to test the degree of correlation between the 4 constructs by considering all the variables which later will form as the framework to CSCMP in the Malaysian Construction Industry.

Spearman's rho (ρ) (correlation coefficient) represents the strength and direction of the association between two variables, ranging from -1 to $+1$. Positive values indicate that both variables move in the same direction, whereas negative values show that one increases as the other decreases. Values closer to zero reflect weak or negligible relationships. The accompanying p-value (statistically significant) indicates whether the observed correlation is statistically significant. In this study, a significance level of at the 0.01 level (2-tailed) is applied; therefore, correlations with p-values below this threshold are considered statistically meaningful and unlikely to have occurred by chance. Conversely, p-values equal to or above 0.01 suggest that any apparent relationship may be random and not statistically reliable. Together, ρ and p provide evidence on whether associations between the constructs are substantive or merely incidental.

Table 6.21, Figure 6.1 and Figure 6.2 present the correlation matrix for the four constructs. All three core relationships in the conceptual framework; (1) between vulnerable areas and business continuity; (2) between vulnerable areas and existing strategies; (3) between vulnerable areas and CSCMP; and (4) between CSCMP and business continuity, thereby providing preliminary support for the structural relationships proposed in the conceptual framework.

Table 6.21
Correlation Between the Four Constructs

Spearman Correlation	Vulnerable Areas	Existing Strategies	CSCMP	Business Continuity
Vulnerable Areas	1	-0.071	.434**	.400**
		0.418	.000	.000
Existing Strategies	-0.071	1	-0.010	0.032
	0.418		0.914	0.718
CSCMP	.434**	-0.010	1	.862**
	.000	0.914		.000
Business Continuity	.400**	0.032	0.862**	1
	.000	0.718	.000	.000

***Correlation is significant at the 0.01 level (2-tailed)*

Based on Table 6.21, the findings are elaborated as following:

a) Vulnerable Areas and Existing Strategy

The correlation between Vulnerable Areas and Existing Strategies is weak and statistically non-significant ($\rho = -0.071$, $p = 0.418$). This finding reinforces the central conclusion of RO2 and the qualitative narratives in Chapter 5 that current crisis strategies used in the Malaysian construction sector lack coherence, depth, and structural integration. Chapter 6 further demonstrated that existing organisational responses are predominantly reactive, fragmented, and compliance-driven, with limited strategic foresight.

The absence of a meaningful correlation suggests that organisations experiencing higher levels of vulnerabilities (e.g., supply chain disruption, labour shortages, financial instability, and contractual exposure, as evidenced in Table 6.6) are not deploying more effective or coordinated strategies. This aligns with earlier literature in Chapter 2, which described crisis responses in developing construction sectors as piecemeal and short-term (Sahin & Ulubeyli, 2015; Tan, 2020). It also supports the expert critique in Chapter 5, where JKR, CIDB, and RISM emphasised that most firms “survive crises through compliance, not competence,” and rely heavily on government directives rather than internal systems.

Thus, the non-significant correlation reflects the structural weakness of current approaches whereby they are neither reducing vulnerabilities (RO1) nor systematically informing organisational resilience. This strengthens the justification for RO3, demonstrating the urgent need for a formalised CSCMP that replaces fragmented practices with an integrated, multi-phase system.

b) Vulnerable Areas and CSCMP

A moderate, positive, and statistically significant correlation exists between Vulnerable Areas and the CSCMP construct ($\rho = 0.434$, $p < 0.01$). This indicates that organisations experiencing higher levels of vulnerabilities are also those more actively engaging with structured crisis management components. While this may initially appear counterintuitive, it is theoretically consistent with the crisis learning, institutional resilience, and problem-driven adaptation models discussed in Chapters 2

and 3 (Fink, 1986; Mitroff, 2005; Duchek, 2020). Empirical studies in high-risk sectors show that organisations tend to institutionalise more formalised crisis structures only after experiencing significant disruption, such a pattern known as problem-driven institutionalisation (Aven, 2016; OECD, 2021).

The statistical significance ($p < 0.01$) confirms that this relationship is not due to chance and provides strong evidence that a structured CSCMP framework offers a more coherent and systematic approach to addressing the vulnerabilities identified under RO1 such as financial fragility, supply chain disruption, labour shortages, and contractual exposure. This aligns directly with RO3 and RQ3, demonstrating that organisations engaging more seriously with CSCMP elements are better positioned to confront and manage the issues they face.

The descriptive findings in Chapter 6 reinforce this interpretation, as all CSCMP phases (Prepare, Prevent, Respond, Recover, Redesign) recorded high levels of agreement (Mean ≥ 4.00), indicating widespread readiness to adopt structured crisis governance. Similarly, experts in Chapter 5 consistently reported that the organisations most severely affected by Covid-19 were the first to adopt crisis management frameworks, explore digitalisation, strengthen business continuity processes, or seek external guidance has further validating the correlation pattern.

Taken together, the results demonstrate that CSCMP provides a far more effective and meaningful framework for addressing sector vulnerabilities than the existing ad-hoc practices identified under RO2. The correlation therefore substantiates the argument that the Malaysian construction industry stands to benefit significantly from transitioning towards a formalised, a multi-phase CSCMP rather than relying on fragmented and reactive strategies.

c) Vulnerable Areas and Business Continuity

A moderate, positive, and statistically significant correlation between Vulnerable Areas and Business Continuity ($\rho = 0.400$, $p < 0.01$) indicates that increases in organisational vulnerabilities are associated with corresponding reductions in continuity capacity. This confirms that unresolved issues, whether financial instability, supply chain disruptions, labour shortages, or planning delays have directly undermine an organisation's ability to sustain operations during external shocks. The statistical significance ($p < 0.01$) demonstrates that this relationship is systematic rather than

random, reinforcing the argument that vulnerabilities constitute structural threats rather than isolated operational difficulties.

This finding is fully consistent with RO1 and RQ1, which identified these vulnerabilities as the primary drivers of operational fragility in the Malaysian construction sector. Chapter 5 further revealed that firms most affected by supply chain failures and cashflow pressure during Covid-19 were also those least able to maintain project timelines, contractual obligations, or workforce stability, mirroring the correlation pattern observed here.

Theoretically, this result aligns with continuity frameworks discussed in Chapter 3, particularly ISO 22301 and resilience models (Duchek, 2020), which emphasise that unresolved risks propagate directly into business continuity failures. The descriptive evidence in Chapter 6 supports this, where high mean values for supply chain disruption, financial strain, and planning instability (Means = 4.11–4.38) represent the same domains driving continuity loss.

Collectively, this correlation demonstrates that business continuity deteriorates as vulnerabilities intensify, affirming the need for proactive risk detection, scenario-based planning, and structured crisis management. These findings provide a strong empirical foundation for the CSCMP developed in RO3, which emphasises preparedness, early prevention, and resilience-building as essential mechanisms to stabilise continuity in a high-risk construction environment.

d) Existing Strategies and CSCMP

The correlation between Existing Strategies and CSCMP is extremely weak and statistically non-significant ($\rho = -0.010$, $p = 0.914$), indicating that current crisis practices in the Malaysian construction industry are not meaningfully connected to the structured, multi-phase CSCMP framework proposed in this study. This result empirically substantiates the conclusion drawn in Chapter 5, where experts consistently described existing strategies as reactive, fragmented, compliance-driven, and short-term in orientation, rather than proactive or strategically embedded within organisational governance.

Although some existing strategies superficially resemble elements of the CSCMP such as SOP adherence, temporary digitalisation, or cost-cutting, the negligible correlation demonstrates that these actions do not constitute the systematic

preparedness, early-warning mechanisms, risk assessments, or coordinated response structures that underpin the CSCMP's five phases. Instead, they remain episodic, untested, and heavily dependent on external directives, particularly government-issued procedures during Covid-19.

This finding directly reinforces RO2, confirming that existing organisational approaches are: (1) untested in real crisis simulations; (2) poorly documented and inconsistent across firms; (3) reactive rather than anticipatory, and: (4) not integrated into any formal crisis governance system. The lack of statistical significance also indicates that these practices neither enhance nor meaningfully contribute to crisis management capacity. In other words, existing strategies operate outside the logic and structure of a formal CSCMP.

Accordingly, the quantitative evidence supports the central argument of RO3 and RQ3: that a sector-wide CSCMP is not simply an enhancement of current practices but a necessary replacement for the fragmented and insufficient strategies currently in use. The weak relationship underscores the critical need for Malaysian construction organisations to transition from reactive routines to a structured, proactive, and institutionally coordinated crisis management framework capable of addressing the complex vulnerabilities identified in RO1.

e) Existing Strategies and Business Continuity

The correlation between Existing Strategies and Business Continuity is extremely weak and statistically non-significant ($\rho = 0.032$, $p = 0.718$), indicating that the crisis practices currently used by Malaysian construction organisations have no meaningful influence on sustaining business continuity. The very weak coefficient suggests that existing strategies in many of which are reactive, short-term, and compliance-oriented do not support operational stability or long-term resilience. The high p-value ($p = 0.718$) further shows that the observed relationship is likely due to random variation rather than any substantive pattern, reinforcing that these strategies are not reliably designed to prevent or mitigate continuity disruptions.

This finding is consistent with the quantitative patterns reported in Chapter 6, particularly in Tables 6.14–6.16, where organisations exhibited low levels of proactive preparedness, minimal business continuity planning, and weak implementation of structured crisis responses. The qualitative insights in Chapter 5 further corroborate this

weakness: experts from JKR, CIDB, and RISM emphasised that firms relying on ad-hoc measures such as cost-cutting, delayed decision-making, and dependence on government SOPs experienced greater operational breakdowns, slower recovery, and heightened vulnerability during Covid-19. This aligns with global crisis management scholarship (Seeger et al., 2003; Boin et al., 2008), which highlights that reactive measures seldom prevent escalation and rarely support continuity under systemic shocks.

The absence of a meaningful correlation directly reinforces RO2, confirming that existing practices are insufficient, fragmented, and poorly aligned with crisis governance principles discussed in Chapters 2 and 3 (Mitroff, 2005; Aven, 2016; OECD, 2021). It also provides quantitative support for RQ3, demonstrating the empirical necessity for a structured, integrated crisis management plan tailored to the construction context. In other words, existing strategies cannot deliver sustained business continuity; instead, organisations must transition toward a comprehensive, multi-phase CSCMP that embeds preparedness, prevention, response, recovery, and redesign as continuous organisational practices. Such structured planning is supported by crisis standards like ISO 22301 that offers a more robust pathway to resilience, operational stability, and long-term continuity than the reactive approaches currently employed.

f) CSCMP and Business Continuity

The relationship between CSCMP and Business Continuity is very strong, positive, and statistically significant ($\rho = 0.862$, $p < 0.01$), shows the strongest correlation observed in this study. This indicates that organisations with higher adoption of structured crisis management practices demonstrate markedly greater capability to sustain operations during disruptions. The strength of this relationship confirms that effective CSCMP implementation is closely linked to operational stability, financial protection, and long-term continuity performance.

This finding directly substantiates RO3 and RO4, demonstrating that a formalised, multi-phase crisis management plan, encompassing Prepare, Prevent, Respond, Recover, and Redesign which is not merely conceptually sound but empirically associated with superior continuity outcomes. It is also fully aligned with the crisis governance and resilience theories discussed in Chapters 2 and 3, particularly

high-reliability principles (Boin et al., 2008), organisational resilience models (Duchek, 2020), and continuity management standards such as ISO 22301, all of which emphasise planned, system-wide readiness as a determinant of business continuity.

Evidence from Chapter 5 supports this pattern: experts from JKR, CIDB, EPF, and PETRONAS consistently observed that organisations with crisis teams, pre-existing business continuity plan, digital tools, and structured decision-making frameworks recovered faster and suffered fewer financial losses during Covid-19. This is echoed in the descriptive results of Chapter 6, where all CSCMP phases recorded high mean values, signalling strong industry endorsement of structured crisis governance.

The statistical significance ($p < 0.01$) confirms that this relationship is not due to random variation but reflects a genuine and substantive association. In practical terms, the CSCMP operates as a resilience-enabling mechanism. Organisations that embed proactive planning, early-warning systems, coordinated response structures, and post-crisis redesign mechanisms are far more capable of sustaining project continuity, meeting contractual obligations, and protecting workforce and financial stability.

Conversely, organizations without structured crisis management or those relying on reactive, ad-hoc measures, remain exposed to recurring disruptions, slower recovery trajectories, and systemic vulnerability, as highlighted under RO1 and RO2.

Overall, this very strong correlation provides compelling empirical justification for the integration of CSCMP framework proposed in this Chapter 6, confirming that structured, multi-phase crisis management is a critical determinant of business continuity in the Malaysian construction sector.

Based on above deliberation, this study has developed Figure 6.1 to illustrates the findings for better understanding.

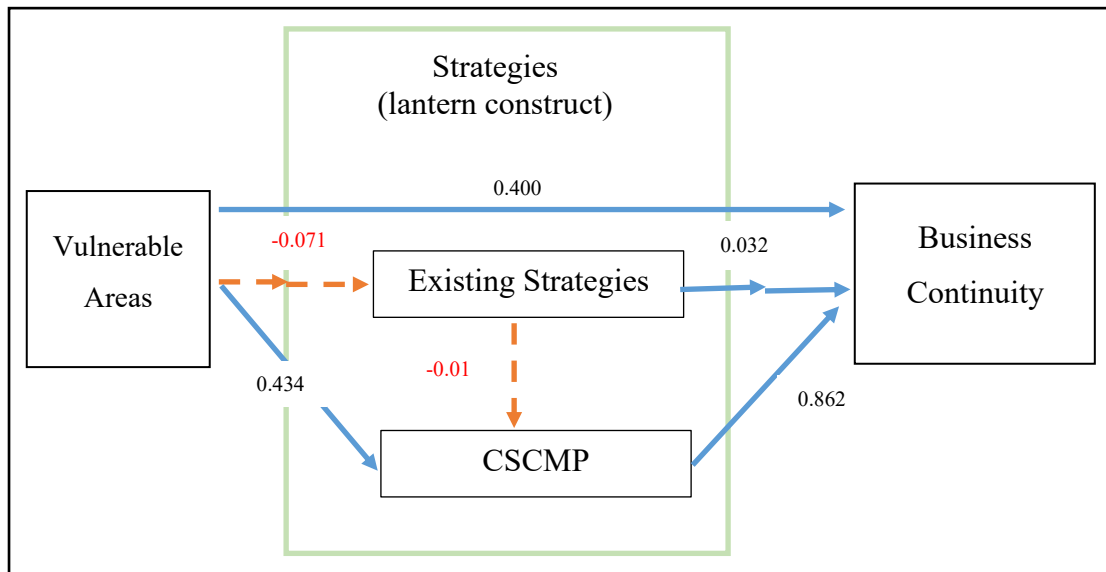


Figure 6.2 Spearman Correlation – Result of SPSS Analysis

Figure 6.2 is presented to visually consolidate the inferential findings of Section 6.7 and demonstrate how the four core constructs in this study, the Vulnerable Areas, Existing Strategies, CSCMP, and Business Continuity are interacting within the proposed crisis management framework. The diagram provides a structural representation of the statistical relationships identified through Spearman's correlation analysis, enabling clearer interpretation of the empirical patterns that support the development of the CSCMP in this Chapter 6.

By mapping the correlation coefficients directly onto the conceptual pathways, the figure serves three key purposes:

- i. To Validate the Conceptual Framework Developed in Chapters 1–3

The figure illustrates how the empirical data align with the theoretical propositions established earlier in the thesis, including crisis vulnerability pathways, crisis-response alignment, and continuity theory. This strengthens the methodological coherence of the study by demonstrating that the relationships predicted by literature are reflected in actual industry data.

ii. To Demonstrate the Weakness of Existing Strategies and the Strength of CSCMP

The visual contrast between the weak, non-significant relationships involving Existing Strategies and the strong, significant pathways involving CSCMP highlights the core contribution of the research: (1) current industry practices are insufficient, and (2) the structured CSCMP framework meaningfully enhances continuity. The figure therefore provides a graphical justification for the transition from reactive strategies to a formalised, multi-phase crisis management plan.

iii. To Provide a Bridge Between Chapter 6 Findings and the Proposed CSCMP

The diagram acts as an integrative link, translating raw statistical outputs into a conceptual pattern that guides the development of the CSCMP. It shows clearly which relationships matter, which do not, and how the proposed model addresses the observed gaps. In doing so, the figure provides a visual rationale for the structure of the CSCMP (Prepare, Prevent, Respond, Recover, Redesign) and demonstrates why the framework is necessary to strengthen resilience across the Malaysian construction sector.

Figure 6.3 provides a detailed visualisation of the Spearman correlation results by mapping the relationships between the study's core constructs—Vulnerable Areas, Strategies (Existing Strategies and the CSCMP), and Business Continuity

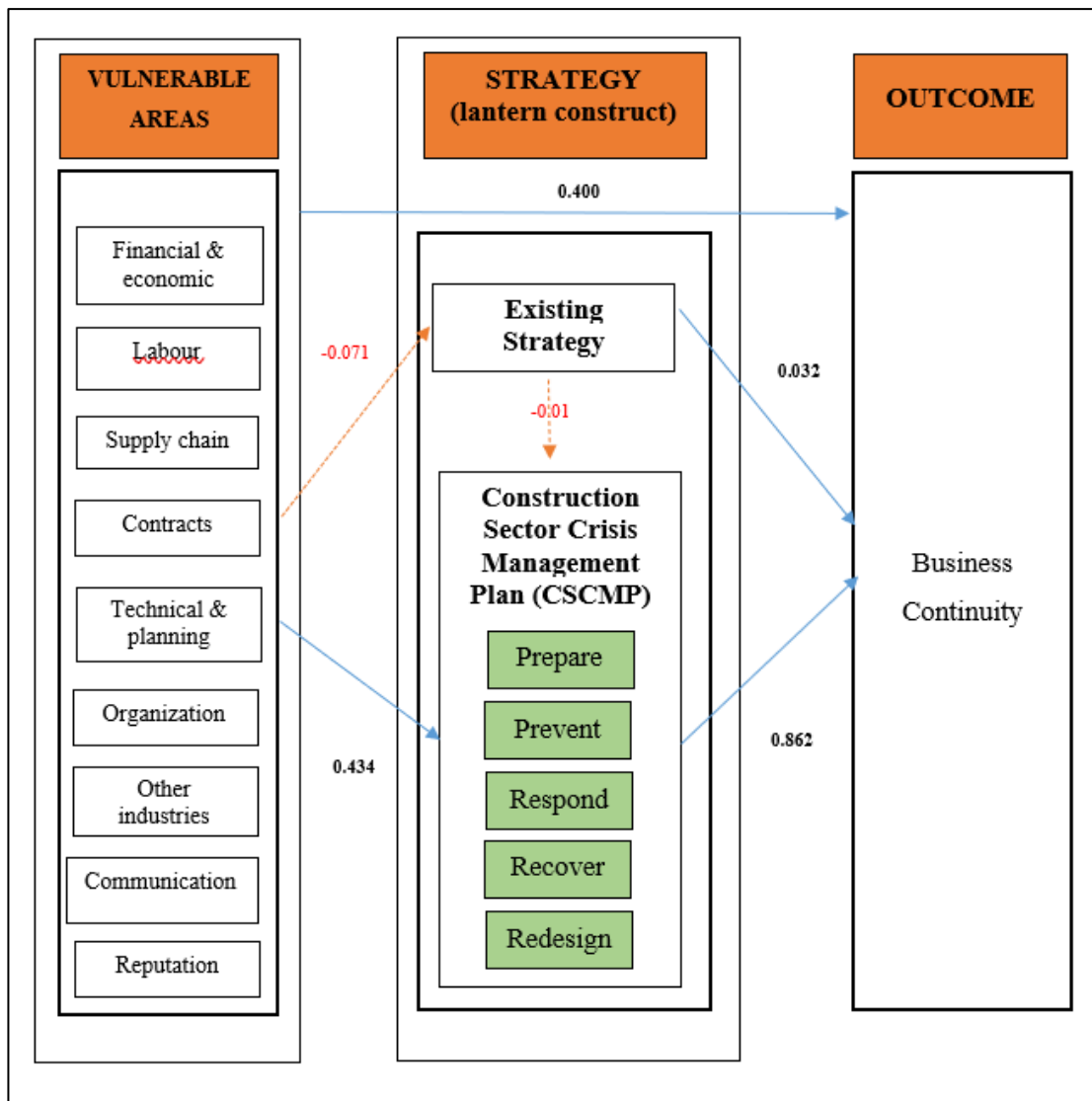


Figure 6.3 Spearman Correlation Between Overall Items – Result of SPSS Analysis

The conceptual framework in Figure 6.3 illustrates how vulnerable areas, existing strategies, the CSCMP, and business continuity interact, based on the Spearman correlation results. The model clarifies how different components of crisis management influence organisational resilience within the Malaysian construction industry.

The moderate positive correlation between Vulnerable Areas and Business Continuity ($\rho = 0.400$, $p < 0.01$) indicates that as financial, labour, supply chain, contractual, and communication issues intensify, continuity becomes increasingly difficult to maintain. This significant relationship reinforces earlier findings in Chapter 5 and Section 6.4, which showed that unresolved vulnerabilities directly threaten operational stability.

In contrast, the weak and non-significant correlations involving Existing Strategies ($\rho = -0.071$, $\rho = 0.032$, $\rho = -0.010$) confirm that current approaches—largely

reactive, compliance-driven, and short-term, do not meaningfully contribute to issue resolution or continuity. These results align with the qualitative evidence in Chapter 5, where practitioners reported fragmented planning, ad-hoc responses, and dependence on government SOPs rather than internal capability.

A stronger and significant correlation between Vulnerable Areas and CSCMP ($\rho = 0.434$, $p < 0.01$) shows that organisations facing higher levels of disruption tend to adopt more structured crisis management components. This is consistent with the crisis learning and resilience theories discussed in Chapters 2 and 3 and reflects the industry's growing recognition of the need for proactive, system-based planning.

The most substantial finding is the very strong and highly significant correlation between CSCMP and Business Continuity ($\rho = 0.862$, $p < 0.01$). This demonstrates that structured, multi-phase crisis management covering Prepare, Prevent, Respond, Recover, and Redesign is closely associated with higher levels of operational stability, faster recovery, and reduced long-term disruption. This outcome also mirrors Chapter 6 descriptive results, where all CSCMP phases recorded high mean values (≥ 4.00), signalling strong industry support for a formalised crisis management approach.

Overall, the framework is strongly supported by the data. It confirms that while existing strategies offer little resilience value, the CSCMP provides a coherent and highly effective foundation for safeguarding business continuity. Organisations that embed structured crisis management practices are better positioned to manage disruptions, mitigate risk, and sustain long-term stability across future crises.

6.6 Research Output: Development of a Construction Sector Crisis Management Plan (CSCMP) for the Malaysian Construction Industry

The development of the Construction Sector Crisis Management Plan (CSCMP) represents the primary research output of this study and marks the culmination of the mixed-methods inquiry undertaken. This outcome directly fulfils Research Objective 4, which aims to develop a structured, context-specific, and practically applicable crisis management framework for organisations within the Malaysian construction industry. At this stage, the CSCMP is presented as an unvalidated framework, derived from the integration of theoretical foundations and empirical findings, prior to formal validation by industry experts in the subsequent phase.

The CSCMP was developed through systematic triangulation of multiple sources of evidence, including the literature review (Chapters 2 and 3), qualitative expert interviews (Chapter 5), and quantitative analyses (Chapter 6). This integrative approach ensures that the framework is not only theoretically grounded but also empirically informed and reflective of real-world industry practices. By combining conceptual insights with observed patterns and statistical relationships, the study enhances methodological rigour and strengthens the credibility of the proposed framework.

Drawing upon established crisis management and organisational resilience theories, including Fink's (1986) crisis life cycle, Mitroff's (1993) five-phase model, and contemporary resilience perspectives (Duchek, 2020; Boin, McConnell & 't Hart, 2008), the CSCMP is conceptualised as a structured and adaptive system rather than a set of isolated practices. The framework is organised into three interconnected components: vulnerable areas (C1), which represent the key sources of disruption; crisis strategy through the CSCMP (C2), which provides a structured and proactive management approach; and business continuity outcomes (C3), which reflect the ultimate objective of sustaining organisational performance and resilience during crisis events.

Importantly, the development of the CSCMP reflects a shift from the industry's prevailing reactive and fragmented practices towards a more integrated, proactive, and resilience-oriented approach. The framework captures the causal linkage between vulnerabilities, strategic intervention, and continuity outcomes, thereby offering a coherent and systematic pathway for managing crises within the construction sector. As such, the CSCMP serves not only as a conceptual contribution to crisis management literature but also as a practical tool to guide industry stakeholders in enhancing preparedness, response, and long-term organisational resilience. Figure 6.3 detailed out the research output.

Component 1: Vulnerable areas

Component 1 (C1) synthesises the vulnerable areas that were consistently identified as critical pressure points during crises. Literature in Chapter 2 highlighted the endemic structural weaknesses in technical planning, supply chain dependencies, contractual obligations, finance, labour, inter-industry linkages, communication, and

reputation (OECD, 2021; CIOB, 2020). These theoretical insights were reinforced by expert interviews in Chapter 5 in which practitioners from CIDB, JKR, and RISM described these domains as the first and most severely affected during Covid-19 and by the quantitative results in Chapter 6, where respondents rated all nine areas above a mean of 4.00, indicating significant operational exposure. The correlation analysis further demonstrated that vulnerable areas are significantly associated with business continuity ($\rho = 0.400$, $p < 0.01$), confirming that disruptions in these domains directly threaten organisational survival. This empirical evidence validates their placement at the start of the CSCMP as the foundational determinants of crisis impact.

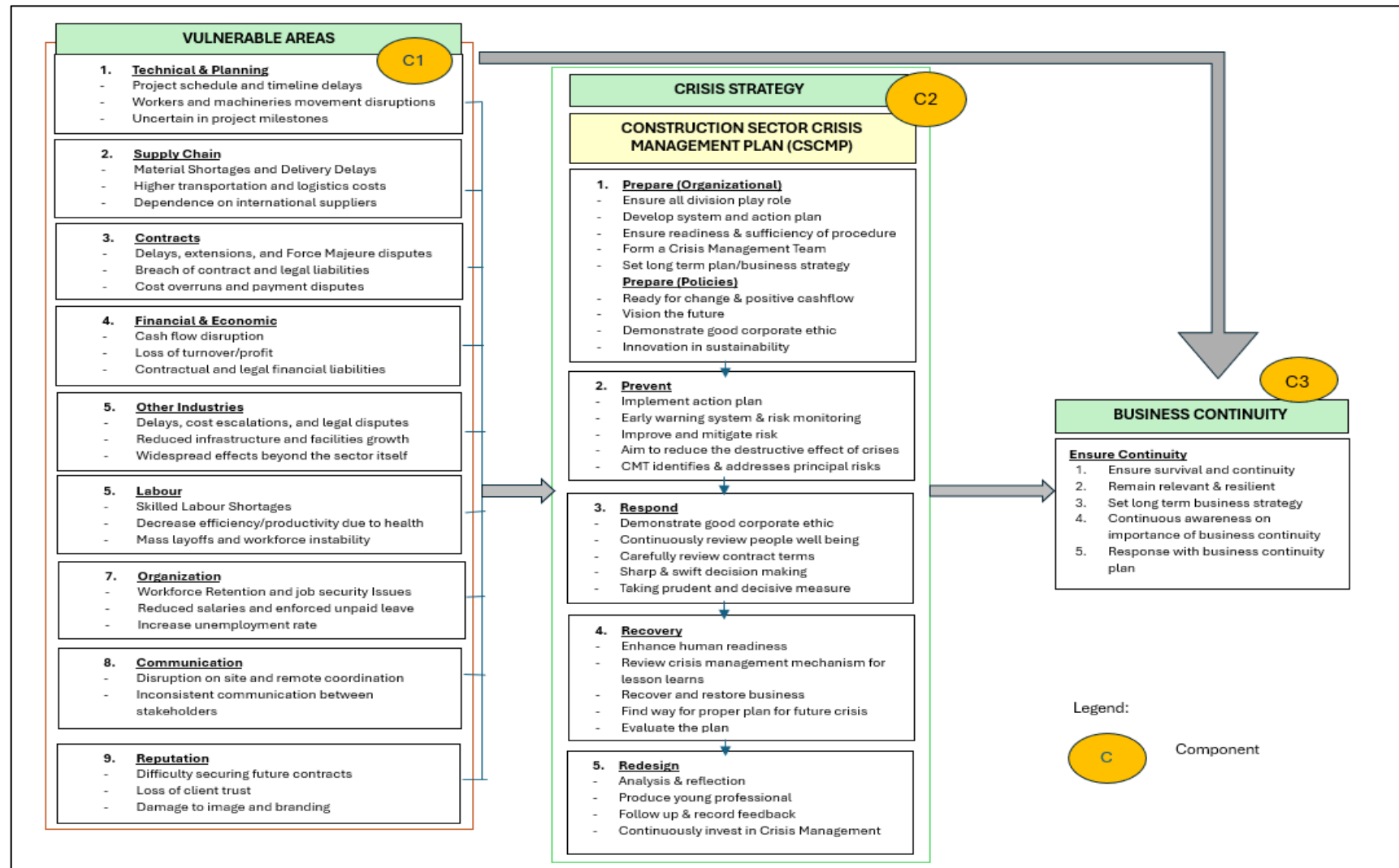


Figure 6.4 Proposed Construction Sector Crisis Management Plan (CSMP)

Component 2: Construction Sector Crisis Management Plan (CSCMP)

Component 2 (C2), the core of the framework, operationalises a five-phase CSCMP: Prepare, Prevent, Respond, Recover, and Redesign. These phases are firmly aligned with the crisis management literature reviewed in Chapter 3 (Mitroff, 2005; Seeger, Sellnow & Ulmer, 2003; ISO 22301) and reflect the expectations of industry experts in Chapter 5 who emphasised the need for organisational readiness, proactive risk detection, decisive crisis action, structured recovery, and post-crisis transformation. The quantitative survey in Chapter 6 demonstrated consistently high endorsement for all CSCMP elements (means ≥ 4.00), confirming sector-wide recognition of their importance.

A critical insight emerging from the analysis is the deliberate exclusion of the “Existing Strategies” construct from the final framework. Although initially included in the preliminary conceptual model, both qualitative and quantitative findings consistently indicate that existing industry practices are largely reactive, fragmented, compliance-driven, and weakly institutionalised. This is further supported by the correlation analysis, which shows that Existing Strategies have weak and statistically insignificant relationships with Vulnerable Areas, CSCMP, and Business Continuity ($\rho = -0.071$; $\rho = -0.010$; $\rho = 0.032$ respectively, all $p > 0.01$).

The absence of a meaningful relationship between Existing Strategies and Business Continuity ($\rho = 0.032$, $p > 0.01$) is particularly significant. It suggests that the presence of current crisis management practices does not translate into improved resilience or sustained operational performance. This indicates that such strategies are not effectively embedded within organisational systems and are instead implemented as short-term, reactive measures during crisis events.

One plausible explanation for this disconnect is the presence of an underlying organisational “denial culture,” as reflected in the survey findings ($M = 3.34$). This suggests that many organisations tend to underestimate potential risks, delay preparedness efforts, or rely on the assumption that crises can be managed as they occur. Consequently, crisis management is not institutionalised as a strategic function but remains peripheral and operational in nature.

This interpretation is consistent with the qualitative findings in Chapter 5, where industry practitioners described existing approaches as “ad hoc,” “SOP-dependent,” and “reactive based.” In contrast, more resilient organisations demonstrate a fundamentally

different orientation, where crisis management is embedded within organisational systems, continuously reviewed, and integrated with crisis management and business continuity planning. These organisations adopt proactive, structured, and system-driven approaches rather than reactive responses. As one respondent highlighted: “Crisis management is not something we activate only during disruption, but it is embedded in our planning, risk management, and daily operations.” Similarly, another expert emphasised: “Preparedness is part of the system. We simulate, we plan, and we continuously review—so when a crisis happens, we are already ready.”

Taken together, these findings provide strong justification for excluding Existing Strategies from the final CSCMP framework. Retaining this construct would undermine the conceptual integrity of the model, as it does not contribute meaningfully to resilience outcomes. Its removal strengthens the framework by ensuring that only empirically supported and theoretically coherent components are retained, thereby reinforcing the CSCMP as a proactive and integrated crisis management system rather than a reflection of current fragmented practices.

Component 3: Business Continuity

Component 3 (C3) represents the intended outcome of CSCMP implementation: business continuity, defined in Chapter 3 as the ability of construction organisations to maintain critical functions, fulfil contractual and financial obligations, protect stakeholders, and restore operations during crises. Qualitative insights in Chapter 5 showed that firms lacking structured crisis plans experienced prolonged shutdowns, cashflow collapse, contractual disputes, and long-term reputational damage. Quantitative findings in Chapter 6 reinforced this narrative, with continuity variables such as survival, resilience, long-term planning, and continuity awareness all receiving high mean values (> 4.00). Most critically, the correlation analysis revealed that CSCMP exhibits a very strong, positive, and statistically significant relationship with business continuity ($\rho = 0.862$, $p < 0.01$), shows the strongest association observed in the entire study. This provides powerful empirical confirmation that the CSCMP is a meaningful predictor of organisational resilience and continuity outcomes, far exceeding the explanatory value of existing strategies. The strength of this relationship substantiates the proposition that structured crisis governance is not reactive short-term

measures and is essential for safeguarding performance and ensuring long-term survival.

Taken together, the proposed CSCMP provides a theoretically grounded, empirically validated, and industry-contextualised framework that integrates Malaysia's construction-sector vulnerabilities with a practical crisis management strategy and a clear continuity outcome. It addresses the systemic weaknesses identified in RO1 (vulnerabilities), RO2 (assessment of existing strategies), RO3 (evaluation of CSCMP phases), and culminates in RO4 (framework development). By replacing fragmented existing practices with a comprehensive preparedness–prevention–response–recovery–redesign model, the CSCMP offers a structured pathway for Malaysian construction organisations to strengthen resilience, enhance continuity, and better withstand future crises.

In essence, business continuity is not a static outcome but a continuous process that requires proactive planning, responsive leadership, organizational discipline, and the flexibility to evolve under pressure. When properly integrated into organizational culture and planning through CSCMP, business continuity becomes a key driver of survival and success in the construction sector.

6.6.1 CSCMP Directly Addresses the Vulnerable Areas

The five phases of the CSCMP namely Prepare, Prevent, Respond, Recover, and Redesign were developed to directly resolve the vulnerable areas identified in Chapter 2 and Component 1 (C1). Each vulnerable area represents a critical pressure point for Malaysian construction organisations, as confirmed in both qualitative interviews and quantitative rankings (Chapter 5 and 6). The CSCMP therefore functions as a structured mechanism that systematically addresses these risks at their root rather than through the fragmented and reactive approaches currently in practice.

First, CSCMP directly addresses Technical and Planning vulnerabilities such as schedule delays, worker mobility disruptions, and uncertainty in project milestones (CIDB, 2020) through the Prepare phase, which mandates early scenario planning, readiness assessments, clear division-level roles, and the establishment of crisis management teams. These measures correspond with planning resilience theory (Duchek, 2020) and were frequently emphasised by industry experts who reported that

early project re-baselining, resource audits, and contingency scheduling significantly reduced disruptions during Covid-19.

Second, Supply Chain vulnerabilities, including material shortages, delivery delays, logistics costs, and reliance on foreign suppliers (United Nations, 2020; DOSM, 2020); World Bank, 2020) are mitigated by the Prevent phase. This phase introduces early-warning systems, risk monitoring, supplier diversification, and proactive sourcing strategies. These actions align with global supply chain resilience frameworks (OECD, 2021) and address the recurring disruptions reported by respondents in Chapter 6 (Means = 4.22–4.38), where supply chain breakdowns were among the most critical determinants of operational instability.

Third, Contractual vulnerabilities, such as force majeure disputes, delays, extensions, and cost overruns (CIDB, 2020; Mohamad, 2020), are resolved through the Respond phase, which strengthens contractual review processes, embeds ethical and transparent decision making, and ensures swift but prudent actions during disruptions. Experts in Chapter 5 highlighted that most disputes during Covid-19 arose from unclear contract terms and slow organisational response; the CSCMP formalises these processes to reduce legal exposure and protect project continuity.

Fourth, Financial and Economic vulnerabilities including cash flow disruptions, reduced turnover, and contractual liabilities (BNM, 2020; WHO, 2020; CIDB, 2020; DOSM, 2020) are supported across all five CSCMP phases, with particular emphasis in Prepare and Recover. The Prepare phase ensures liquidity planning, financial readiness, and long-term budgeting, while the Recovery phase focuses on restoring revenue streams, recalibrating expenditure, and stabilising cash flow. This is consistent with crisis-finance literature (Herbane, 2013) and reflects respondents' strong agreement that financial fragility is the greatest threat to continuity (Chapter 6, Mean = 4.38).

Fifth, Labour vulnerabilities, including shortages, productivity decline, and workforce instability, (ILO, 2020; United Nations, 2020) are addressed through the Respond and Recover phases. Respond ensures continuous monitoring of employee wellbeing, rapid deployment of workforce adjustments, and adherence to safety protocols. Recover emphasises rebuilding human readiness, reskilling workers, and addressing morale issues—concerns amplified by interviewees who described labour instability as a major bottleneck.

Sixth, Inter-industry and sectoral spillovers such as delays, cost escalations, and infrastructure stagnation (MIDA, 2020; DOSM, 2020) are reduced through the Prevent

and Redesign phases. Prevent reduces exposure to cascading disruptions through risk monitoring, while Redesign supports long-term structural improvements, new technologies (e.g., BIM, IoT), and sector-wide collaboration, consistent with international construction recovery literature (World Bank, 2022).

Seventh, Organisational vulnerabilities, including workforce retention, job security, and enforced leave (ILO, 2020; Harun, 2020), are addressed across Prepare, Respond, and Recover. Prepare formalises organisational roles and internal governance; Respond ensures ethical leadership and continuity in operations; Recover focuses on restoring workforce stability in addressing the gaps reported in Chapter 5 where firms lacked clear organisational structures during the crisis.

Eighth, Communication breakdowns such as poor remote coordination and inconsistent stakeholder messaging (Babulal, 2020; CIDB, 2020) are directly improved by Prepare (communication protocols), Respond (stakeholder communication), and Recovery (evaluation of communication failures). Interview data emphasised communication as one of the weakest existing strategies, making its integration into the CSCMP essential.

Ninth, Reputational risks including loss of client trust, damaged branding, and difficulties securing future contracts (Le & Nguyen, 2023; CIDB 2020) are mitigated primarily through Redesign, which focuses on organisational renewal, post-crisis reflection, feedback mechanisms, and enhancing corporate governance. This aligns with legitimacy and reputation theories (Ulmer et al., 2011), which highlight the value of learning and image recovery as central to post-crisis competitiveness.

Each phase of the CSCMP (C2) is intentionally designed to address specific vulnerabilities identified in C1. Prepare strengthens technical planning and financial readiness; Prevent reduces supply chain and inter-industry risks through monitoring and mitigation; Respond stabilises labour, contractual, and communication weaknesses through coordinated actions; Recover restores financial, organisational, and workforce stability; and Redesign enhances long-term resilience, reputation, and strategic relevance. By explicitly mapping CSCMP phases to C1 vulnerabilities, the framework demonstrates a comprehensive and empirically grounded mechanism for strengthening crisis resilience and business continuity (C3) across the Malaysian construction sector.

6.6.2 Benefit of the Framework

The Framework proposed will produce the following benefits:

- i. The framework can be used by the Government agencies and the construction players such as contractors and consultants as a guideline on vulnerable areas when a crisis sparks, recommended strategies to be adopted ensuring business continuity as the best outcome.
- ii. It will help to give awareness and improve preparedness of an organization about what strategies to use in managing a crisis ensuring business continuity.
- iii. The framework provides ease of understanding and could be applicable to construction organizations.

The proposed framework is next subjected to the validation process by the Malaysian construction professionals. Although, the proposed framework has not been tested empirically in the industry, it is believed that the opinions by the experts could help to justify the necessity and the applicability of the framework in the construction project environment.

6.7 CSCMP Framework Validation

The validation of the Construction Sector Crisis Management Plan (CSCMP) represents a critical step in assessing the framework's completeness, appropriateness, and practical applicability within the Malaysian construction industry. Validation refers to the systematic evaluation of whether a proposed framework is fit for purpose when assessed against defined criteria (Nordin, 2015). In this study, validation was conducted through an expert panel approach, which is widely recognised as an effective method for evaluating conceptual and practice-oriented frameworks in construction management research (Chan et al., 2022; Al-Tekreeti & Beheiry, 2021). Consistent with these methodological standards, a structured validation questionnaire was distributed to twelve (12) experts closely affiliated with the Malaysian construction sector, representing CIDB G7 contractors (5), consultants (3), and developers (4). The inclusion of experts from multiple organisational backgrounds follows the

recommendations of Balogun et al. (2020) and Chang et al. (2023), who emphasise the importance of diverse professional perspectives in strengthening construct validity. Expert selection was guided by two criteria: (1) direct involvement with consultancy, contracting, or development activities within the construction sector; and (2) substantial experience in crisis contexts or prior participation in this research, consistent with the criteria set by Manakandan et al. (2020).

Of the twelve targeted experts, ten responded, and six had previously participated in earlier data collection phases (interviews or surveys). Their continued involvement enhances informational continuity and strengthens interpretive validity, ensuring that the CSCMP is assessed by individuals familiar with the study's empirical foundations. This approach aligns with established guidelines, where experts are defined as individuals with extensive sectoral experience, significant practical responsibility, or recognised professional expertise (Balogun et al. (2020; Chang et al. ,2023), who characterise an expert as someone with extensive sectoral experience, substantive practical responsibility, or recognised scholarly contribution. Furthermore, expert judgement has been shown to outperform formal estimation models in complex assessments (Wilson, 2023), reaffirming the appropriateness of this validation method. Table 6.22 summarises the profile of the experts who completed the validation.

Table 6.22
Profile of Experts

Expert	Role	Organization	Experience (years)	Involved in Previous Data Collection
V1	Director	Consultant	30	Yes
V2	Senior Architect	Consultant	15	Yes
V3	Manager	Contractor	10	Yes
V4	Manager	Contractor	17	Yes
V5	Senior Manager	Contractor	22	Yes
V6	Project Manager	Contractor	19	Yes
V7	Vice President	Developer	22	No
V8	Manager	Developer	12	No
V9	Manager	Developer	24	No
V10	Head	Developer	18	No

The validation instrument comprised four structured sections. The first section introduced the development of the CSCMP and summarised its methodological

foundations including document review, exploratory interviews, and quantitative survey analysis, reflecting the triangulated approach adopted throughout this research. The second section outlined the purpose of the CSCMP as a comprehensive mechanism for embedding business continuity into construction organisations across all five crisis phases: Prepare, Prevent, Respond, Recover, and Redesign. The third section presented the proposed framework comprising three core Components (C1–C3), showing how vulnerable areas, crisis strategies, and continuity outcomes integrate into a unified model.

The final section contained the validation questionnaire, consisting of two sets of items.

The first set required experts to evaluate the CSCMP across three dimensions:

- i. Completeness of C1 (vulnerable areas), C2 (crisis strategies via CMP phases), and C3 (continuity outcomes).
- ii. Appropriateness of vulnerable areas, integrated CMP elements, and expected continuity impacts.
- iii. Usability, including clarity, practicality, and relevance to contractors, consultants, and regulatory bodies.

Responses were rated using a five-point Likert scale (1 = Poor; 5 = Excellent).

The second set comprised open-ended questions inviting broader reflections and recommendations regarding the framework's applicability and adaptability within the Malaysian construction context. Written responses were analysed using thematic content analysis, allowing expert views to refine the final version of the CSCMP.

6.7.1 Validation Result and Discussion

Table 6.23 shows the results of the validation process for CMP Framework conducted with 10 experts following questionnaires explained in 6.7 above.

Table 6.23

Results of Framework Validation for Construction Sector Crisis Management Plan (CSCMP) for the Malaysian Construction Industry

	Rate of Completeness of CSCMP Framework			Rate of Appropriateness of CSCMP Framework			Rate of Useable of CSCMP Framework		
	Coverage of Vulnerable areas (C1)	The 5 CSCMP Phases (C2)	Impact of CSCMP Implementation (C3)	Ranking of vulnerable areas (C1)	Integrated elements under CSCMP (C2)	Business Performance Outcome (C3)	Ease of Understanding	Ease of Use	Beneficial Use
Poor									
Satisfactory	2	1	2	1	1	2	1	2	
Good	1	1	1	3	1	1	3	3	3
Very Good	2	6 (60%)	6 (60%)	2	7 (70%)	6	5	5	3
Excellent	5 (50%)	2	1	4 (40%)	1	1	1		4
Total	10	10	10	10	10	10	10	10	10

Table 6.26 summarises the expert evaluation of the CSCMP framework by ten respondents representing contractors, consultants, and developers. Overall, the validation results demonstrate a consistently high level of expert agreement across all three dimensions namely completeness, appropriateness, and usability. The dominance of “very good” and “excellent” ratings indicates strong confidence in the framework’s structure, relevance, and applicability within real construction settings.

i. Completeness of the CSCMP Framework

a. Coverage of Vulnerable Areas

The completeness of the vulnerable areas, which represent the key domains affected during crisis events, received strong endorsement from the expert panel. 50% rated it “excellent” and 20% rated it “very good,” indicating broad consensus that the framework provides a comprehensive and accurate representation of the crisis sensitive domains in the Malaysian construction sector. These domains of vulnerable areas including technical and planning disruptions, supply chain instability, financial fragility, labour shortages, contractual risks, communication breakdowns, and organisational readiness which mirror the crisis impacts documented in Chapters 2 and 5 (CIDB, 2020; Balachandran et al., 2021).

Experts who rated the framework as “excellent” provided the following remarks:

V1: “Appears to cover all critical vulnerable areas.”

V2: “Good identification of issues for crisis.”

V5: “The issues have been comprehensively covered.”

V7: “The prioritisation of crisis areas is accurate and aligns with on-ground realities in industry.”

V10: “The framework identifies a comprehensive set of nine critical areas affected by crises, highly relevant and reflective of real-world challenges.”

These comments strongly endorse the alignment between the identified vulnerabilities and the practical challenges faced during Covid-19, consistent with the

crisis exposure literature reviewed in Chapter 2 (Fink, 1986; Mitroff, 2005) and qualitative insights from Chapter 5.

Experts who rated the framework as “very good” similarly affirmed its relevance:

V9: “Advantages obtained by identifying and understanding the areas that are most vulnerable to risk.”

V8: “The framework captures a wide spectrum of issues relevant to the Malaysian context.”

Taken together, these remarks confirm that C1 is viewed as complete, credible, and grounded in both empirical evidence and theoretical foundations, consistent with the quantitative results in Chapter 6 where all vulnerable-area variables recorded high mean values (4.11–4.38). The expert feedback validates that the vulnerability set forms a strong basis for the CSCMP, accurately representing the real crisis exposure landscape of the Malaysian construction industry.

b. The Five CSCMP Phases

The completeness of the five CMP phases namely Prepare, Prevent, Respond, Recover, and Redesign have received strong validation, with 80% of the experts rating this component “very good” or “excellent.” Experts emphasised that the framework captures the full sequence of actions required for effective crisis readiness and recovery in construction organisations.

Experts who rated “very good” emphasised:

V1: “Appears to be an encompassing strategy.”

V7: “The five phases are strong; further integration with public policy and digital readiness would strengthen the framework.”

V9: “These outcomes help measure success, identify gaps and guide future planning.”

V10: “Logical and aligned well with crisis management theory; promotes proactive and continuous improvement.”

Experts rating “excellent” affirmed the completeness and clarity:

V2: “Good strategy and workflow.”

V8: “Clear and structured strategy from preparation to redesign. Well-sequenced and practical for implementation.”

These evaluations confirm that the five phases comprehensively reflect the crisis lifecycle models reviewed in Chapter 2 (Fink, 1986; Mitroff, 2005) and align closely with the organisational challenges described in Chapter 5, where practitioners emphasised the absence of systematic crisis steps during crisis. The high approval demonstrates that C2 is sufficiently complete to support operationalisation in real construction settings.

c. Impact of CMP Implementation

The expected impact of CSCMP implementation on business continuity was also strongly supported, with 70% of experts rating the component “very good” or “excellent.”

Experts providing “very good” ratings noted:

V8: “Demonstrates how CMP supports business continuity and recovery.”

V7: “Business performance can greatly improve through the use of this framework.”

V1: “All-round positive outcome.”

V5: “Impact has been comprehensively covered.”

V9: “Effectively demonstrates how CMP enhances long-term resilience.”

V10: “Clearly supports business performance and continuity.”

The expert assigning an “excellent” rating stated:

V7: “Implementation clearly shows potential for strengthening business continuity and organisational resilience.”

These remarks affirm that business continuity fully captures the organisational outcomes identified in Chapter 6 (high means across continuity variables; strong correlations) and aligns with continuity theory discussed in Chapter 3 (ISO 22301;

Duchek, 2020). Experts recognised that the outlined impacts cover stability, recovery, risk reduction, and resilience, are realistic and comprehensive reflections of how a CMP functions in high-risk industries, consistent with the qualitative insights from Chapter 5.

ii. Appropriateness of the CSCMP

a. Ranking of Vulnerable Areas

The ranking of the nine vulnerable areas was strongly endorsed, with 60% of experts rating it “very good” or “excellent.” Experts highlighted that the prioritisation accurately reflects the real impact patterns experienced during Covid-19, consistent with empirical findings in Chapter 6 and the crisis exposure patterns discussed in Chapters 2 and 5.

“Excellent” and “very good” expert remarks include:

V7: “The prioritisation of crisis areas is accurate and aligns with on-ground realities in the industry.”

V1: “Appropriately ranked according to priority interests.”

V10: “The identified areas are well-prioritised based on real impact severity observed during crises.”

V5: “Contracts should be given the highest priority due to legal and financial implications.”

V9: “The ranking helps distribute resources efficiently and develop focused interventions.”

These comments validate the statistical ranking derived in Chapter 6 (Means = 4.11–4.38) and reinforce the vulnerability classifications in RO1.

b. Integrated Elements under CSCMP

The integration of CMP elements received the highest endorsement among all appropriateness criteria, with 70% rating it “very good” and additional experts rating it

“excellent.” Experts affirmed the design as structurally coherent, practically relevant, and aligned with crisis management theory.

“Very good” and “excellent” remarks include:

V1: “Integrated elements address strategy according to the order of process.”

V9: “It is a comprehensive plan enabling faster decision-making, better stakeholder engagement, and efficient resource use.”

V10: “The strategies align well with the ranked issues and incorporate practical actions.”

V8: “The five phases logically integrate risk management and operational response.”

These validations correspond with crisis lifecycle models presented in Chapter 2 (Mitroff, 2005; Fink, 1986) and support the high respondent agreement documented in Chapter 6, confirming that the phases are both theoretically grounded and operationally suitable for construction organisations.

c. Business Performance Outcomes Following CSCMP Adoption (C3)

The experts also rated the business outcome component highly, with 70% assigning “very good” or “excellent”. They emphasised that the framework provides a realistic pathway to improve continuity, resilience, and operational stability—findings that directly align with the correlation analysis in Section 6.7, where CSCMP showed a very strong positive relationship with business continuity ($\rho = 0.862$).

Selected expert remarks (very good/excellent):

V7: “Business performance can greatly improve through the use of this framework.”

V9: “It supports better decisions, cost savings, faster recovery time, and improved risk mitigation.”

V10: “The framework provides a clear pathway toward resilience, relevance, and survival.”

V8: “Aligns with long-term resilience goals and post-crisis performance recovery.”

V5 (Excellent): “Appropriate as the utmost priority is to ensure business operations continue as usual.”

These expert assessments are consistent with behavioural and organisational resilience theory (Duchek, 2020) and mirror the qualitative findings in Chapter 5, where firms with structured crisis mechanisms demonstrated faster recovery and operational stability during crisis.

Overall, expert feedback strongly validates the appropriateness of the CSCMP. The ranking of vulnerabilities reflects real crisis impacts; the integrated strategy elements align with theory and practice; and the business outcomes confirm CSCMP's potential to enhance continuity as empirically supported by both qualitative and quantitative findings across Chapters 5 and 6.

iii. Ease of Understanding, Ease of Use, and Beneficial of the CSCMP Framework

In The expert panel's assessment of the CSCMP's clarity, usability, and practical value further validates the robustness of the framework developed through the triangulated analysis in Chapters 5 and 6 and grounded in the crisis and resilience theories reviewed in Chapters 2 and 3. Overall, the framework received strong endorsement, with the majority of experts rating it "very good" or "excellent."

a. Ease of Understanding and Ease of Use

Half of the experts (50%) rated the CSCMP as "very good" in terms of clarity and ease of use. Their remarks highlighted that the structural organisation of the framework mirrors the logical sequencing of crisis management models discussed in the literature (Fink, 1986; Mitroff, 2005), making it intuitive for practitioners. The comments reflect strong alignment with Chapter 3, which emphasised the need for structured, easily interpretable crisis governance tools in high-impact industries:

V1: "Logical structure and terminology."

V3: "Clearly outlines the content and flow."

V7: "Provides a clear and organised process that helps anticipate potential crises."

V8: "Easy to understand; although implementation may require structured training across divisions."

V9: "Clearly articulated and enables consistent use during crisis."

In addition, V10 rated the structure as “excellent,” stating that the CSCMP “explains the components clearly with logical progression and minimal jargon.”

This reinforces themes identified in Chapter 5, where construction practitioners stressed that crisis frameworks must be operationally simple, accessible, and adaptable to varying organisational capacities.

b. Beneficial Use of the CSCMP Framework

The strongest endorsement relates to its usefulness: 40% of experts rated the framework as “excellent.” These comments affirm the framework’s practical relevance and its potential to institutionalise resilience—consistent with the organisational resilience perspectives outlined in Duchek (2020) and continuity standards such as ISO 22301.

High-rating feedback included:

V7: “Highly relevant and useful; a strategic guide for maintaining business stability.”

V2: “A great guide to consultants and contractors on how to mitigate issues during crisis.”

V1: “Clearly defines matters of concern to address.”

V10: “Promotes readiness, collaboration, and resilience across all tiers of construction stakeholders.”

Experts who rated the usefulness as “very good” also noted its value for preparedness and decision making, consistent with findings in Chapter 6 where respondents broadly endorsed the five phase CSCMP components (means ≥ 4.00). The remarks echo observations from Chapter 5, where industry leaders highlighted the absence of structured frameworks as a central cause of delayed response, fragmented decision-making, and continuity failures during Covid-19 (CIDB, 2020; Balachandran et al., 2021).

Additionally, the recognition of the framework’s practical utility aligns with international crisis governance scholarship (Boin et al., 2008; OECD, 2021), which asserts that well-structured crisis management models significantly strengthen organisational adaptability and resiliency.

Overall, the validation results demonstrate strong consensus among experts that the CSCMP is comprehensive, appropriate, and practically applicable within the Malaysian construction context. The consistent “very good” and “excellent” ratings across all dimensions indicate that the framework successfully captures critical vulnerabilities, provides a structured crisis management approach, and supports business continuity outcomes. These findings confirm that the CSCMP is both theoretically grounded and empirically relevant, thereby providing a robust foundation for the refined and validated framework presented in the subsequent section. Building on the strong validation outcomes and expert feedback, the CSCMP framework was further refined to enhance its completeness, clarity, and practical applicability. The validated and improved version of the CSCMP framework is presented in the following section.

6.7.2 The Validated CSCMP Framework

The validated CSCMP framework presented in this section represents the final refined outcome of the study, incorporating insights from literature, empirical findings, and expert validation. The refinement process ensures that the framework is not only theoretically robust but also practically applicable and aligned with current industry needs. Key enhancements introduced through validation include the incorporation of additional elements such as ESG considerations, performance measurement through KPI toolkits, and improved integration across crisis management phases. The validated CSCMP framework represents a comprehensive, empirically validated approach to strengthening crisis preparedness, response capacity, and long-term resilience within the Malaysian construction industry. Drawing from the triangulated findings of literature review (Chapters 2–3), qualitative insights (Chapter 5), quantitative analysis (Chapter 6), and expert validation, this framework consolidates the critical components required for a sector-wide crisis governance model. The results confirm its completeness, appropriateness, and practical applicability, reinforcing its suitability for achieving Objective 3 (to develop and validate a CSCMP) and Objective 4 (to determine its impact on business continuity).

The validated CSCMP framework is illustrated in Figure 6.4, which presents the integrated relationship between vulnerable areas, structured crisis management phases, and business continuity outcomes.

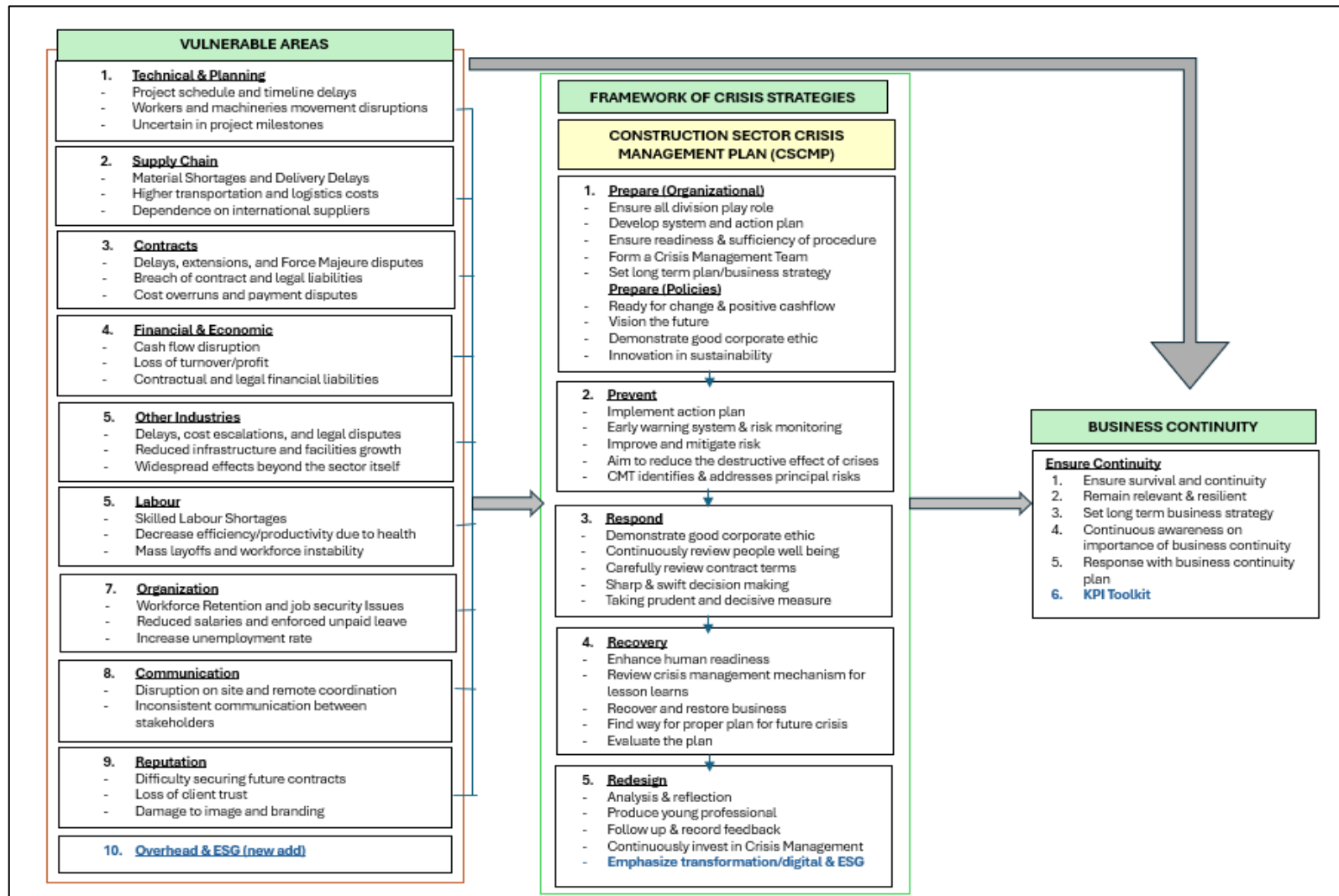


Figure 6.5 Validated Construction Sector Crisis Management Plan (CSMP) Framework

As shown in Figure 6.5, the framework demonstrates how identified vulnerabilities are systematically addressed through the five-phase CSCMP, ultimately leading to improved business continuity and organisational resilience.

Vulnerable Areas

Ten critical vulnerabilities were identified from the literature and field evidence, including Technical & Planning, Supply Chain, Contractual, Financial, Interrelated Industries, Labour, Organisation & Employees, Communication, Reputation, and the newly added Overhead & ESG category.

The first nine areas were consistently recognised in Chapters 2 and 5 as the most disrupted during Covid-19 (CIDB, 2020; Balachandran et al., 2021), while the addition of Overhead & ESG emerged from expert validation. Experts emphasised that operational expenditures, sustainability compliance, environmental and safety obligations significantly intensify during crises, aligning with recent industry trends in ESG-driven construction governance. Including ESG therefore improves the completeness and contemporary relevance of the framework.

CSCMP Strategy

The five-phase CMP strategy consists of Prepare, Prevent, Respond, Recover, and Redesign—forms the strategic core of the framework. These phases are consistent with internationally recognised crisis models (Fink, 1986; Mitroff, 2005; Boin et al., 2008), and the strong validation feedback confirmed that they are logical, sequential, and practical, reflecting real operational patterns observed during the pandemic (Chapter 5).

- i. Prepare ensures early readiness through governance structures, digital capability, training, and scenario planning in responding to the pre-crisis gaps highlighted under RO2.
- ii. Prevent introduces risk anticipation and early warning mechanisms, addressing the absence of forecasting tools noted across the industry (Chapter 5).

- iii. Respond emphasises ethical leadership, rapid decision-making, and operational coordination, in line with crisis response theories and validated by the strong importance placed on these items in Chapter 6.
- iv. Recover incorporates business restoration, stakeholder communication, afterward action review, and capability rebuilding, consistent with ISO 22301's continuity principles.
- v. Redesign focuses on strategic kpi toolkit, digitalisation, talent development, and ESG integration, echoing the resilience literature (Duchek, 2020) and reflecting the industry's call for long-term reforms (Chapter 5).

This structured progression demonstrates how each CSCMP phase systematically resolves or reduces vulnerabilities identified in Part 1, ensuring coherence between crisis exposure and crisis capability development.

Business Continuity

The final part reinforces the central proposition of this study: effective crisis management directly sustains business continuity. Consistent with the very strong correlation between CSCMP and continuity ($\rho = 0.862$), this component highlights the need for proactive planning, organisational resilience, and long-term adaptation.

The inclusion of a KPI Toolkit responds directly to expert suggestions for measurable indicators to track recovery, resilience performance, risk mitigation effectiveness, and stakeholder confidence. This addresses the gaps identified in Chapter 5, where organisations lacked structured mechanisms to assess continuity readiness or post-crisis performance.

As a validation summary, the expert's validation strongly endorsed the framework:

- i. Completeness of vulnerable areas received the highest ratings ("very good" to "excellent"), confirming alignment with real industry risks.
- ii. Strategic phases were considered clear, well-sequenced, and theoretically sound. Experts affirmed that the five-phase model mirrors practical crisis workflows in construction organisations.

- iii. Business performance outcomes were rated highly, with experts recognising that the CMP clearly supports operational stability, faster recovery, and resilience building. Suggestions to enhance usability such as KPI integration and training that have been incorporated into the updated model.
- iv. The framework was also rated highly for ease of understanding, ease of use, and beneficial application, indicating strong practitioner readiness and alignment with industry realities.

In conclusion, the validated CSCMP framework represents a comprehensive, industry-relevant, and empirically supported model for enhancing crisis resilience in the Malaysian construction sector. By systematically linking vulnerabilities, structured crisis management strategies, and measurable business continuity outcomes, the framework provides a clear and actionable pathway from risk identification to resilience building.

The integration of ESG considerations, digital readiness, and performance measurement further strengthens its relevance in addressing contemporary and future industry challenges. As such, the CSCMP contributes both theoretically and practically, offering a robust foundation for organisational implementation, industry best practices, and future policy development aimed at strengthening crisis preparedness and long-term sustainability.

6.8 Achievement of the Study

The study's achievement is assessed based on how effectively its findings address the research questions and fulfil all four research objectives. Guided by the investigation into (1) vulnerable areas, (2) existing strategies, (3) the development of the Construction Sector Crisis Management Plan (CSCMP), and (4) the role of the CSCMP in ensuring business continuity, the major findings are summarised as follows:

- a) The study identifies nine core vulnerable areas, including technical and planning, supply chain, finance, contracts, labour, organisational capacity, communication, and reputation that significantly threaten business continuity during crises such as Covid-19. These vulnerabilities were consistently

validated through literature (Chapters 2-3), qualitative interviews (Chapter 5), and quantitative evidence (Chapter 6).

- b) Analysis of existing strategies shows that most construction organisations are underprepared, relying on reactive, fragmented, and largely untested approaches, often dependent on government SOPs. These strategies were shown to have no meaningful relationship with issue resolution or business continuity, confirming their inadequacy and aligning with expert insights that organisations lacked preparedness, forecasting mechanisms, and structured crisis governance.
- c) Based on the synthesis of qualitative and quantitative findings, the study proposes a structured CSCMP comprising five phases consists of Prepare, Prevent, Respond, Recover, and Redesign. This framework directly addresses the weaknesses identified in existing strategies, aligns with crisis and resilience theories reviewed in earlier chapters, and responds to practical industry needs. The CSCMP provides a coherent, proactive, and systematic approach to managing crises in construction organisations.
- d) The study demonstrates that the CSCMP is highly effective in ensuring business continuity. Correlation analysis shows a very strong, statistically significant relationship between CSCMP implementation and business continuity ($\rho = 0.862$, $p < 0.01$), making it the strongest predictor among all constructs. Expert validation further confirms that the CSCMP supports resilience, speeds recovery, strengthens decision-making, and preserves operational stability during disruptions.

Overall, the study successfully achieves its objectives by identifying key vulnerabilities, evaluating existing strategies, developing a validated CSCMP, and demonstrating its critical role in enabling business continuity. The findings confirm that a structured, multi-phase crisis management plan is essential for improving preparedness, reducing operational disruption, and strengthening long-term resilience in the Malaysian construction industry.

6.9 Summary of Chapter

In summary, this chapter reported the questionnaire results using descriptive (mean ranks) and inferential (Spearman) analyses to address the four research objectives. The quantitative evidence is interpreted in direct continuity with the literature (Chapters 2–3) and the exploratory interviews (Chapter 5) and was confirmed through expert panel validation (Section 6.7).

Objective 1 was met: empirical means identify the sector's critical vulnerabilities including technical and planning, supply chain disruption, contractual/complexity and financial fragility (Means $\approx$ 4.11–4.38). These findings replicate and extend the crisis-exposure patterns reviewed in Chapters 2–3 (Fink, 1986; Mitroff, 2005; Aven, 2016) and the qualitative accounts in Chapter 5 (CIDB, 2020; Balachandran et al., 2021).

Objective 2 was met: organisations predominantly adopt reactive, compliance based responses (e.g. SOP adherence, cost-cutting; Means $\approx$ 4.00). This pattern mirrors the interview evidence in Chapter 5 and explains the weak, non-significant associations between Existing Strategies and both Issues and Continuity observed in the inferential tests.

Objective 3 was met: implementation barriers limited financial commitment, environmental and adaptive constraints, communication shortfalls, and leadership weakness that were identified (Means $\approx$ 3.46–3.64). These constraints, noted in both survey and interviews, help explain why unstructured strategies fail to translate into resilience in practice.

Objective 4 was met and validated: the proposed five-phase CSCMP (Prepare, Prevent, Respond, Recover, Redesign) is strongly supported by respondents and experts. Spearman correlations show the CSCMP is the single strongest predictor of business continuity ($\rho = 0.862$, $p < 0.01$), while CSCMP is moderately associated with reductions in identified vulnerabilities ($\rho \approx 0.434$, $p < 0.01$).

Expert panel ratings (majority “very good”/ “excellent”) corroborated the framework's completeness (including the newly added Overhead & ESG), practical sequencing and usefulness, and recommended minor refinements such as KPI tooling and implementation training (Section 6.7).

In sum, the chapter demonstrates internal coherence and cross-chapter consistency: the quantitative patterns corroborate the theoretical propositions in

Chapters 2–3, echo the lived experiences reported in Chapter 5, and provide empirical and expert-validated grounding for the CSCMP developed in Chapter 7. The results therefore justify a shift from fragmented, reactive practice toward a structured, measurable CSCMP that integrates digital readiness, ESG concerns, and performance metrics to materially improve business continuity (OECD, 2021; Duchek, 2020; Boin et al., 2008).

CHAPTER 7

CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

7.1 Introduction

This final chapter integrates the overall findings of the research and presents the study's key conclusions, contributions, recommendations, limitations, and future research directions. It begins with a recapitulation of the study and its stages, followed by conclusions aligned with the four research objectives. The subsequent sections outline the theoretical, methodological, and practical contributions of the study, as well as practical recommendations for stakeholders in the construction sector. The chapter concludes with limitations of the study and proposed avenues for future research.

7.2 Recapitulation of the Research

This This research was undertaken in response to the urgent need for a structured, evidence-based, and sector-specific crisis management framework for the Malaysian construction industry. The COVID-19 pandemic, together with ongoing global polycrises, exposed the fragility of construction organisations and revealed systemic weaknesses in preparedness, response capability, and business continuity. These disruptions highlighted the absence of a comprehensive and validated framework capable of guiding organisations through crisis events while supporting long-term resilience.

The study addressed four key problem areas. First, construction organisations were found to be highly vulnerable across multiple domains, including finance and economy, labour, organisational capacity, supply chain, contractual obligations, technical and planning processes, communication, interdependence with other industries, and reputation. Second, existing crisis response strategies were largely reactive, fragmented, and unsustainable, limiting their effectiveness in managing prolonged disruptions. Third, there was no validated and sector-specific crisis management framework tailored to the unique characteristics of the construction

industry. Finally, the absence of a structured and integrated approach hindered organisations' ability to sustain business continuity during and after crisis events.

To address these challenges, the research was structured into four sequential stages. The first stage involved a comprehensive literature review on crisis management, organisational resilience, and business continuity, which identified key theoretical and practical gaps within the Malaysian context. This stage informed the formulation of four research objectives: to identify crisis-induced vulnerabilities affecting construction organisations; to examine existing crisis management practices; to develop and validate a Construction Sector Crisis Management Plan (CSCMP); and to evaluate its contribution to business continuity.

The second stage comprised a preliminary qualitative study involving semi-structured interviews with key industry stakeholders, including representatives from CIDB, JKR, RISM, PETRONAS, and EPF. This stage provided in-depth insights into crisis experiences, validated the identified vulnerable areas, and revealed best practices from more resilient organisations. These findings formed the foundational basis for the development of the CSCMP.

The third stage involved a quantitative survey administered to G7 contractors and construction consultants, yielding 133 valid responses. The analysis provided empirical validation of the qualitative findings, quantified the extent of crisis impacts, and examined relationships between crisis management practices and business continuity outcomes. This stage strengthened the evidence base for the proposed framework.

The final stage focused on the development and validation of the CSCMP. Drawing on the integrated findings from previous stages, a five-phase framework—Prepare, Prevent, Respond, Recover, and Redesign—was developed to provide a structured approach to crisis management. The framework was subsequently validated by industry experts, who confirmed its relevance, completeness, and practical applicability. Enhancements such as the inclusion of ESG considerations and digital readiness further strengthened its alignment with current industry needs and future resilience requirements.

7.3 Conclusion

The findings of this research were derived through a rigorous triangulation of qualitative and quantitative data collected across multiple phases of inquiry. The research employed a sequential exploratory mixed-methods design, integrating insights from literature, expert interviews, and empirical survey data. This methodological approach ensured a comprehensive understanding of the crisis landscape within the Malaysian construction sector. The primary contribution of this study lies in the development and validation of the CSCMP framework, which represents a structured, sector-specific, and empirically grounded approach to crisis management in the Malaysian construction industry. The validated framework integrates identified vulnerabilities, a systematic five-phase crisis management strategy, and measurable business continuity outcomes into a coherent model. This research output not only addresses the gaps identified in existing practices but also provides a practical and scalable solution for enhancing resilience within construction organisations. All four research objectives were successfully achieved, and the conclusions are presented as follows:

7.3.1 Research Objective 1: To Identify Crisis-Induced Vulnerabilities Affecting Malaysian Construction Organisations During A Crisis

The first research objective was to identify the critical areas of vulnerability within construction organisations during a crisis. This objective was achieved through the integration of literature review, qualitative interviews, and quantitative analysis, which collectively identified nine key vulnerable areas affecting the Malaysian construction sector. These findings were consistently validated across all phases of the study, confirming the systemic nature of these vulnerabilities and their significant impact on organisational performance during crisis events.

The study confirmed nine vulnerable areas consistently affected during crises: finance and economy, labour, organisation and employees, supply chain, contracts, technical and planning, communication, interdependence with other industries, and reputation. Among these, technical and planning, supply chain, and contracts were the most severely impacted, as reflected in both qualitative responses and the highest quantitative mean scores ($M = 4.31, 4.27, \text{ and } 4.22$ respectively).

Disruptions in these areas caused project delays, increased operational costs, labour shortages, material constraints, and reputational risks. The findings clearly demonstrate that the construction sector lacks structured crisis governance to mitigate these impacts, resulting in repeated vulnerabilities across crises.

7.3.2 Research Objective 2: To Examine Crisis Management Practices Adopted by Construction Organisations in Managing Crises

The second research objective was to examine the crisis management strategies adopted by construction organisations in responding to crisis situations. This objective was achieved through qualitative insights and quantitative findings, which revealed that existing strategies are largely reactive, fragmented, and short-term in nature. The analysis demonstrated that these approaches are insufficient to support sustained organisational resilience, thereby highlighting the need for a more structured and proactive crisis management framework.

The research found that crisis strategies widely adopted during Covid-19 were predominantly reactive, short-term, and compliance-based. Common responses included SOP adherence, cost-reduction measures, contract renegotiations, and partial adoption of remote work.

Although these strategies enabled minimal continuity, they lacked integration into a long-term crisis management structure. Only 21% of surveyed organisations had a formal CMP prior to Covid-19, and even among these organisations, confidence in the plans was low.

This demonstrates that the construction sector remains heavily reliant on government direction, with limited internal strategic crisis capability. These findings reinforce the need for a structured crisis management framework such as the CSCMP.

7.3.3 Research Objective 3: To Develop and Validate A Construction Sector Crisis Management Plan (CSCMP) Informed by Crisis Management and Organisational Resilience Foundations

The third research objective was to develop and validate a Construction Sector Crisis Management Plan (CSCMP) informed by crisis management and organisational resilience principles. This objective was achieved through the systematic integration of

literature, empirical findings, and expert input, leading to the development of a five-phase CSCMP comprising Prepare, Prevent, Respond, Recover, and Redesign. The framework was subsequently validated by industry experts, confirming its relevance, completeness, and practical applicability within the Malaysian construction context.

The Through synthesis of literature, empirical findings, and expert input, the five-phase CSCMP was developed: Prepare, Prevent, Respond, Recover, and Redesign. Each phase captures a critical stage of crisis governance, from readiness and proactive mitigation to structured response, recovery, and institutional learning.

Expert validation confirmed the CSCMP as relevant, practical, and adaptable to both public and private sector contexts. Enhancements recommended by experts including ESG integration and digital readiness, were incorporated to strengthen future applicability.

7.3.4 Research Objective 4: To Evaluate the Contribution of CSCMP Towards Strengthening Business Continuity

The fourth research objective was to evaluate the contribution of the CSCMP towards strengthening business continuity within the Malaysian construction sector. This objective was achieved through quantitative analysis, which demonstrated a strong and positive relationship between the adoption of structured crisis management practices and improved business continuity outcomes. The findings indicate that organisations implementing systematic crisis management approaches are better positioned to maintain operations, recover efficiently, and enhance long-term resilience during and after crisis events.

The Quantitative analysis demonstrated a strong positive association between the adoption of the CSCMP and improved business continuity outcomes. Organisations that applied structured crisis management practices showed, greater resilience during crisis periods ($M > 4.00$), faster operational recovery, sustained performance post-crisis and higher stakeholder confidence

Correlation results indicated significant positive relationships between CSCMP components and business continuity indicators ($p < 0.05$). These associations suggest that structured crisis planning is strongly linked to continuity outcomes, although causality cannot be inferred from correlation alone.

Expert validation echoed these findings, with 77% rating the CSCMP as good to excellent, and recommending its adoption across the sector.

7.4 Final Research Output – Validated CSCMP

The final research output of this study is the validated Construction Sector Crisis Management Plan (CSCMP), which integrates identified vulnerabilities, a structured five-phase crisis management approach, and business continuity outcomes into a comprehensive framework. The validated CSCMP provides a systematic and practical model for enhancing crisis preparedness, response, and long-term resilience within the Malaysian construction sector.

The framework, presented in Chapter 6, represents a refined and empirically supported model that addresses the limitations of existing reactive practices. It offers a clear pathway for organisations to transition from fragmented crisis responses to a structured and proactive resilience strategy. Final research output is presented again in Figure 7.1.

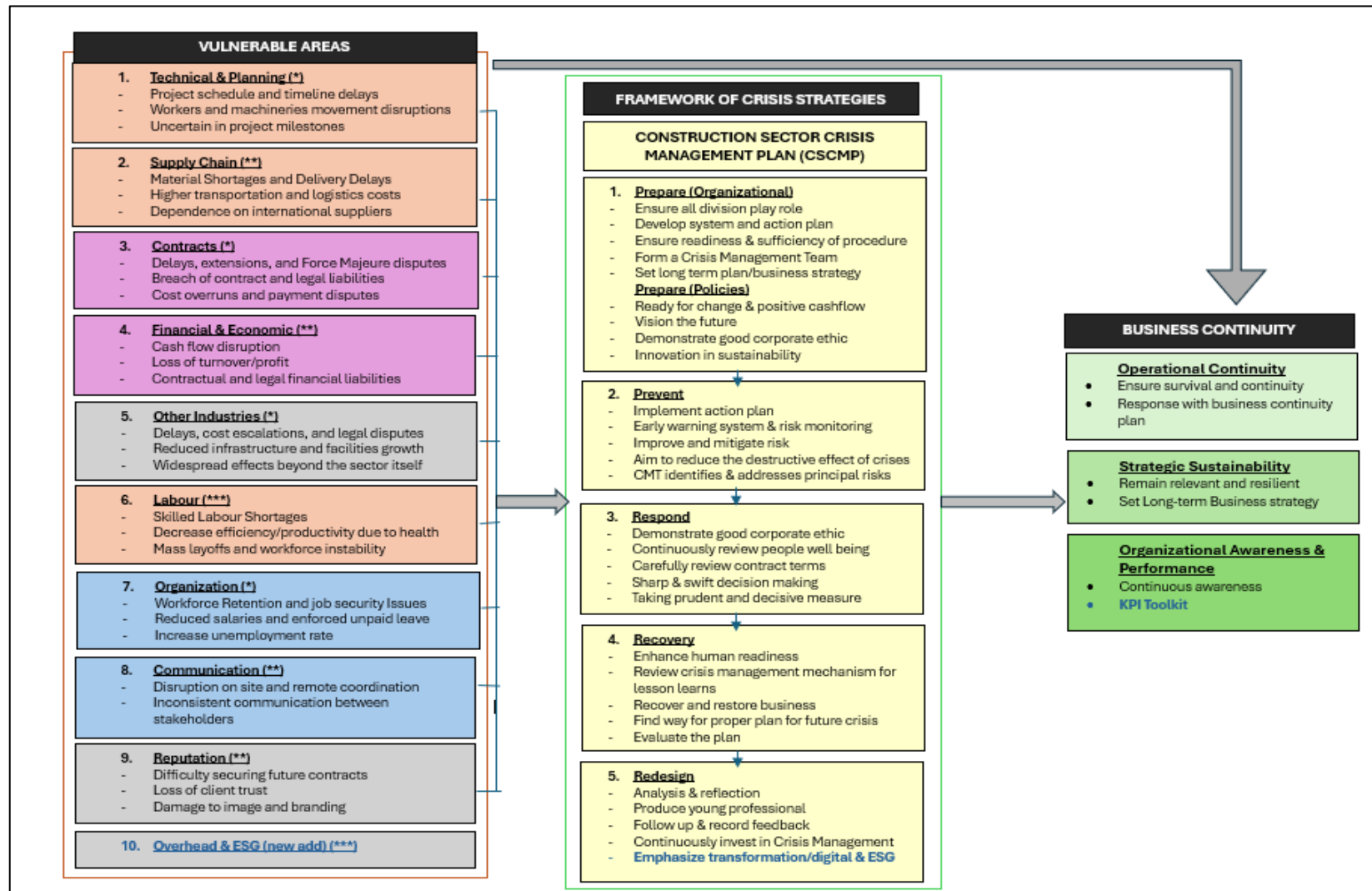


Figure 7.1 Final Research Output - Validated Construction Sector Crisis Management Plan (CSMP) Framework

The final output of validated Construction Sector Crisis Management Plan (CSCMP) framework presented in Figure 7.1 illustrates a structured and integrated approach to crisis management within the Malaysian construction sector. The framework is organised into three interconnected elements: vulnerable areas, crisis management strategies, and business continuity outcomes, reflecting a clear progression from risk identification to strategic intervention and ultimately to organisational resilience.

On the left-hand side, the framework identifies ten key vulnerable areas representing the primary sources of disruption during crisis events. These vulnerabilities are derived from empirical findings and ranked based on mean values obtained from the quantitative analysis, indicating their relative level of impact. To enhance clarity and interpretability, the vulnerable areas are grouped into four categories and distinguished using colour coding.

The orange-coded group represents operational and project-related risks, including technical and planning issues, supply chain disruptions, contractual challenges, and labour constraints. These are among the highest-ranked vulnerabilities and reflect immediate disruptions to construction activities. The purple-coded group captures financial and economic risks, which affect organisational cash flow, financial stability, and contractual obligations. The blue-coded group represents organisational risks, including workforce-related challenges and communication issues that influence internal coordination and responsiveness. Finally, the grey-coded group reflects external and strategic risks, including interdependencies with other industries, reputational impacts, and emerging considerations such as overhead costs and ESG-related factors.

While the vulnerable areas are visually grouped to improve usability, their analytical ranking is retained through numerical ordering (1–10), ensuring that the framework maintains both empirical rigour and practical relevance. Higher-ranked vulnerabilities are positioned at the top, signalling priority areas requiring immediate attention.

At the centre of the framework is the CSCMP, which forms the core strategic component. It comprises five interrelated phases: Prepare, Prevent, Respond, Recover, and Redesign. These phases represent a continuous and systematic crisis management cycle. The Prepare and Prevent phases emphasise proactive planning, organisational readiness, and early risk mitigation. The Respond phase focuses on immediate crisis

actions, including coordination, decision-making, and operational control. The Recover phase ensures the restoration of business functions and organisational stability, while the Redesign phase promotes learning, adaptation, and long-term transformation, including the integration of digitalisation and ESG considerations.

On the right-hand side, the framework presents business continuity as the ultimate outcome of effective crisis management. To improve clarity, the six identified elements are organised into three outcome clusters. Operational continuity focuses on immediate survival and continuity of operations during disruptions. Strategic sustainability reflects the organisation's ability to remain relevant, resilient, and aligned with long-term business objectives. Organisational awareness and performance emphasises continuous learning, awareness of crisis preparedness, and the use of tools such as KPI frameworks to monitor and enhance performance.

The directional flow of the framework demonstrates a causal relationship, whereby identified vulnerabilities are systematically addressed through structured crisis management strategies, leading to improved business continuity outcomes. This integrated model reinforces the central proposition of the study that effective crisis management requires a proactive, structured, and continuous approach embedded within organisational systems.

Overall, the validated CSCMP framework provides a comprehensive and practical model that enables construction organisations to transition from reactive and fragmented crisis responses to a more coordinated, resilient, and forward-looking approach.

7.5 Research Contributions

This study makes a significant theoretical contribution by extending crisis management and organisational resilience theories into the construction sector, which has been relatively underexplored in existing literature. The research introduces a validated, sector-specific CSCMP framework that integrates established crisis lifecycle models with empirical insights from the Malaysian construction context. By linking vulnerabilities, structured crisis management phases, and business continuity outcomes, the study advances existing theoretical perspectives by demonstrating how crisis management can be operationalised within a high-risk, project-based industry.

7.5.1 Theoretical Contributions

This study makes a significant theoretical contribution by advancing the understanding of crisis management and organisational resilience within the construction sector. It introduces a validated five-phase Construction Sector Crisis Management Plan (CSCMP), which is grounded in established crisis management and resilience theories while extending their application into a project-based and high-risk industry context. By developing a sector-specific framework, the study addresses a notable gap in the literature, where existing crisis management models have largely remained generic and not tailored to the unique operational complexities of construction organisations.

Furthermore, the study integrates crisis lifecycle phases with organisational resilience perspectives, offering a more holistic and dynamic approach to managing crises. Rather than treating crisis response as an isolated event, the framework conceptualises crisis management as a continuous and structured process that links vulnerability identification, strategic intervention, and continuity outcomes. In doing so, the research contributes to theory by demonstrating how crisis management principles can be operationalised within the construction domain to support both immediate response and long-term resilience.

7.5.2 Methodological Contributions

From a methodological perspective, this study demonstrates the effectiveness of a sequential exploratory mixed-methods design in developing and validating a complex framework. The integration of qualitative interviews, quantitative surveys, and expert validation provides a robust triangulated approach that enhances the reliability and credibility of the findings. The study also contributes methodologically by illustrating how multiple data sources can be systematically synthesised to develop a context-specific framework grounded in both theory and practice.

7.5.3 Practical Contributions

Practically, this research provides a structured and actionable CSCMP framework that can be adopted by construction organisations, industry stakeholders,

and policymakers. The framework aligns with national development priorities such as the Construction 4.0 Strategic Plan and the Twelfth Malaysia Plan (12MP), which emphasise resilience, digitalisation, and sustainable development within the construction sector. By incorporating elements such as ESG considerations, digital readiness, and performance measurement, the CSCMP offers a practical tool for improving crisis preparedness, operational continuity, and long-term resilience. Furthermore, the framework can be applied not only at the organisational level but also at the project level, enabling project managers to systematically manage risks and disruptions throughout the project lifecycle.

7.6 Limitation of the Study

Despite achieving the research objectives, several limitations should be acknowledged. The quantitative data collection was limited to respondents within the Klang Valley, which may restrict the generalisability of the findings to other regions in Malaysia. Additionally, the use of non-probability sampling may introduce sampling bias, while reliance on self-reported data may result in subjective or overly optimistic assessments of organisational preparedness. Furthermore, although the CSCMP framework has been validated through expert evaluation, it has not yet been tested in real project environments. As such, the validation remains perception-based rather than implementation-based, which presents an opportunity for further empirical testing.

These limitations inform recommendations for future research.

7.7 Recommendations for Future Research

Although the CSCMP framework has been validated and demonstrated its relevance and effectiveness, further research is required to enhance its applicability, scalability, and generalisability across different contexts. Future studies should focus on extending the empirical testing and practical implementation of the framework to strengthen its robustness and long-term impact.

Firstly, future research should explore the application of the CSCMP within live construction projects. Implementing the framework in real project environments would allow researchers to assess its practical effectiveness, adaptability, and influence on project performance under actual crisis conditions. Such studies would provide valuable

insights into operational challenges and enable refinement of the framework based on real-time feedback.

Secondly, the geographical scope of the study can be expanded beyond the Klang Valley to include other regions within Malaysia as well as neighbouring Southeast Asian countries. This would facilitate comparative analysis and provide a deeper understanding of how regional differences, regulatory environments, and industry practices influence crisis management capabilities and resilience outcomes.

In addition, longitudinal studies are recommended to evaluate the sustained impact of CSCMP implementation over time. Examining organisational performance, resilience, and stakeholder confidence across extended periods would provide stronger evidence of the framework's long-term effectiveness and its role in supporting continuous improvement.

Future research should also investigate the role of policy alignment and institutional support in facilitating the adoption of structured crisis management practices. This includes examining how regulatory frameworks, industry standards, and governing bodies such as CIDB and JKR can support, standardise, and institutionalise crisis preparedness within the construction sector.

Finally, further refinement of the KPI Toolkit is recommended to enhance its practicality and usability. Future studies could develop benchmarking metrics, sector-specific performance thresholds, and digital or automated reporting systems to support continuous monitoring, evaluation, and improvement of crisis management practices.

Overall, these future research directions provide a pathway for strengthening the CSCMP framework and expanding its relevance across different organisational, project, and national contexts.

REFERENCES

- Ahmed, S. k. (2024). How to choose a sampling technique and determine sample size for research: A simplified guide for researchers. *Elsevier*, 1-11.
- Ajith, M., & Lux, A. (2025). Adaptive crisis management at the operational level: Responses to COVID-19 in the Australian resources sector. *Journal of Management & Organization*, 1909-1933.
- Alaloul, W. S., Musarat, M., Rabbani, M. B., & Iqbal, Q. (2021). Investigating the impact of inflation on labour wages in Construction Industry of Malaysia. *Ain Shams Eng.*, 1-26.
- Alawag, A. M., & Alaloul, W. S. (2020). Total Quality Management Practices and Adoption in Construction Industry Organizations: A Review. doi: 10.1109/IEEECONF51154.2020.9319992. .
- Aldossary, M. A. (2025). Supply Chain Process Integration Capability and Project Outcomes: The Interplay of Supply Chain Visibility and Project Complexity. *International Journal Of Construction Supply Chain Management*, 112-134.
- Ali, Q. S. (2023). Systematic literature review of Business Continuity Management (BCM) practices: Integrating organisational resilience and performance in Small and medium enterprises (SMEs) BCM framework. *International Journal of Disaster Risk Reduction*, 1-8.
- Ansell, & Sorensen. (2021). The COVID-19 pandemic as a game changer for public administration and leadership? The need for robust governance responses to turbulent problems. *Pubmic Management Review*, 1-15.
- Ansell, C., & Sorensen, E. (2024). *Robust Governance in Turbulent Times*. Cambridge: Cambridge University Press.
- Ariff, & Bakar. (1999). The Malaysian Financial Crisis: Economic Impact and Recovery prospects. *The Developing Economies*, 1-22.
- Athukorala, P. C. (2010). The Malaysian economy during three crises. *Scopus*, 83-105.
- Ayalp, G. G. (2025). Modeling Critical Rework Factors in the Construction Industry: Insights and Solutions. *MDPI*, 1-12.
- Babu, S. S. (2016). Construction project Management During Economic Crisis. *International Journal of Management (IJM)*, 370-382.

- Babulal. (2021, August 18). Retrieved from New Straits Times Press (M) Bhd:
<https://www.nst.com.my/news/nation/2021/08/719174/532-cent-clusters-recorded-past-5-months-workplace-related>
- Bakar & Awang . (2011). Strategies for Survival during Economic Downturn in Construction Industry: A Survey on Construction Companies in Malaysia. *World Applied Science Journal*,, 1967-1974.
- Bakar & Yusof. (2011). Survival Strategies of Construction Companies in Malaysia during Two Periods of Recession. *International Journal of Academic Research*, 481-486.
- Bank Negara Malaysia. (2020). *Economic and Financial Developement in Malaysia in the Second Quarter Of 2020*. Kuala Lumpur: Bank Negara Malaysia.
- Baubion, C. (2013). *Strategic Crisis Management*. Geneva: OECD.
- Bell, I. B. (2009). Pandemic Influenza as 21st Century Urban Public Health Crisis. *US National Library of Medicine*, 1963-1969.
- Benner, M. J. (2016). The lemons problem in markets for strategy. . *Strategy Science*, 71-89.
- Bernama. (2020, April 2). *Most companies have crisis management plan*. Retrieved from Retrieved from The Star.
- Björck, A., & Bläse, R. (2024). Becoming crisis-ready: A systematic literature review on corporate crisis readiness and the process to achieving it. *Research Gate*, 1-19.
- Boateng, G. O.-Q. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 149.
- Boin, A. &. (2016). The politics of crisis management: Public leadership under pressure. *Cambridge University Press*.
- Boin, A., & Lodge, M. (2020). Learning from the COVID-19 crisis: an initial analysis of national responses. *Policy Design and Practice*, 1-17.
- Boin, A., 't Hart, P., Stern, E., & Sundelius, B. (2005). The politics of crisis management: Public leadership under pressure. . *Cambridge University Press*.
- Brinckmann, J., & Villanueva, J. (2019). Sources of strategic flexibility in new ventures: An analysis of the role of resource leveraging practices. *Strategic Entrepreneurship Journal*, 154–178.
- Broekema, W., & Graaf, B. d. (2024). Rethinking legislation to cope with transboundary crises. *Wiley*, 1-13.

- Bruneau. (2021). Disaster resilience of communities and infrastructure: New perspectives. *Earthquake Spectra. Elsevier*, 3-20.
- Bryman. (2021). *Social Research Methods (6th edition)*. Oxford University Press.
- Bundy, J. P. (2021). Crises and Crisis Management: Integration, Interpretation, and Research Development. *Journal of Management*, 1501-1526.
- Chakrabarti, A. (2015). Organizational adaptation in an economic shock: The role of growth reconfiguration. *Strategic Management Journal*, 1717-1738.
- Chang, R., Hong, J., & Varley, K. (2020, December 1). *The best and worst places to be in the Coronavirus era*. Retrieved from Bloomberg. Retrieved from <https://www.biznews.com/health/2020/12/01/covid-19-countries>
- Cheval, S. &. (2020). Observed and Potential Impacts of the COVID-19 Pandemic on the Environment. *Environmental Research and Public Health*, 1-25.
- Chowdhury. (2022). COVID-19 pandemic–related supply chain studies: A systematic review. *Transportation Research Part E*, 156.
- Christensen, T. L. (2020). Organizing for crisis management: Building governance capacity and legitimacy. . *Public Administration Review*, 767–774.
- Chua, Y. (2013). *Mastering research methods (2nd ed.)*. McGraw-Hill Education.
- CIDB. (2020). *Construction 4.0 Strategic Plan (2021-2025)*. Kuala Lumpur: CIDB.
- CIDB. (2022, March 31). *CIDB*. Retrieved from <https://www.cidb.gov.my/eng/impact-of-covid-19-on-the-construction-industry-in-asia-what-lies-ahead/>
- CIDB. (2025). *Construction 4.0 Strategic Plan (2021-2025)*. Kuala Lumpur;. Construction Industry Development Board.
- Cohen. (2018). *Research Methods in Education (8th ed.)*. Routledge.
- Cohen, L. M. (2018). *Research Methods in Education (8th ed.)*. Routledge.
- Crandall, W. R. (2013). Crisis management: Leading in the new strategy landscape. *SAGE Publications*.
- Cresswell, J. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.)*. Sage Publication.
- Creswell, J. W. (2023). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (6th ed.)*. SAGE Publications.
- Ding, M. J. (2025). Mitigating the supply chain uncertainties and risks in the construction projects: case studies of Australian construction projects. *Elsevier*, 1-9.
- DOSM. (2012). *Performance of the Construction Sector*. Putrajaya: DOSM.

- DOSM. (2020). *Malaysian Economic Statistic Review*. Putrajaya: Department of Statistics Malaysia. Putrajaya: DOSM.
- DOSM. (2023). Economic Census 2023: Construction. *DOSM*, 1.
- Esa, M. (2020). *Covid-19: Analysis of the Situation for the Construction Sector in Malaysia*. . Kuala Lumpur: UIA.
- Fani, S. V., & Subriadi, A. P. (2019). Business Continuity Plan: Examining of Multi-Usable Framework. *ScienceDirect*, 275-282.
- Fraser, R., & White, Z. (2024). Business continuity as self-efficacy: Augmenting existing business continuity practice. *Sage Journals*, 1-8.
- Gaal, O. H., & Afrah, A. N. (2017). “*Lack of infrastructure: The impact on economic development as a case of Benadir region and Hir-shabelle, Somalia*. Semantic Scholar.
- Gamil, Y. &. (2020). *The Impact of Pandemic Crisis on the Survival of Construction Industry: A Case of COVID-19*. . 122-130.: Mediterranean Journal of Social Sciences.
- Gara, J. A., & Zakaria, R. (2022). Effects of the COVID-19 Pandemic on Construction Work Progress: An On-Site Analysis from the Sarawak Construction Project, Malaysia. *MDPI*, 1-11.
- Ghazi, K. (2017). The Impact of Strategic Planning on Crisis Management Styles in Hotels. *Journal of Tourism Research*, 1-20.
- Gillberg, N., & Ahlstrom, L. (2023). Resilience Capability and Capacity in Unexpected Crises: Experiences and Lessons Learned in a Healthcare Organisation during the COVID-19 Pandemic. *Journal of Nursing Management*, 1-10.
- Glaesser, D. (2006). Crisis Management in the Tourism Industry. . *Elsevier*, 1-22.
- Gupta, I., & Guina, P. (. (2010). Communicable diseases in the South-East Asia Region of the World Health Organization: towards a more effective response. *Buletin of the World Health Organisation*, 199-205.
- Hair, J. F. (2010). *Multivariate data analysis (7th ed.)*. Pearson.
- Hair, J. F. (2019). *Multivariate data analysis (8th ed.* Cengage Learning.
- Hale, T. A. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*, 529–538.
- Hannah, S. T. (2022). Crisis leadership: A review and future research agenda. *The Leadership Quarterly*, 1-33.

- Harinderan, K. (2024, April 30). Rollout of Mega Projects to Fuel Construction Sector in Coming Quarters. p. Business Today Malaysia.
- Hart, B. &. (2003). Public leadership in times of crisis: Mission impossible? *Public Administration Review*, 544-553.
- Harun, & Razak. (2020, September 23). *Malaysia's construction industry suffers record decline*. Retrieved from Retrieved from nst.com.my: <https://www.nst.com.my/news/nation/2020/09/626530/malaysias-construction-industry-suffers-record-decline>
- Henseler, J. H. (2021). Partial least squares path modeling: Updated guidelines. *Springer*.
- Hinton, P. M. (2014). *SPSS explained (2nd ed.)*. Routledge.
- Ho, C., & Chee, C. (2020). Mental Health Strategies to Combat the Psychological Impact of COVID-19 Beyond Paranoia and Panic. *Ann. Acad. Med. Singapore*.
- Hoda, R. (2024). Research Philosophy In: Qualitative Research with Socio-Technical Grounded Theory. *Springer Cham*.
- Hoekstra, R. V. (2022). An updated guide to Cronbach's alpha for research use. *Practical Assessment, Research & Evaluation*, 1-18.
- Howell, D. (2010). *Statistical methods for psychology (7th ed.)*. Wadsworth.
- Hu, C., & Yun, K. H. (2022). Effective Crisis Management during Adversity: Organizing Resilience Capabilities of Firms and Sustainable Performance During COVID-19. *MDPI*, 1-20.
- Hua, Y., & Kang, M. (2025). How to Foster Project Organization Resilience in the Construction Industry: The Role of Data Governance Capabilities. *MDPI*, 1-11.
- Hulley, S. B. (2013). *Designing clinical research (4th ed.)*. Lippincott Williams & Wilkins.
- Husein, I. A., & Borisovich, Z. (2021). COVID-19: Key global impacts on the construction industry and proposed coping strategies. *Research Gate*, 1-10.
- Ibrahim, E. &. (2020). Covid-19 pandemic lockdown: The consequences towards project success in Malaysian construction industry. *Adv. Sci. Technol. Eng. Syst*, 973–983.
- Iftikhar, R., & Davies, A. (2024). Adaptive sense-making for crises in interorganizational projects: The case of International Islamabad Airport project. *International Journal of Project Management*, 1-17.

- ILO. (2020). *The socioeconomic impacts of COVID-19 in Malaysia: Policy review and guidance for protecting the most vulnerable and supporting enterprises*. Kuala Lumpur: International of Labour Organisation Malaysia. ILO.
- ILO. (2022). *Impact of the COVID-19 Pandemic on Malaysian Labour Market and Policy Responses*. Japan: Japan Labour Issues.
- IMF. (2025). *World Economic Outlook*. New York: IMF.
- Iqbal et al. (2021). COVID-19 pandemic and construction industry: : impacts, emerging construction safety practices, and proposed crisis . *Brazilian Journal of Operations & Production Management management framework*, 1-17.
- ISO22301. (2019). *Business Continuity Management Systems (BCMS)*. Business Continuity Management Systems (BCMS).
- Jabeen, R. (2018). Organisation Crisis Management: A conceptual framework for public sector organizations. *University of Vaasa*.
- James, C., & Gina, F. (2020). A Look at Covid-19 Impacts on Construction Industry. . *Atlanta: Holand & Knight Alert*.
- Kassem, M. A., & Radzi, A. R. (2022). Impacts and Response Strategies of the COVID-19 Pandemic on the Construction Industry Using Structural Equation Modeling. *MDPI*, 1-24.
- Kaushal, V. (2021). “Strategies to Mitigate COVID-19 Pandemic Impacts on Health and Safety of Workers in Construction Projects. *Civil Engineering Beyond Limits*, 1-8.
- Keat, H. S. (2009). *Federal Reserve Bank of San Francisco Asia Economic Policy Conference: Asia & the Global Financial Crisis 18-20 October 2009*. Singapore.
- Khoon, G. S., & Hui, M. L. (2010). *The Impact of Global Financial Crisis: The Case of Malaysia*. Penang: Third World Network.
- Kim, A., & Bansal, P. (2018). Hidden in plain sight: The importance of scale in organizations‘ attention to issues. *Academy of Management Review*, 217-241.
- Kineber, A. F. (2024). Critical success factors for construction sustainability initiatives: A survey of industry professionals. . *Journal of Construction Engineering and Management*.
- Koutsoukis, N., & Farantos, G. (2015). Integrated crisis management: A literature review.

- Kum, Y. T., & Yap, J. B. (2024). Ramifications of the COVID-19 pandemic on construction operations in developing countries: Malaysian experience. *Frontiers in Engineering and Built*, 196-214.
- Lafhaj, Z., & Rebai, S. (2024). Complexity in Construction Projects: A Literature Review. *MDPI*, 1-19.
- Laguna, B. (2024). Crisis management from a relational perspective: an analysis of interorganizational transboundary crisis networks. *Journal of Public Policy*, 720–746.
- Lai, H. Y., Aziz, A. R., & Chan, T. K. (2016). . Effect of the global financial crisis on financial performance of Malaysian construction firms. . *Journal of Financial Management of Property and Construction*, 19(3), , 246–263.
- Latouche, M. A., & Gericke, A. (2023). *Venezuela - Dimensions of the Crisis*. Venezuela: Springer.
- Lawrence, M. e. (2024). Global polycrisis: causal mechanisms of crisis entanglement.
- Lee Yu Nan et al. (2023). Improving Employee Performance on Work Efficiency: A Survey in Employee Productivity in Malaysia during COVID-19 Pandemic Age. *Jurnal Intelek*, 1-16.
- Lee, E. (2020, April 12). *The Edge Malaysia*. Retrieved from <https://theedgemalaysia.com/article/cover-story-lessons-last-three-major-economic-crises?>
- Leonard, D. (2012). *Rethinking the management of large-scale national risks*. . OECD Workshop on Strategic Crisis Management.
- Lewis, P. T. (2013). *Research methods for business students (6th ed.)*. United Kingdom: Pearson.
- Lim, T. C. (2020). Effectiveness of the Covid-19 Economic Stimulus Packages: Viewpoints from Malaysian Young Entrepreneurs. *Estudios de Economia Aplicada*, 1-7.
- Lin, S. &. (2022). Risk management practices in Malaysian construction SMEs: A quantitative analysis. *Asian Journal of Construction Management*, 45-58.
- Linnenluecke, M. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *Int. J. Manag. Rev*, 4-30.
- Liu, H., & Renn, O. (2025). Polycrisis and Systemic Risk: Assessment, Governance, and Communication. *International Journal of Disaster Risk Science*, 526-549.

- Loosemore. (1998a). Reactive crisis management in construction projects. *Journal of Management in Engineering*, 26-32.
- Loosemore. (1998b). The role of organizational behaviour in construction crises. *Construction Management and Economics*, 53-64.
- Loosemore. (1998c). The three dimensions of crisis management in construction: communication, sensitivity and obligation. *International Journal of Project Management*, 197-208.
- Loosemore. (1998d). Social network analysis and crisis response in construction project organizations. *Engineering, Construction and Architectural Management*, 5-19.
- Loosemore. (1998e). Communication problems in crisis management. *Construction Management and Economics*, 39-47.
- Loosemore. (1999). A grounded theory of construction crisis management. *Construction Management and Economics*, 9-19.
- Loosemore, M. (1997). Construction crises as social phenomena. *International Journal of Project Management*, 149-154.
- Margherita, A. (2021). Business continuity in the COVID-19 emergency: A framework of actions undertaken by world-leading companies. *Elsevier*, 683-695.
- Marzouk. (2021). Managing crisis impacts in construction projects. *Sustainability*.
- MEDAC. (2021, March 21). *The malaysian Reserve*. Retrieved from <https://themalaysianreserve.com/2021/03/16/smes-get-rm5b-under-medacs-new-plan/>
- Meerow, & Newell. (2020). Defining urban resilience: A review. *Landscape and Urban Planning. Elsevier*, 1-11.
- Mitroff, & Anagnos. (Managing Crises Before They Happen: What Every Executive and Manager Needs to Know About Crisis Management). 2022. Wiley.
- Mitroff, I. (2005). Why some companies emerge stronger and better from a crisis. *AMACOM*.
- Mitroff, I., & Shrivastava, P. (1987). Effective crisis management. . *Academy of Management Review*, 283-292.
- MOF. (2010). *2010 report (budget / economic performance)*. Putrajaya: MOF.
- Mukhtar et al. (2022). Developing a Resilient Crisis Management Plan for the Construction Sector. *Built Environment Journal* , 1-8.
- Murad, M. (2019). Turnover culture and crisis management in Malaysian hotels. . *Academy of Strategic Management Journal*.

- Musarat, M., Alaloul, W. S., & Liew, M. (2020). Investigating the impact of inflation on building materials proces in construction industry. *J. Build. Eng.*
- Nambiar, S. (2009). *Malaysia and the Global Crisis: Impact, Response, and Rebalancing Strategies*. Kuala Lumpur: Asian Development Bank Institute.
- Nguyen, B. N., & Le, H. N. (2023). Safety communication in construction projects in Vietnam from contractors' perspective. *Law and Management* , 4104-4114.
- Niu, W., & Xu, Z. (2023). Internationalization of the construction industry in the global value chain. Technological and Economic Development of Economy. *Technological and Economic Development of Economy*, 1336-1352.
- NSC. (2020). *Standard Operating Procedure for Malaysian Construction Industry*. Putrajaya: The Malaysian National Security Council.
- OECD. (2025, June 24). *Managing Emerging Critical Risks: Case Studies and Cross-Country Synthesis Report*. Retrieved from [www.oecd.org: https://www.oecd.org/en/publications/managing-emerging-critical-risks_1f9858ea-en/full-report.html?utm_source](https://www.oecd.org/en/publications/managing-emerging-critical-risks_1f9858ea-en/full-report.html?utm_source)
- Ofori, G. (2015). Nature of the Construction Industry, Its Needs and Its Development: A Review of Four Decades of Research. *Journal of Construction in Developing Countries*, 115-135.
- Olanrewaju, A., & AbdulAziz, A. (2021). Evaluation of measures to prevent the spread of COVID-19 on the construction sites. *Clean Eng. Technol.*
- Ong, & Shazni. (2020). *Major construction projects resume following MITI's approval*. The Malaysian Reserve.
- P.Fuller, R., & Sala, A. L. (2021). Crisis Communication Preparedness Practices Among U.S. Charitable Organizations: Results From a National Survey. *Sage Journals*, 1-15.
- Pallant, J. (2020). *SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS (7th ed.)*. McGraw-Hill.
- Pamidimukkala, A., & Kermanshachi, S. (2021). Impact of Covid-19 on field and office workforce in construction industry. *Elsevier*, 1-10.
- Panteli et al. (2023). Resilience in critical infrastructure systems: Recent advances and future directions. *Reliability Engineering & System Safety. Elseview*, 1-15.
- Parkin, S. (2026, March May). Retrieved from BCIS: https://www.bcis.co.uk/news/middle-east-conflict-what-will-the-impact-be-on-construction/?utm_source=chatgpt.com

- Petak, W. J. (1985). Emergency management: A challenge for public administration. *Public Administration Review*, 3-7.
- Pheng, L. S., & Hou, L. S. (2019). The Economy and the Construction Industry. *Springer*, 1-12.
- PMI. (2017). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 6th ed. USA: Project Management Institute: Newtown Square, PA.
- Radzi, A. R., & Rahman, R. A. (2022). Modeling COVID-19 Impacts and Response Strategies in the Construction Industry: PLS–SEM Approach. *International Journal of Environmental Research and Public Health*, 1-25.
- Radzi, A., & Rahman, R. (2022). Modeling COVID-19 Impacts and Response Strategies in the Construction Industry: PLS–SEM Approach. *International Journal of Environmental Research and Public Health*, 1-25.
- Rahim, S., & Khatooni, M. (2024). Saturation in qualitative research: An evolutionary concept analysis. *International Journal of Nursing Studies Advances*, 1-11.
- Rajendran, Y., & Hasmoni, M. F. (2022). The Impact of Covid-19 Pandemic to the Construction Industry in Malaysia. *Civil Engineering and Built Environment*, 1586-1595.
- Ramli, R. (2020). *Preparing for post-COVID-19 from SDG perspective*. . GHR Post.
- Raoufi, M., & Fayek, A. (2020). *Actions to mitigate COVID-19 impacts on construction*. . Public Works Management & Policy.
- Ren, C. R., & Hu, Y. (2019). Responses to rival exit. . *Strategic Management Journal*, 253–276.
- Ruhoma, K. O. (2025). The Impact of Green Energy Use in the Construction Manufacturing Sector on GDP: "A Comparative Analysis of GCC Countries and China (2000–2023). *The Scientific Journal of Business and Finance*, 1-28.
- Sahin, S. (2015). Innovative Crisis Management in Construction: Approaches and Processes. *Science Direct*, 2298-2305.
- Salami, B. A., & Ajayi, S. O. (2023). Tackling the impacts of Covid-19 on construction projects: an exploration of contractual dispute avoidance measures adopted by construction firms. *International Journal of Construction*, 1196-1204.
- Salim, F. (2020). COVID-19 epidemic in Malaysia: Lockdown impact. . *ResearchGate*, 1–28.
- Saunders, M. N., Lewis, P., & Thornhill, A. (2023). *Research Methods for Business Students (9th Edition)*. United Kingdom: Pearson E.

- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 350-353.
- Scholten, & Schilder. (2021). The role of digital tools in organizational crisis management. *Journal of Contingencies and Crisis Management*, 113-125.
- Schweizer, P.-J., & Juhola, S. (2024). Navigating systemic risks: governance of and for systemic risks. *Cambridge University Press*, 1-12.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill-building approach (7th ed.)*. Wiley.
- Shah, A. U. (2020). COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. *Int. J. Infect. Dis*, 108-116.
- Sheng, A. (1989). *Bank Restructuring in Malaysia 1785-88*. Kuala Lumpur: The World Bank .
- Shishehgarkhaneh, M. B., & Moehler, R. C. (2024). Construction supply chain risk management. *Elsevier*, 1-21.
- Singla, H. K. (2025). *Risk management practices in construction projects: A qualitative exploration of MSMEs in India*. *Journal of Advances in Management Research*.
- Sospeter, N., & Rwelamila, P. (2022). *Built Environment Project and Asset Management*, 205-222.
- Star, T. (2020). *CIDB: Only 23% of construction sites operating*. The Star.
- Stat, U. (2023, October 18). *ISIC Revision 5 Explanatory Notes*. Retrieved from https://unstats.un.org/unsd/classifications/Meetings/UNCEISC2023/3-1_Background1_ISIC5_Exp_Notes.pdf?utm_source=chatgpt.com
- Stieglitz, N., & Knudsen, T. (2016). Adaptation and inertia in dynamic environments. . *Strategic Management Journal*, 1854–1864.
- Subramaniam, C., & Ismail, S. (2020). Causative Failure Factors of Communications Management in Mixed-Use Development Projects in Malaysia. . *J. Crit. Rev*, 82-86.
- Surech, S. (2024). Navigating Sample Size Estimation for Qualitative Research. *Journal of Medical Evidence*, 133-139.
- 't Hart, & Boin. (2003). The Crisis Approach. *Springer Link*.
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 1273-1296.

- Taherdoost, H. (2016). Validity and reliability of the research instrument: How to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management*, 28-36.
- Tavakol, M. &. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 53-55.
- Toh, C., & Patrick, H. (2020, April 2). *How should Contractors in the Construction Industry manage the COVID-19 MCO?* Retrieved from <https://mahwengkwai.com/portfolio/video-gallery-part-1-how-should-contractors-in-the-construction-industry-manage-the-covid-19-mco/?utm>
- Ulmer, Sellnow, & Seeger. (2021). *Effective Crisis Communication: Moving from Crisis to Opportunity*. Sage, 1-12.
- UNDP. (2017). *Framework for resilient development in the Pacific*. UNDP.
- UNDP. (2020). *COVID-19 pandemic response*. Retrieved from . <https://www.undp.org/>
- UNDRR. (2022). *Global Assessment Report on Disaster Risk*. UNDRR.
- UNDRR. (2022). *www.undrr.org*. Retrieved from <https://www.undrr.org/gar/gar2022-our-world-risk-gar>
- United Nations. (2020). *Policy brief: The impact of COVID-19 in Southeast Asia*. United Nation.
- van Teijlingen, E. &. (2010). Pilot studies in social science research: Importance and limitations. *Social Research Update*, 1-4.
- Victor, M. (2020). COVID-19 crisis response checklist. *Deloitte*.
- WHO. (2023, April 26). Retrieved from WHO: <https://www.who.int/news/item/26-04-2023-who-launches-new-initiative-to-improve-pandemic-preparedness>
- Williams, T. A. (2020). Organizational Response to Adverse Events: Managing Sudden, Unexpected, and Disruptive Crises. *Academy of Management Review*, 547-571.
- Wutich, A. (2024). Sample Sizes for 10 Types of Qualitative Data Analysis: An Integrative Review, Empirical Guidance, and Next Steps. *International Journal of Qualitative Methods*, 1-17.
- Xiaoying, Q. (2025). Reconceptualizing Crisis: An Empirically Based Investigation. *Sociological Inquiry*. *Sociological Inquiry*, 1-17.
- Yahaya, N. N., & Othman, S. (2023). Crisis Management in Malaysian Companies during Challenging Times: A Review. *International Conference on Public Policy & Social Sciences 2023*, 327-331.

- Zainon, N., & Aziz, N. (2025). Navigating Instability: Adaptive Strategies Of Malaysian Construction Firms In Times Of Crisis. *Journal of Surveying, Construction and Property*, 91-105. *Construction and Property*, 91-105.
- Zamani. (2021). Effect of Covid-19 on Building Construction Projects: Impact and Response Mechanisms. *Earth and Environmental Science*, 1-11.
- Zamani, S. H., & Rahman, M. A. (2021). Effect of COVID-19 on building construction projects: Impact and response mechanism. *IOP Conference Series: Earth and Environmental Science*.
- Zenger, M. J. (2016). The lemons problem in markets for strategy. *Strategy Science*. 71-89.
- Zhang-Zhang, Y., & Varma, A. (2020). Organizational preparedness for COVID-19. *European Business Review*.

APPENDICES

APPENDIX 1

Preliminary Survey Phase 1: Exploratory Interview



Faculty of Architecture, Planning and Surveying,
Universiti Teknologi MARA (UiTM)
Shah Alam, Malaysia

PRELIMINARY SURVEY PHASE 1: EXPLORATORY INTERVIEW

**Title: CONSTRUCTION SECTOR CRISIS MANAGEMENT PLAN (CSCMP)
TOWARDS THE MALAYSIAN CONSTRUCTION ORGANISATION
RESILIENCE DURING PLIGHT**

The purpose of this interview is to explore and determine which group of construction organisation affected the most during major external crises such as ASEAN economic downturn 1998, global economic recession 2008 and Pandemic Covid-19 that also led to economic crisis.

Researcher: Anis Mardhiah Mukhtar
PhD (Built Environment)
Faculty Architecture, Planning & Surveying, UiTM, Shah Alam.
H/P:
Email: aremelis@gmail.com

SECTION 1 – GENERAL BACKGROUND

1. Organisation :
2. Name :
3. Position :
4. Age : ☐ < 30 years old
☐ 30 – 40 years old
☐ 40– 50 years old
☐ >50 years old
5. Working Experience : ☐ < 5 years
☐ 5 – 10 years
☐ 10 – 15 years
☐ >15 years

SECTION 2 – HISTORICAL CRISIS EXPERIENCE (Financial Crises in 1998 and 2008)

6. How has the economic crises that took place in 1998 and 2008 impacted you personally and your profession?
7. How was the construction industry and your organisation impacted by the economic crises in 1998 and 2008?
8. What steps did most organisations take to overcome the business challenges they faced during the financial crisis?
9. Has the relevant professional organisation come out or develop Crisis Management Plan since the financial crisis in 2008?
10. What are the challenges in implementing the steps response strategies in managing crisis?
11. In your opinion, among all construction players (contractors, consultants and clients), who is the most affected due to the crises? Why?

SECTION 3 – CURRENT CRISIS EXPERIENCE (Pandemic Covid-19 & Economic Crisis)

12. How has the current economic, health (Covid-19) and social crises impacted you personally and your profession?
13. How does it impact construction industry and your organisation?
14. What steps did most organisations take to overcome the business challenges they faced during the crisis?
15. Has the Crisis Management plan been developed during previous financial crises help the organisation to sustain facing the current crisis (if any)?
16. What are the challenges in implementing the steps and response strategies in managing crisis?
17. Do you have any data, information that show impact of the crisis towards the profession? If yes, appreciate it if you can share for research purposes.
18. In your opinion, among all construction players (contractors, consultants and clients), who is the most affected due to the crises? Why?

*****THANK YOU FOR YOUR PARTICIPATION*****



Faculty of Architecture, Planning and Surveying,
Universiti Teknologi MARA (UiTM)
Shah Alam, Malaysia

PRELIMINARY SURVEY PHASE 1: EXPLORATORY INTERVIEW

**Title: CONSTRUCTION SECTOR CRISIS MANAGEMENT PLAN (CSCMP)
TOWARDS THE MALAYSIAN CONSTRUCTION ORGANISATION
RESILIENCE DURING PLIGHT**

Essential concern of negative occasions and threats in the current globalized world may lead to crisis and in this manner influence organizations within the construction industry in time steadily. These unexpected events can put an organization into a tailspin, and sometimes even out of business. Therefore, the purpose of this interview is to investigate strategies being adopted by non-construction organizations in managing crisis.

Researcher: Anis Mardhiah Mukhtar
PhD (Built Environment)
Faculty Architecture, Planning & Surveying, UiTM, Shah Alam.
H/P: 011-27400000
Email: aremelis@gmail.com

SECTION 1 – GENERAL BACKGROUND

1. Name :
2. Position :
3. Age : ☐ < 30 years old 4. Working Experience : ☐ < 5 years
☐ 30 – 40 years old ☐ 5 – 10 years
☐ 40– 50 years old ☐ 10 – 15 years
☐ >50 years old ☐ >15 years

SECTION 2 – CURRENT CRISIS EXPERIENCE (Pandemic Covid-19 & Economic Crisis)

5. How has the current economic, health (Covid-19) and social crises impacted you personally?
6. How it impacts your organisation?
7. What were the main business challenging your organisation faced during the crisis?
8. What steps and responses did your organisation take to overcome the business challenges it faced during the crisis?
9. What are the challenges in implementing the steps and responses?
10. Prepare, mitigate response and recover are the common process in Crisis Management Plan. For your organisation, what elements gauge each process?
11. How do you think an organisation can be resilience during crisis?
12. In your opinion, among all construction players (contractors, consultants and clients), who is the most affected due to the crises? Why?

*****THANK YOU FOR YOUR PARTICIPATION*****

APPENDIX 2

Phase 3: Questionnaire Survey



No:

ACADEMIC RESEARCH QUESTIONNAIRE

Dear valued respondent,

Title Of Research: Construction Sector Crisis Management Plan (CSCMP) towards the Malaysian Construction Organisation Resilience During Plight.

I am a doctoral candidate at the Institute of Graduate Studies, Universiti Teknologi MARA and currently embarking on this study as part of my PhD program. Focusing on the above title, this study aims to develop a crisis management plan for organizations in the Malaysian construction industry. Construction is a diverse and complex sector. It consists of projects with intricate activities and interfaces between stakeholders who undergo a series of development phases using numerous resources, integration of technologies, materials, and approaches. Theoretically, construction projects can be well planned. However, it is being exposed to unanticipated external events or crises that could disrupt original plans, affecting organizations' operation and the progress of construction projects. Problems may even have the propensity to destroy the organization significantly. Considering the current paradigm of crisis, the Covid-19 outbreak that emerged in late 2019 has continuously left a lasting impact on the construction industry. Therefore, by developing a crisis management plan for organizations in the Malaysian Construction Industry is expected will offer guidance to the organization be resilient during plight.

Definition

The Crisis Management Plan in this research refers to a mechanism that can successfully deal with those future external eventualities/crises such as economic crisis, pandemic,

and political unrest. It is also a key strategy for the survival of an organization as well as to ensure its business continuity and sustainability.

Note About the Questionnaire

There are a few objectives that need to be achieved before accomplishing the aim of the research to develop a Crisis Management Plan. The objectives are first to identify disruptive effects of a crisis on vulnerable areas in construction organizations. Secondly, is to investigate response strategies being adapted by the organizations in managing the crisis and thirdly is to explore challenges in implementing the response strategies in managing the crisis. Therefore this questionnaire is arranged in five (5) sections :

1. Section A: General Information
2. Section B: Disruptive effects on Vulnerable Areas
3. Section C: Existing Strategies (Macro & Micro)
4. Section D: Challenges
5. Section E: Crisis Management Plan
6. Section F: Leadership Factor

This questionnaire should not take you more than 20 minutes to complete and since the survey is anonymous, responses will not be linked to any individuals, and it is strictly used for academic purposes only.

Thank you for participating in this survey. Your effort, as well as time, are sincerely appreciated.

Yours faithfully

ANIS MARDHIAH MUKHTAR

Faculty of Architecture, Planning and

SurveyingUniversiti Teknologi MARA

Malaysia

40450 Shah Alam

Tel:

Email: aremelis@gmail.com

SECTION A: GENERAL INFORMATION

For each question, thick (/) only one (1) relevant answer

A1. What is your administrative role?

☐ Senior Officer ☐ Manager ☐ Senior manager ☐ Above Senior Manager

A2. What is your highest academic qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree ☐ Others.....

A3. Which organization you are currently with?

☐ Contractor ☐ CIDB Grade ☐ Consultant - Engineering
☐ Consultant – Architecture ☐ Consultant – Quantity Surveyor

A4. How long have you been involved in the construction industry?

☐ Less than 5 years ☐ 5 to 10 years ☐ 10 to 15 years
☐ More than 15 years

A5. How long have you been with the current organization?

☐ Less than 5 projects ☐ 5 to 10 projects ☐ 10 - 15 projects
☐ More than 15 projects

A6. Do you aware the impact of economic recessions, social crises and pandemics on construction industry?

☐ Yes ☐ No ☐ I am not sure

SECTION B: DISRUPTIVE EFFECTS ON VULNERABLE AREA

For each question, thick (/) only one (1) relevant answer.

B1. Do you agree that the Great Financial Crisis of 2008-2009 had adversely impacted the organization I was employed at the time?

☐ Disagree ☐ Agree

B2. Do you agree that your organization has made a recovery since the financial crisis in 2009?

☐ Disagree ☐ Agree

B3. Do you agree that the Pandemic Covid-19 and Economic crisis in 2020 until to date has adversely impacted the organization I was employed at the time?

☐ Disagree ☐ Agree

B4. Do you agree that your company is well prepared and able to handle external crises at the right time?

☐ Disagree ☐ Agree

B5. Do you agree that a construction organization should has a crisis management plan?

☐ Disagree ☐ Agree

SECTION B

ADVERSE IMPACT ON VULNERABLE AREAS

Question: With reference to your experiences, to what extent do you agree with the following statements of an adverse impact on vulnerable areas in the construction organization due to an external crisis i.e.: economic crisis and pandemic?

B6. Finance & Economy						
Please rate your responses based on the following scale 1 to 5						
(1) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5) Strongly Agree						
DE01	Difficulty in getting paid for work progress and work done.	1	2	3	4	5
DE02	Loss of turnover/profits.	1	2	3	4	5
DE03	Difficulty in managing cash flows.	1	2	3	4	5
B7. Organization & Employees						
Please rate your responses based on the following scale 1 to 5						
(1) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5) Strongly Agree						
DE04	Less work/low demand.	1	2	3	4	5
DE05	Redundancies/reduced staff increase the unemployment rate.	1	2	3	4	5
DE06	Cutting costs/overhead due to a high level of uncertainty.	1	2	3	4	5
DE07	Employees facing pressures affecting mental health and lifestyle.	1	2	3	4	5
DE08	Encouraging staff to work part-time or take unpaid leave or reduce working hours.	1	2	3	4	5
B8. Labour						
Please rate your responses based on the following scale 1 to 5						
(1) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5) Strongly Agree						
DE09	Decreasing efficiency/productivity.	1	2	3	4	5
DE10	Loss of foreign labour and difficulty to get a replacement.	1	2	3	4	5
DE11	Increased health risks exacerbated decent work deficits.	1	2	3	4	5

B9. Supply Chain – Material & Equipment					
Please rate your responses based on the following scale 1 to 5					
(!) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5)					
Strongly Agree					
DE12	Material delays or shortages are felt for a significant period on any project.	1	2	3	5
DE13	Multiple national lockdowns continue to slow or stop the flow of supply and delivery of material.	1	2	3	5
DE14	Affect logistic management that incurred cost of material.	1	2	3	5
B10. Contracts					
Please rate your responses based on the following scale 1 to 5					
(!) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5)					
Strongly Agree					
DE15	Project delayed or canceled as its impacts all activities at sites.	1	2	3	5
DE16	Disputes relating to the inability to perform the contractual obligation.	1	2	3	5
DE17	Lack of provision governing delays caused by MCO, suspension order by appropriate authorities.	1	2	3	5
B11. Technical – Planning & Scheduling					
Please rate your responses based on the following scale 1 to 5					
(!) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5)					
Strongly Agree					
DE18	Disrupt the schedule of subcontractors and suppliers.	1	2	3	5
DE19	Disrupt movement of workers and machinery at sites that affect overall work performance.	1	2	3	5
DE20	Multiple times of revising the work programme and schedule as there is no confirmed date of commencement/resuming of work.	1	2	3	5

B12. Communication						
Please rate your responses based on the following scale 1 to 5						
(!) Strongly Disagree (2)Disagree (3)Neither Disagree nor Agree (4) Agree (5)						
Strongly Agree						
DE21	Interruption of work progress while adopting alternative ways to communicate.	1	2	3	4	5
DE22	Communication breakdown between employees and top management led to unclear direction and instruction.	1	2	3	4	5
DE23	Less equipment and inadequate cyber security.	1	2	3	4	5
B13. Other Industries						
Please rate your responses based on the following scale 1 to 5						
(!) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5)						
Strongly Agree						
DE24	Unable to develop and operate their facility and building.	1	2	3	4	5
DE25	Construction has a multiplier effect on other industries.	1	2	3	4	5
DE26	One industry's decline leads to 'spillover effects' that affect construction businesses.	1	2	3	4	5
B14. Reputation						
Please rate your responses based on the following scale 1 to 5						
(!) Strongly Disagree (2) Disagree (3)Neither Disagree nor Agree (4) Agree (5)						
Strongly Agree						
DE27	Damage to branding and image of the organization.	1	2	3	4	5
DE28	Compromised trust issues with client.	1	2	3	4	5
DE29	Loss market confidence.	1	2	3	4	5

SECTION C

RESPONSE STRATEGIES BY THE GOVERNMENT & CONSTRUCTION ORGANIZATION

Question: With reference to your experiences, to what extent do you agree with the following statements of current response strategies being adopted by the Government? (Please rate on a scale of 1 to 5; where 1 = Not important; 2 = Somewhat Important; 3 = Important; 4 = Very Important; 5 = Extremely Important)

C. Current Strategies by the Government (Macro)					
C1-A : Fiscal Policy					
RS01	Provide economic and fiscal stimulus through several packages for recovery.	1	2	3	4 5
RS02	Secure income and employment protection as efforts to limit lay-offs and unemployment benefits.	1	2	3	4 5
RS03	Provide social protection such as cash and in-kind transfer programmes	1	2	3	4 5
RS04	Increase employability via training and public employment services.	1	2	3	4 5
RS05	Provide group-specific initiatives such as informal economy workers, youth programmes and migrant workers.	1	2	3	4 5
RS06	Provide sector-specific initiatives such as support for SME, support for the key export sector and support for 'green' jobs.	1	2	3	4 5
RS07	Bring forward public work projects, energy, infrastructure and maintenance projects.	1	2	3	4 5
RS08	Increasing the country's core capacity for the detection, verification, reporting and response.	1	2	3	4 5
RS09	Provide additional financial aid for lower-income individuals and the unemployed.	1	2	3	4 5
RS10	Provide support to businesses and workers includes wage subsidies.	1	2	3	4 5
RS11	Allow waiver to social security and contribution.	1	2	3	4 5

C1-B : Action Plan						
RS12	Implement of movement control order and lockdown.	1	2	3	4	5
RS13	Establish new normal Standard Operating Procedure (SOP) for general and construction industry.	1	2	3	4	5
RS14	Establish special councils and Acts for containment, response, mitigation and exit strategy.	1	2	3	4	5
RS15	Develop 6R Plan (Resolve, Resilience, Restart, Recovery, Revitalize and Reform).	1	2	3	4	5
RS16	Maintain good diplomatic relation with other countries (Chian, South Korea, UAE and ASEAN) for aid support.	1	2	3	4	5
RS17	Introduce Vaccination Programme.	1	2	3	4	5
RS18	Promote and invest on artificial intelligence.	1	2	3	4	5
RS19	Strengthen international trade and transport facilitation.	1	2	3	4	5
C1-C : Monetary Policy						
RS20	Reduce and lower bank interest rate.	1	2	3	4	5
RS21	Provide moratorium.	1	2	3	4	5
RS22	Allow debt restructuring.	1	2	3	4	5
RS23	Ensure continuous access to financing.	1	2	3	4	5
RS24	Reschedule credit facilities.	1	2	3	4	5
RS25	Lower utility billing.	1	2	3	4	5
RS26	Allow tax relief and tax incentives.	1	2	3	4	5
RS27	Ensure availability of soft loans for individual and SME.	1	2	3	4	5

Question: With reference to your experiences, to what extent do you agree with the following statements of current response strategies being adopted by the construction organization?

(Please rate on a scale of 1 to 5; where 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Disagree nor Agree; 4 = Agree; 5 = Strongly Agree)

C2. Current Strategies by the Construction Organization (Micro)						
C2-A : Responds During and Post Crisis						
RS28	Adhere with the Government’s SOP and Acts.	1	2	3	4	5
RS29	Reduce assets i.e.: Staff retrenchment, logistic, travel and office equipment.	1	2	3	4	5
RS30	No salary increments and yearly bonus.	1	2	3	4	5
RS31	Cost-cutting measures i.e.: Salary and allowance cutting.	1	2	3	4	5
RS32	Give pressure on employees.	1	2	3	4	5
RS33	Initiate and allow remote working (WFH) and flexible working hours.	1	2	3	4	5
RS34	Preserve the status quo of an organization’s business activities.	1	2	3	4	5
RS35	Innovation to steering strategic renewal in response.	1	2	3	4	5
RS36	Exit/discontinuation of an organization’s business.	1	2	3	4	5
RS37	Many organizations and their workforces are under pressure and trying hard to survive.	1	2	3	4	5
RS38	Reliance on government supports.	1	2	3	4	5
C2-B : Responds Prior to Crisis						
RS39	Organization does not prepare and does not have a contingencies plan.	1	2	3	4	5
RS40	Organization does not have long term assumptions on threats.	1	2	3	4	5
RS41	Organization does not explore digitalization, IR 4.0 and intellectual property	1	2	3	4	5
RS42	Organization does not allocate a budget for crisis management.	1	2	3	4	5

RS43	Organization focusses on reactive approach (response & recovery) as compared to a proactive approach (preparedness & prevention).	1	2	3	4	5
RS44	Organization does not have crisis management plan in its strategic planning.	1	2	3	4	5
RS45	Organization does not have a plan for pre, during and post crisis.	1	2	3	4	5
RS46	Organization does not have a business continuity plan.	1	2	3	4	5
RS47	Organization in denial when comes to external threats i.e.: pandemic and economic crisis.	1	2	3	4	5
RS48	Organization remains ignorant and does not have a prediction on future crisis.	1	2	3	4	5
C2-C : Efficacy of the responds						
RS49	Crisis management in the Malaysian construction industry is still untested and under-explored.	1	2	3	4	5
RS50	The industry is still looking for forthcoming crisis strategies and plans.	1	2	3	4	5
RS51	Organization unable to put extra attention to craft policies on education, human resource development, improving technological infrastructure, expanding business worldwide and moving away from dependencies on foreign worker.	1	2	3	4	5
RS52	Organization ignores warning signs and rely on the fragile untested plan.	1	2	3	4	5

SECTION D

CHALLENGES IN IMPLEMENTING THE RESPONSE STRATEGIES IN MANAGING THE CRISIS

Question: With reference to your experiences, to what extent do you agree with the following statements of challenges in implementing response strategies in managing crisis?

(Please rate on a scale of 1 to 5; where 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Disagree nor Agree; 4 = Agree; 5 = Strongly Agree)

Challenges in Response Strategies during Managing Crisis						
D1 : Financial Position						
CR01	No budget allocation and planning for crisis plan (pre. During, post).	1	2	3	4	5
CR02	The assumption that a crisis management plan is a nonprofitable.	1	2	3	4	5
CR03	Over expenditure on other matters.	1	2	3	4	5
CR04	No budget allocation for technology advancement and talent improvement.	1	2	3	4	5
CR05	Difficulty in managing income and investment in volatile financial markets.	1	2	3	4	5
D2 : Leadership						
CR06	Unable to responds in timely manners.	1	2	3	4	5
CR07	Insufficient support system.	1	2	3	4	5
CR08	Lack of comprehensive understanding of various function management.	1	2	3	4	5
CR09	Unable to forecast threat magnitude and severity (prediction on worst-case scenario).	1	2	3	4	5
CR10	Unable to play a major role as a mediator that links relationship between crisis responsibility and perceived organization reputation.	1	2	3	4	5
CR11	Inadequate understanding of time pressure and control management.	1	2	3	4	5
CR12	Lack of ability to use and react to the information.	1	2	3	4	5

CR13	Fail to communicate adequately with the various audience.	1	2	3	4	5
CR14	Fail to coordinate and keep synchronise action in allocating resources.	1	2	3	4	5
CR15	Weakness in controlling situations, managerial errors, internal harm, unhealthy working conditions.	1	2	3	4	5
CR16	Leader doesn't have knowledge about external crisis.	1	2	3	4	5
C2-C : Communication						
CR17	The audience does not receive information and clear instruction.	1	2	3	4	5
CR18	Working-level doesn't understand their role when the crisis happened.	1	2	3	4	5
CR19	Communication and connectivity seem not a priority when handling a crisis.	1	2	3	4	5
CR20	Inadequate systems and technology.	1	2	3	4	5
CR21	Lack of systematic understanding on how the pandemic can create situations leading to business failure.	1	2	3	4	5
CR22	Fail to communicate adequately with various audiences during a crisis can suffer serious consequences.	1	2	3	4	5
CR23	Crisis communication is a central factor in successful crisis management.	1	2	3	4	5
C2-D : Environment						
CR24	Lack of awareness on the importance of technology advancement/digitalization.	1	2	3	4	5
CR25	Lack of knowledge on the importance of preparedness and mitigation measures.	1	2	3	4	5
CR26	Wait & see and denial culture.	1	2	3	4	5
CR27	Refuse to explore and venture into new opportunities, partnership and business diversification.	1	2	3	4	5

SECTION E

PROPOSING A CRISIS MANAGEMENT PLAN

Question: With reference to your experiences, to what extent do you agree with the following statements of proposing the elements and processes in a crisis management plan?

(Please rate on a scale of 1 to 5; where 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Disagree nor Agree; 4 = Agree; 5 = Strongly Agree)

Proposing a Crisis Management Plan						
E1. Pre Crisis : Step 1 – Preparation						
CM01	Form a strong Crisis Management Team (CMT) to formulate and oversee all operational crisis management activities.	1	2	3	4	5
CM02	CMT recommends the context setting such as external crisis, internal crisis, crisis appetite (amount, level and type), crisis criteria and allocates the crisis budget.	1	2	3	4	5
CM03	Develop and execute planning which includes crisis policies, strategies, culture, structure, people, and processes	1	2	3	4	5
CM04	Develop a system, action plan, SOP and manual and monitor the compliance.	1	2	3	4	5
CM05	Ensure readiness and sufficiency of procedure, tools, resources, budget, leadership and support, line of communication, monitoring and guidance.	1	2	3	4	5
CM06	Ensure all divisions, departments and branches responsible and play roles for managing crises in their respective function on a day-to-day basis.	1	2	3	4	5
CM07	Create a robust crisis-practicing culture via training and crisis simulation.	1	2	3	4	5
CM08	Constantly engage in healthy and productive discussions on key crisis matters and processes.	1	2	3	4	5
CM09	Development of knowledge and skills in managing crises via tutorials, walkthroughs, call trees and BCM i-learning.	1	2	3	4	5

CM10	Building the right skill set and enhancing skilled workers.	1	2	3	4	5
CM11	Develop strategic business partnerships and relationships.	1	2	3	4	5
CM12	Explore lean business and explore digitalization and technology advancement.	1	2	3	4	5
CM13	Set out long term planning including business strategies, diversifying the business, exploring opportunities and allowing financial backup.	1	2	3	4	5
Preparedness on Policies to Immunize against the Effect of External Shock						
CM14	Build strategic business relationship and partnership with clients and the supply chain.	1	2	3	4	5
CM15	Evaluate and exploit future demand.	1	2	3	4	5
CM16	Demonstrate good corporate ethics.	1	2	3	4	5
CM17	Get ready for change.	1	2	3	4	5
CM18	Seek innovation in sustainability.	1	2	3	4	5
CM19	Apply the lessons of the past to the vision of the future.	1	2	3	4	5
CM20	Invest in risk management.	1	2	3	4	5
CM21	Secure additional funds by creating uncommitted financial resources and negotiating alternative loan services.	1	2	3	4	5
CM22	Ensure positive cash flow including carefully considering payment terms and consideration of clients' ability to make payment.	1	2	3	4	5
CM23	Exerted additional efforts to reduce material wastage, stricter financial management on company cash flow and stricter procurement procedures.	1	2	3	4	5
E1: Pre Crisis : Step 2 – Prevention						
CM24	Early warning signal detection, identification, analysis, assessment, treatment and manage the crisis.	1	2	3	4	5
CM25	Report and monitor the crisis via a crisis information system.	1	2	3	4	5
CM26	Constantly review the crisis profile to ensure relevance and appropriate action.	1	2	3	4	5
CM27	Update the crisis status and level of control required. Manage and curb the transmission.	1	2	3	4	5

CM28	Implement an action plan and adhere to crisis management practices and guidelines.	1	2	3	4	5
CM29	Manage its crisis effectively by minimising the impact of the crisis to an acceptable level and enhancing the organization's ability to achieve its strategic objectives.	1	2	3	4	5
CM30	CMT to identify principal crises with the corresponding crisis mitigations and key crisis indicator.	1	2	3	4	5
CM31	Continuously improve to mitigate the crisis.	1	2	3	4	5
CM32	Aim to reduce the destructive effects of an emergency or catastrophic event.	1	2	3	4	5
CM33	Crisis leader correctly detects an impending crisis in the prodromal phase, the effect of the crisis in the acute phase can be minimized.	1	2	3	4	5
CM34	Apply master cyclist approach based on the view that, when the economy heads towards recessions.	1	2	3	4	5
CM35	Apply reactive cyclist focuses on cost-cutting measures.	1	2	3	4	5
CM36	Remove unnecessary matters immediately that obstacle the strategies.	1	2	3	4	5
Crisis : Step 3 - Responds						
CM37	Activate crisis oversight structure to recognize the crisis.	1	2	3	4	5
CM38	Activate response protocol system to demarcates roles and responsibilities.	1	2	3	4	5
CM39	Immediately taking several decisive and prudent measures to ensure the resiliency and sustainability of its operational and financial positions, with increased focus on cost compression, fiscal discipline and higher productivity.	1	2	3	4	5
CM40	Review action to ensure positive cash flow.	1	2	3	4	5
CM41	Concentrate on developing the relationship with existing strategic clients and stakeholders.	1	2	3	4	5
CM42	Organise and manage the crisis to protect People, Environment, Asset and Reputation (PEAR).	1	2	3	4	5
CM43	Sharp and swiftly decision making on type of strategies, action development and resources identification.	1	2	3	4	5

CM44	Respond in a timely manner with an informative fashion and execute the right solution.	1	2	3	4	5
CM45	Site management prioritised achieving a good company image and good relationship with the client.	1	2	3	4	5
CM46	Carefully reviewed project risks and ensured less risk is carried by an organization.	1	2	3	4	5
CM47	Site management prioritised to achieve the lowest construction cost and higher profit.	1	2	3	4	5
CM48	Review and consider carefully which contract terms were not acceptable during the crisis period	1	2	3	4	5
CM49	Maintain relation and continue to work with the approved supply chain.	1	2	3	4	5
CM50	Focuses on how to interact with partners and how to maintain the corporate image.	1	2	3	4	5
CM51	Continually review well-being of people and safety to reduce incidents.	1	2	3	4	5
CM52	Message creation, coordinate, control and monitor the response implementation and interruption of information.	1	2	3	4	5
CM53	Promote continuous improvement on crisis assurance and optimal operation of our businesses across the value chain.	1	2	3	4	5
CM54	Testing and exercise for respective units or departments.	1	2	3	4	5
CM55	Demonstrate good corporate ethics.	1	2	3	4	5
CM56	Focus on social responsibilities and sustainable agenda.	1	2	3	4	5
Post Crisis : Step 4 – Recovery						
CM57	Build the capability to recover and ensure business continuity, survival and deliver sustainable long-term value.	1	2	3	4	5
CM58	Recover and restore business in a reasonable period, to sustain activities and minimise disruptions to stakeholders.	1	2	3	4	5
CM59	Search for ways to properly plan for the next crisis and meet the promises made during the crisis phase.	1	2	3	4	5
CM60	Provide all the information promised to stakeholders as soon as the information is released.	1	2	3	4	5

CM61	Keep stakeholders updated about the development of recovery efforts, including corrective steps and inquiries.	1	2	3	4	5
CM62	Review the crisis management mechanism for lessons learned and incorporate them into its own crisis management plan.	1	2	3	4	5
CM63	Profiting from crisis and turning potential surprises into strategic opportunities.	1	2	3	4	5
CM64	Evaluation of the plan and efforts to respond to the crisis.	1	2	3	4	5
CM65	Enhance human resource readiness related to the development of knowledge and skills in managing crises.	1	2	3	4	5
CM66	Review and refine regularly to ensure its continuous application and relevance.	1	2	3	4	5
CM67	Government and corporate leaders to formulate longer-term strategies.	1	2	3	4	5
CM68	Ensure sufficient resources and committed teamwork along the crisis lifecycle.	1	2	3	4	5
CM69	Cultivate the ability to begin to look around the corner, anticipate disruption and reduce shocks.	1	2	3	4	5
Post Crisis : Step 5 - Redesign						
CM70	Follow up and record feedback and modification.	1	2	3	4	5
CM71	Analysis and reflection based on recording and feedback.	1	2	3	4	5
CM72	Continuously invest in crisis management and enhance its robust crisis management system.	1	2	3	4	5
CM73	Remain relevant and resilient ahead of the ever-changing crisis landscape to ensure that risks are managed effectively within the organization.	1	2	3	4	5
CM74	Build a team and train staff with business continuity knowledge.	1	2	3	4	5
CM75	Produce younger professional to improve skills and quality staff.	1	2	3	4	5
CM76	Ensure survival, business continuity and sustainability of the business.	1	2	3	4	5

SECTION F

SUCCESSFUL FACTORS VIA LEADERSHIP BY PORTER'S STRATEGIES

(Please rate on a scale of 1 to 5; where 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Disagree nor Agree; 4 = Agree; 5 = Strongly Agree)

F1. Cost Leadership						
Please rate the following success factors in leadership that will strengthen the Crisis Management Plan						
F1a	Financial					
SF01	Implement stricter financial management	1	2	3	4	5
SF02	Renegotiating loan arrangement	1	2	3	4	5
SF03	Setting aside cash reserves	1	2	3	4	5
F1b	HR Personnel					
SF04	Upskill/retrain staff	1	2	3	4	5
SF05	Freezing/cutting salaries of employees/laying off employees	1	2	3	4	5
F1c	Operational/Project Management					
SF06	Cutting operational/administration costs	1	2	3	4	5
SF07	Revert to simple efficiency panning	1	2	3	4	5
F1d	Procurement					
SF08	Cutting supplier costs/Direct sourcing	1	2	3	4	5
SF09	Retrench/downsize the business	1	2	3	4	5
SF10	Lowering project tendering pricing	1	2	3	4	5
F2. Differentiation						
Please rate the following success factors in leadership that will strengthen the Crisis Management Plan						
F2a	Marketing					
SF11	Increase/improve marketing & advertising	1	2	3	4	5
SF12	Improving relationships with stakeholders.	1	2	3	4	5
SF13	Forming partnerships with clients/suppliers	1	2	3	4	5
SF15	Specialising in a particular expertise	1	2	3	4	5
F2b	Technology/Innovation					
SF16	Investing in R&D/new technologies	1	2	3	4	5

SF17	Improve/increase services/product offered	1	2	3	4	5
SF18	Innovative project financing method	1	2	3	4	5
SF19	Innovative project management method	1	2	3	4	5
F2c	Operational/Project Management					
SF20	Speed up project delivery	1	2	3	4	5
SF21	Ensure high quality of inputs	1	2	3	4	5
SF22	Provide high quality of outputs	1	2	3	4	5
F2d	Restructuring					
SF23	Changing/adapting organisational structure	1	2	3	4	5
F3.Focus						
Please rate the following success factors in leadership that will strengthen the Crisis Management Plan						
F3a	Marketing					
SF24	Entry into new construction markets	1	2	3	4	5
SF25	Venturing into oversea markets	1	2	3	4	5
SF26	Diversify into other construction businesses	1	2	3	4	5
SF27	Service only a specific group of clients	1	2	3	4	5
SF28	Set up a network of partners	1	2	3	4	5
F3b	Operational/Project Management:					
SF29	Focus on core skills/capabilities	1	2	3	4	5
F3c	Restructuring					
SF30	Expand by merger or acquisition	1	2	3	4	5
F3d	Tendering / Contracts					
SF31	Joint venture on contracts	1	2	3	4	5
SF32	Undertake smaller contracts	1	2	3	4	5

Comment No:

.....

.....

.....

END OF QUESTIONNAIRE

THANK YOU

APPENDIX 3

Outcome of Exploratory Interview

Table 5.3

Section A – Historical Crisis Experiences

No	HISTORICAL CRISIS EXPERIENCE (ECONOMIC CRISIS IN 1998 AND 2008)			
	Questions	SEGMENT A		
		E1	E2	E3
1	How did the 1998 and 2008 financial crises impact your organisation and the construction industry?	JKR reported that both the 1998 and 2008 financial crises had significant personal and organisational impacts. Rising living costs affected staff, while reduced government spending led to fewer project awards. At the industry level, the crises triggered cost escalation, supply disruptions, workforce reductions, and widespread project delays. Despite these challenges, JKR maintained operations by prioritising essential public projects and introducing policies aimed at stabilising the sector. The expert emphasised that when construction workers are unable to operate, the entire industry experiences a slowdown.	CIDB reported that the 1998 and 2008 crises caused significant disruption across the construction sector, including reduced investment, project delays, cancellations, and heightened unemployment. Contractors faced severe financial strain, leading to retrenchment and salary reductions. Material price escalation, particularly steel, intensified cost pressures, prompting the government to introduce the Variation of Price (VOP) mechanism. Throughout the crises, CIDB focused on stabilising the sector by upholding quality and safety standards, supporting SMEs, and promoting skills development and local resource utilisation to help contractors remain viable.	Although RISM (formerly ISM) was formally established after the 1998 and 2008 crises, the organisation highlighted their significant impact on the surveying profession. The contraction in the property and construction sectors resulted in reduced project awards, leading to fewer job opportunities and diminished workloads for surveyors, particularly in cost control and contract administration. In response, RISM supported its members through professional development initiatives, advocacy for sound cost management practices, and calls for sustained government investment in critical construction projects.
2	What actions were taken to manage the crises, and how well did they work?	JKR highlighted that the construction industry had no dedicated crisis council or coordinated mechanism during the 1998 and 2008 crises, resulting in largely unstructured and reactive responses. Organisations mainly relied on short-term survival measures such as retrenchments,	CIDB reported that most construction companies depended heavily on government assistance to remain viable during the 1998 and 2008 crises, highlighting widespread gaps in crisis preparedness and financial resilience. The industry lacked both the	RISM noted that, during the 1998 and 2008 crises, the construction industry relied almost entirely on government-led measures to stabilise the sector. This reliance reflected the absence of formal crisis planning within firms and limited the industry's ability to respond proactively or independently.

No	HISTORICAL CRISIS EXPERIENCE (ECONOMIC CRISIS IN 1998 AND 2008)			
	Questions	SEGMENT A		
		E1	E2	E3
		salary freezes, and cost-cutting due to severe financial and operational pressures. Cashflow constraints, project delays, and supply chain disruptions forced rapid, ad hoc decisions rather than planned interventions. Overall, the expert noted that the absence of prior crisis planning significantly limited the effectiveness of industry responses, revealing a systemic lack of preparedness.	technical capacity and skilled personnel needed to implement effective response strategies, resulting in slow and often inadequate reactions to rapidly evolving challenges. Overall, the expert emphasised that limited crisis knowledge and weak organisational capability significantly undermined the effectiveness of industry responses.	
3	Has your organisation or the industry developed a formal CMP or business continuity strategy since the 2008 crisis?	JKR confirmed that no formal Crisis Management Plan or industry-wide business continuity framework was developed following the 1998 and 2008 financial crises. Construction organisations largely continued to rely on government initiatives and incentives rather than developing their own structured crisis systems. While the crises raised awareness of the need for better financial risk management, most responses remained reactive and centred on cost-cutting measures such as retrenchments and operational reductions, rather than the establishment of comprehensive crisis or continuity strategies.	CIDB indicated that no dedicated crisis management or business continuity plan was developed for the construction sector after the 2008 crisis. However, the Malaysian Construction Industry Transformation Programme (CITP), introduced in 2016, incorporated elements of risk management, quality enhancement, and sustainability. Although not a formal crisis management framework, CITP sought to strengthen industry readiness for future disruptions, including economic shocks, by improving systemic resilience and long-term capability.	RISM confirmed that the construction industry has not established a formal Crisis Management Plan or business continuity framework since the 2008 crisis. While some organisations have begun to introduce elements of risk management, these efforts do not constitute a comprehensive crisis management cycle. The expert noted that, as demonstrated during the 1998 and 2008 crises, the absence of structured crisis planning has left many firms unprepared for sudden disruptions, resulting in reactive rather than pre-emptive responses and ad hoc decision-making during periods of instability.

Table5.4
Covid-19 Crisis Experiences

No	COVID-19 CRISIS EXPERIENCES					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
1	How did the Covid-19 Crisis affect you personally and professionally?	Covid-19 brought widespread economic, social, and operational disruption, requiring major adjustments both personally and professionally. The expert noted significant shifts toward digital work, changes in social interaction, and heightened awareness of health system vulnerabilities. At the organisational level, Covid-19 accelerated the need for digital transformation, stronger preparedness, and more resilient operational planning.	The expert reported significant personal lifestyle adjustments during Covid-19, including shifts in family routines, children's online education, and changes in household spending and mobility. Professionally, the construction sector continued operating but had to adapt to new health protocols, remote collaboration, and revised project timelines. These changes required flexibility and resilience as the industry adjusted to evolving regulatory and safety requirements.	The expert described Covid-19 as a transformative event that disrupted economic activity, supply chains, and social interaction. It accelerated digital adoption and reshaped work and lifestyle patterns. The pandemic also exposed weaknesses in healthcare systems and increased attention to sustainability. Overall, the expert emphasised that Covid-19 required professionals across sectors to adapt quickly and innovate in response to rapidly changing conditions.	The expert explained that Covid-19 significantly altered personal interactions and work environments, requiring individuals to adapt to new routines and ways of connecting. While some benefited from greater flexibility, others experienced increased stress and mental health challenges. At PETRONAS, the organisation responded by strengthening support for employees through flexible working arrangements, mental-health initiatives, and resources to help staff adjust to evolving work expectations.	The expert noted that Covid-19 deeply affected daily routines, social interactions, and personal well-being. A major concern was the disruption to children's education and the long-term implications of remote learning on development. These challenges underscored the need for greater support for students, families, and educators during and after the pandemic.

No	COVID-19 CRISIS EXPERIENCES					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
2	How did the Covid-19 crisis impact the construction industry and your organisation?	For this question, as the 3 organizations are government agencies, their responds are quite similar. Hence, the researcher has summarised feedback from JKR, CIDB and RISM as following: <u>1. Labour & Material Price Increases:</u> The pandemic has disrupted global supply chains, resulting in sharp increases in material costs. Many construction materials, such as steel, cement, and lumber, have seen price spikes due to shortages, transportation delays, and increased demand in various sectors. This has had a significant impact on project budgets, making it more challenging to maintain profitability and complete projects within the original cost estimates. Costs of both labour and materials rose sharply, affecting project budgets and complicating planning. This was due to both supply chain disruptions and labour shortages, particularly with international labour access restricted. <u>2. Foreign Labor Issues:</u> The Malaysian construction industry relies heavily on foreign labour, but Covid-19 travel restrictions and health concerns have reduced the availability of this workforce. This labour shortage has increased project costs, delayed timelines, and necessitated new recruitment and retention strategies to attract local workers or adapt to limited staffing. <u>3. Similarities to the 2008 Crisis and the Government's Implementation of Variation of Price (VOP) Clause for 2021 Projects:</u> Just as during the 2008 financial crisis, the pandemic has created economic instability that affects contract management and cost forecasting. The government's implementation of the VOP clause allows contractors to adjust pricing for volatile materials, helping to alleviate the financial burden of sudden cost increases and ensure projects can continue without excessive financial strain on contractors.			COVID-19 and Its Impact on Petronas: i. The oil and gas industry, including Petronas, faced immense challenges due to the dual shocks of the COVID-19 pandemic and the sharp decline in oil prices. This unprecedented combination sent the industry into uncharted territory, affecting both operations and market conditions. ii. In 2020, PETRONAS recorded a Profit After Tax (PAT) of RM10.5 billion, a significant decrease of 78% compared to RM48.8 billion in the previous year. This decline was primarily driven by reduced revenue, which was partially mitigated by lower group costs. The global economic downturn, reduced demand, and the volatility in oil prices all contributed to this outcome.	i. It is impossible to discuss 2020 without first acknowledging the significant challenges and adversities brought about by the COVID-19 pandemic. The prolonged uncertainty and confusion that accompanied the pandemic made an already difficult period even more trying. Many of our members faced job losses or reductions in income as businesses struggled to navigate through these turbulent times. ii. The EPF has had to navigate an exceptionally volatile market environment, compounded by political instability, a weakening ringgit, and ongoing geopolitical tensions. These factors, along with various unforeseen events, have continued to shape the economic, financial, and risk landscape in ways that

No	COVID-19 CRISIS EXPERIENCES				
	Questions	SEGMENT A			SEGMENT B
		E1	E2	E3	E4
		<u>4. Increased Costs to Comply with Standard Operating Procedures (SOPs):</u> New health and safety SOPs, including social distancing, sanitization, and personal protective equipment (PPE) requirements, have added extra costs to construction projects. These measures, essential for protecting worker health, have raised operational expenses and increased project management complexity. <u>5. Project Delays:</u> Covid-19 has led to frequent delays due to workforce limitations, disrupted supply chains, and stringent health protocols. These delays have impacted project timelines, created bottlenecks, and in some cases, resulted in contractual penalties or strained relationships with clients. <u>6. Potential Disputes:</u> Given the financial pressures and delays, disputes between clients, contractors, and suppliers are more likely to arise. Issues around cost overruns, contractual obligations, and delivery deadlines can lead to legal challenges, which may affect project outcomes and stakeholder relationships. <u>7. High Unemployment Rates:</u> Covid-19 has led to significant job losses in the construction sector, particularly affecting small contractors, consultation firms and unskilled labour. As projects are delayed or cancelled, the demand for labour has reduced, leading to increased unemployment and creating challenges for workers and communities reliant on construction jobs. <u>8. Material and Supply Chain Disruptions:</u> The pandemic has created bottlenecks in the supply chain, leading to material shortages and delivery delays. This has made it difficult for construction companies to obtain necessary supplies on time, forcing them to revise schedules and, in some cases, source materials locally at higher costs.			iii. The Group's revenue also saw a significant drop, with RM178.7 billion in 2020 compared to RM240.3 billion in the previous year. This was largely attributed to the dramatic fall in oil prices, which resulted in lower realized prices for all products. Additionally, demand disruptions during the pandemic led to reduced sales volumes in key areas such as processed gas, petroleum products, and LNG. iv. Despite these challenges, Petronas remains steadfast in its commitment to sustainability, which lies at the core of all our value creation efforts. Our Sustainability Agenda continues to guide us, supported by four strategic sustainability lenses that help ensure long-term resilience and value
					were both unprecedented and difficult to predict

No	COVID-19 CRISIS EXPERIENCES				
	Questions	SEGMENT A			SEGMENT B
		E1	E2	E3	E4
		<u>9. Lack of New Projects:</u> The economic uncertainty and increased financial risk have led to a decline in new projects, particularly from the private sector. With fewer investment initiatives, the industry faces challenges in sustaining growth and employment, further impacting the supply chain and smaller businesses. <u>10. Survival Challenges for Small Contractors:</u> Small contractors, who typically operate with limited financial reserves, have been hit especially hard. The combination of increased costs, project delays, and fewer new projects has made it difficult for smaller firms to stay afloat, leading to closures and exacerbating unemployment in the sector. <u>11. Cashflow Challenges, Especially in Private Projects:</u> The pandemic led to cash flow issues, particularly in private projects. Delays in project payments, combined with interruptions in project progress, strained finances across the industry and disrupted the financial stability of many firms. <u>12. Industry Unpreparedness and Slow Responses:</u> The construction sector was unprepared for the scale of disruption caused by Covid-19. Unlike other industries that quickly adapted to remote work or virtual operations, construction relies heavily on physical presence, making it more vulnerable to sudden shifts. The industry's low readiness and delayed response in studying and understanding the pandemic's impact added to the difficulties. This reactive approach, rather than proactive crisis management, has highlighted the need for better resilience planning in the future.			creation for all stakeholders, even in times of crisis.

No	COVID-19 CRISIS EXPERIENCES					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
3.	What were the main business challenging your organisation/industry faced during the crisis?	Most companies were not prepared to handle the crisis in the first place. This aligns with broader industry challenges, where many organizations found themselves in a reactive mode, struggling to adapt without prior planning. The emphasis on "the challenge is to survive" reflects the immediate financial and operational pressures faced during crises, such as cash flow issues, project delays, and supply chain disruptions The core challenge for many companies was their lack of preparation and reliance on reactive measures to stay afloat.	Less emphasizes the gap in knowledge and skills necessary for effectively navigating crises. Less focusing on the capability to implement crisis response strategies, rather than just surviving. The lack of understanding and expertise to execute them properly often hinders effective implementation. Many organizations, particularly in the construction sector, may not have had the technical know-how or experienced personnel needed to manage complex crises like the 1998 financial crisis or the 2008 global recession.	Challenges were to decide something that we don't want to decide. For instance, staff retrenchment, reduce salary, no salary etc. The tension between making decisions that preserve the organization financially while simultaneously trying to minimize harm to the workforce. This is a common challenge during crises, where staffing cuts, budget reductions, and other austerity measures are inevitable but painful.	PETRONAS responded to Covid-19 by taking swift, strategic actions supported by strong Board oversight. With falling demand and oil prices, the company prioritised cost optimisation, financial discipline, and productivity improvements to remain competitive. The organisation also streamlined operations, accelerated digital adoption, managed budget constraints, and strengthened communication to support employees during uncertainty. These challenges provided important lessons that have since informed PETRONAS's long-term resilience and future strategic direction.	EPF faced significant challenges during Covid-19, particularly managing investments in highly volatile global financial markets. Despite sharp fluctuations in asset values, EPF maintained strong financial performance and continued delivering high levels of customer service. In response to the crisis, EPF introduced several unprecedented member-support initiatives, including withdrawal and financial relief schemes, to assist individuals and employers facing economic hardship. These swift actions helped mitigate the pandemic's financial impact on members while ensuring the organisation remained resilient.

No	COVID-19 CRISIS EXPERIENCES					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
4	Has your organisation or the industry developed a Crisis Management Plan since the 2008 financial crisis?	No. The industry has not developed a formal Crisis Management Plan since 2008 and continues to rely on government measures. Most organisations focused only on reactive cost-cutting rather than establishing comprehensive crisis or continuity strategies.	No specific crisis management plan was developed. However, the CITP (2016) introduced elements of risk management, quality, and sustainability, which help prepare the industry for future challenges, though it is not a full crisis management plan.	No formal Crisis Management Plan has been established. Although some emphasis has been placed on risk management, it does not cover the full crisis management cycle. As seen in past crises, organisations remained unprepared and relied on reactive, real-time responses due to the absence of a structured CMP or business continuity framework.	-	-

Table5.5
Existing Action Plan

No	EXISTING ACTION PLAN					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
1	What steps did your organisation or the industry take to address the business challenges during the Covid-19 crisis?	No dedicated council or task force was formed to support the construction industry, resulting in an uncoordinated and reactive response. Most organisations relied on short-term cost-cutting measures including retrenchments, salary reductions, and pay freezes, to manage financial pressure, reflecting the severity of the crisis and its impact on employment across the sector.	CIDB observed that most construction organizations depended heavily on government assistance to survive, highlighting weak financial resilience and the absence of organisational crisis planning. The industry's response remained largely reactive, reinforcing long-standing capacity gaps in managing large-scale disruptions.	RISM reported that organisations primarily reduced operating costs by cutting staff, travel, logistics, and office expenses. No pre-existing crisis strategies were in place, forcing firms to improvise during the downturn. This demonstrated the sector's lack of proactive planning and vulnerability to economic shocks.	PETRONAS adopted a highly structured and proactive crisis response, leveraging its mature resilience ecosystem comprising Enterprise Risk Management (ERM), Crisis Management (CM), and Business Continuity Management (BCM). The organisation activated its Pandemic Preparedness and Response Team (PPRT) early, enabling swift implementation of stringent health protocols and continuity procedures across global operations. PETRONAS strengthened operational stability through rigorous financial discipline, portfolio reshaping, and accelerated digital transformation to support remote work and decision-making. Cross-functional teams (HR, legal, finance, operations) ensured coordinated action, while more than 85 technical guidelines and directives were developed to operationalise emergency procedures. The company emphasised preventive and	EPF implemented a comprehensive crisis response anchored in strong governance, risk management, and a well-established Business Continuity Management (BCM) framework. As one of the first pension funds globally to deploy Covid-19 relief initiatives, EPF introduced unprecedented member-support schemes to cushion financial hardship while managing extreme volatility across domestic and international markets. Its investment decisions were guided by ESG-aligned risk assessments, ensuring long-term portfolio resilience. At the organisational level, EPF strengthened its Operational Risk Management (ORM) framework through enhanced risk identification, analysis, communication, and monitoring. The pandemic triggered full activation of EPF's BCM components including human resource readiness (training, simulations, crisis

No	EXISTING ACTION PLAN					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
					mitigation strategies, guided by Bow-Tie analysis to minimise impact on People, Environment, Assets, and Reputation (PEAR). Importantly, PETRONAS avoided retrenchment, safeguarded employee welfare, established quarantine facilities, and maintained uninterrupted operations, demonstrating a level of crisis preparedness uncommon in many Malaysian industries.	exercises), infrastructure readiness (disaster recovery systems), and plan readiness (digital workflow, remote operations, virtual services). The establishment of a Covid-19 Command Centre and a Disaster Monitoring Committee ensured rapid information flow and coordinated organisational responses. EPF sustained nationwide service delivery throughout the crisis, reflecting a high degree of institutional preparedness and operational resilience.

Table 5.7

Proposed Steps for CSCMP and Business Continuity

No	PROPOSED CMP AND BUSINESS CONTINUITY					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
1	What are your views on the proposed five-step Construction Sector Crisis Management Plan, which includes Prepare, Prevent, Respond, Recover, and Redesign?	The proposed steps are well-designed and highly relevant for establishing a comprehensive Crisis Management Plan for the construction industry. Looking back, these phases could have mitigated many of the shortcomings observed during the 1998 Asian Financial Crisis, the 2008 Global Financial Crisis, and even Covid-19. Historically, both public and private sector players tended to respond reactively, relying on short-term measures such as retrenchments, cost-cutting, and project slowdowns. There was no dedicated task force or coordinated framework to manage	The proposed Prepare, Prevent, Respond, Recover, and Redesign framework is both timely and highly relevant for the construction industry. It directly addresses the weaknesses observed during previous crises, where many firms were unprepared and relied extensively on government interventions to remain afloat. This structured CMP offers a clear and practical roadmap for shifting the industry from reactive, survival-based responses toward a more anticipatory and resilient approach. CIDB recognises the value of embedding such a model within national construction policies, capacity-building	RISM fully supports the proposed Prepare, Prevent, Respond, Recover, and Redesign framework, as it directly reflects the gaps experienced by the industry and our members during past crises. Historically, responses were predominantly reactive, centred on cost-cutting and asset reduction, with no structured crisis management plan to guide decision-making. Professional service providers, including surveyors, were particularly vulnerable due to limited preparedness and inadequate foresight. This five-step approach offers a more proactive and strategic pathway for the construction and	PETRONAS views the proposed Prepare, Prevent, Respond, Recover, and Redesign framework as comprehensive and highly relevant, aligning closely with its existing crisis and resilience architecture. The organisation's approach is anchored in a robust Group Risk Management Framework that ensures proactive risk identification, assessment, and mitigation, effectively fulfilling the Prepare and Prevent components of the model. PETRONAS also applies the PEAR framework (People, Environment, Assets, Reputation) to guide prioritisation and decision-making during crises, ensuring a balanced and holistic Response. To operationalise its crisis governance, PETRONAS maintains a dedicated Preparedness Team responsible	EPF finds that the proposed Prepare, Prevent, Respond, Recover, and Redesign framework aligns closely with its own crisis management approach and reflects the principles that guided the organisation's response during the Covid-19 pandemic. EPF's crisis governance was built around several core elements. First, preparedness was strengthened through the rapid deployment of secure remote-work solutions, enabling staff productivity while safeguarding data and systems—addressing both the Prepare and Prevent dimensions of the model. Second, digital agility played a critical role; having already embarked on digital transformation, EPF accelerated its initiatives to ensure uninterrupted service delivery, facilitating an effective Response and

No	PROPOSED CMP AND BUSINESS CONTINUITY					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
		crises systematically, leaving many organisations. Particularly contractors are unprepared. A structured plan built on these five steps would support more proactive, sustainable, and resilient crisis management across the sector, moving beyond ad hoc survival strategies. However, successful implementation would require strong institutional leadership, cross-agency coordination, and industry-wide commitment to embed these practices effectively.	initiatives, and industry training programmes to strengthen long-term crisis readiness across all tiers of the sector.	consultancy sectors, enabling organisations to anticipate risks and manage crises more effectively.	for developing standards, crafting crisis plans, designing preventive strategies, and ensuring staff readiness. A specialised Response Team is activated during emergencies to execute action plans and coordinate interventions across the organisation. Regular simulations and drills are conducted to validate and refine crisis procedures, enhancing organisational readiness and strengthening SOPs. Business Continuity Planning (BCP) remains a critical pillar, with every site required to activate continuity measures and maintain minimum manning levels to sustain operations. PETRONAS also adopts a proactive stance, often “over-preparing” by anticipating worst-case scenarios and taking early preventive measures. Practices such as the Green Bubble concept help safeguard essential personnel and critical operations during high-risk	supporting a stable Recovery phase. EPF also prioritised clear and consistent communication, enhancing trust and transparency with members, stakeholders, and government agencies. Member-focused initiatives, including financial relief and cash-flow support schemes, demonstrated EPF’s commitment to societal resilience and contributed to both Recovery and longer-term Redesign. These efforts were supported by an integrated crisis framework underpinned by people, leadership, communication, technology, and adequate resourcing—key enablers consistent with all five stages of the proposed CMP. Finally, EPF emphasises continuous improvement, recognising that crisis readiness requires ongoing

No	PROPOSED CMP AND BUSINESS CONTINUITY					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
					periods. Strong digital infrastructure further enabled the company to transition to remote work and virtual coordination as early as January 2020, ensuring seamless communication and uninterrupted operations throughout the crisis.	training, strategic foresight, and the flexibility to revise plans as conditions evolve. This commitment reflects the essence of the Redesign component. Overall, EPF considers the proposed framework practical, reflective of real-world lessons, and a strong foundation for enhancing crisis preparedness and resilience across the construction and broader public sectors.
	How can organisations build resilience to sustain performance and ensure business continuity?	To build resilience and ensure continuity, the construction sector—especially agencies like JKR—must move from reactive actions to a structured, proactive crisis management approach. Past crises showed that the absence of a formal plan led to fragmented, survival-based responses.	CIDB believes resilience and business continuity are vital to overcoming long-standing industry weaknesses such as poor financial readiness and reliance on government support. Resilience must start with embedding preparedness and preventive measures across the entire construction value chain.	To build resilience, Organizations must institutionalize crisis management planning beyond just cost-cutting. Ultimately, RISM supports long-term reforms that embed crisis preparedness in professional standards and industry practices.	PETRONAS views resilience as a structured, organisation-wide culture supported by an integrated risk and crisis management ecosystem. Their approach focuses on being consistently prepared and able to sustain performance even under pressure.	EPF builds resilience through a clear crisis framework integrating people, leadership, resources, communication, and digital systems. It treats crisis management as a long-term organisational commitment to ensure continuity without compromising service to members.

No	PROPOSED CMP AND BUSINESS CONTINUITY					
	Questions	SEGMENT A			SEGMENT B	
		E1	E2	E3	E4	E5
6	Which group is most affected - contractors or consultants?	All players. Government affected. But mostly the contractors and consultants.	Contractors and consultants	Both, consultants and contractors	Both contractors and consultants.	Contractors and consultants.

APPENDIX 4

UiTM Research Ethics Committee Approval Letter

www.uitm.edu.my



UNIVERSITI
TEKNOLOGI
MARA

Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCP/5/1/6)
Our reference : REC/11/2021 (MR/874)
Date : 17th November 2021

Ir. Ts. Dr. Rumaizah Mohd Nordin
(Anis Mardhiah Mukhtar - 2020832076)
Faculty of Architecture, Planning & Surveying
Universiti Teknologi MARA
40450 Shah Alam
SELANGOR

Dear Ir. Ts. Dr. Rumaizah Mohd Nordin,

APPROVAL LETTER - UTM RESEARCH ETHICS COMMITTEE

Thank you for submitting your research proposal to Research Ethics Committee (REC). After considering your application, the Committee approved your proposal entitled "Construction Sector Crisis Management Plan (CSCMP) Towards the Malaysian Construction Organisation Resilience During the Plight" at Klang Valley.

Details of the approval are as follows:

Ref. number:	REC/11/2021 (MR/874)
Approval Period:	17 th November until 31 st October 2023
Authorised personnel:	1. Ir. Ts. Dr. Rumaizah Mohd Nordin 2. Dr. Norfashih Hashim 3. Ir. Dr. Abdul Aziz Abas 4. Anis Mardhiah Mukhtar

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysia Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research, must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to REC for approval.

If you require further information, please contact REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

Yours sincerely,

PROFESSOR DATO' DR. ABU BAKAR ABDUL MAJEED
Chairman
UiTM Research Ethics Committee

c.c.: Dean, Faculty of Architecture, Planning & Surveying, UiTM

Universiti Teknologi MARA
Arau 3, Bangunan Wawasan
40450 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 3544 2004/2275
Fax: (+603) 3544 2070



AUTHOR'S PROFILE



Sr. Anis Mardhiah Mukhtar is a PhD candidate in Built Environment at Universiti Teknologi MARA (UiTM), Malaysia, with over 18 years of industry experience in the construction and oil and gas sectors. Her doctoral research focuses on crisis management for the construction industry. She obtained a Master of Science in Integrated Construction Project Management (Hons.) from UiTM in 2016 and a Bachelor of Quantity Surveying (Hons.) from Universiti Teknologi Malaysia (UTM) in 2008. She is currently with MISC Berhad, managing engineering, procurement, construction, operation and maintenance activities for offshore oil and gas projects, including FPSO and FPU developments.

LIST OF PUBLICATIONS:

- Mukhtar, A.M., Mohd, N.R., Hashim, N., Abas, A.A. (2022). Developing a Resilient Crisis Management Plan for the Construction Sector in *Built Environment Journal* (Vol. 19. Issue 1).
- Mukhtar, A.M., Mohd, N.R., Hashim, N., Abas, A.A. (2023). Impactful Crisis Management in the Surviving Organizations: A Dynamic Model and Empirical Evidence in *AIP Conference Proceedings* 2881, 050009.
- Mukhtar, A.M., Mohd, N.R., Hashim, N., Abas, A.A., Kurniawan, C., (2026). Crisis Management Plan (CMP) and Synergistic Leadership (SL) as the Key Determinant of Business Continuity (BC) over Volatile Outlook for Construction Organisations in *IJRISS* (Vol. X. Issue 1 January 2026).

Certificate Of Completion

Envelope Id: 9B112924-A422-8E3B-8279-C7004EE5FAF9

Status: Completed

Subject: Complete with Docusign: Permata.pdf

Document Type: Others

Source Envelope:

Document Pages: 1

Signatures: 1

Envelope Originator:

Certificate Pages: 1

Initials: 0

Anis Mardhiah Mukhtar

AutoNav: Enabled

Anismardhiah.mukhtar@miscbhd.com

Envelopeld Stamping: Disabled

IP Address: 120.138.95.13

Time Zone: (UTC+08:00) Kuala Lumpur, Singapore

Record Tracking

Status: Original

Holder: Anis Mardhiah Mukhtar

Location: DocuSign

7/14/2026 11:10:32 PM

Anismardhiah.mukhtar@miscbhd.com

Signer Events

Anis Mardhiah Mukhtar

Anismardhiah.mukhtar@miscbhd.com

Security Level: Email, Account Authentication
(None)

Signature

Signed by:
Anis Mardhiah Mukhtar
248E911D55A0421...

Signature Adoption: Pre-selected Style

Using IP Address: 120.138.95.13

Timestamp

Sent: 7/14/2026 11:11:22 PM

Viewed: 7/14/2026 11:11:33 PM

Signed: 7/14/2026 11:11:49 PM

Electronic Record and Signature Disclosure:

Not Offered via Docusign

In Person Signer Events

Signature

Timestamp

Editor Delivery Events

Status

Timestamp

Agent Delivery Events

Status

Timestamp

Intermediary Delivery Events

Status

Timestamp

Certified Delivery Events

Status

Timestamp

Carbon Copy Events

Status

Timestamp

Witness Events

Signature

Timestamp

Notary Events

Signature

Timestamp

Envelope Summary Events

Status

Timestamps

Envelope Sent

Hashed/Encrypted

7/14/2026 11:11:22 PM

Certified Delivered

Security Checked

7/14/2026 11:11:33 PM

Signing Complete

Security Checked

7/14/2026 11:11:49 PM

Completed

Security Checked

7/14/2026 11:11:49 PM

Payment Events

Status

Timestamps