

**Faculty of Business**

**Collaborative Framework Arrangement for Agile/Leagile  
Procurement and Supply of Humanitarian Food Aid:  
A Case Study of Malaysia**

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**This thesis is presented for the Degree of  
Doctor of Philosophy  
of  
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## **DECLARATION**

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award by any other degree or diploma in any university.

Signature:

Date: 29<sup>th</sup> October 2019

## ABSTRACT

Disasters are reportedly occurring more frequently in rural area, and the phenomenon presents procurement and supply gap for the Humanitarian Relief Organisations (HROs) practises to ensure availability and quick delivery of relief supplies to the victims. Previous studies centred on utilising quantity-flexible framework arrangement (FA) contracts that are based on pre-specified terms for different settings and related cost for mostly financially fit suppliers to reserve relief supplies, and delivery it based on geographical coverage. Arguably, while such FA have been effective, the problem lies in the difficulty of small-rural base suppliers to adhere to the pre-specified terms due to financial constraints. Instead, FA between HROs and local and small suppliers leveraging on collaborative strategy is professed to be a viable option in reducing risks and cost in humanitarian aid mission. This study aims to determine how collaborative FA instead of financial or incentive FA contract for small and localised supplier could be used to achieve efficiency and effectiveness in the procurement and supply of humanitarian aid. Building on existing work on supply chain management's non-financial measurement on efficiency and effectiveness mirrored concepts of lean, agile, and leagile, this study asks: How Collaborative FA could be an agile or leagile driver for the procurement and supply of humanitarian aid?

Based on literature findings, the study considered complementary theoretical perspectives based on the concepts of FA, buyer-supplier collaboration, contingency response adoption, lean, agile and leagile performance measurement, and, proposed a conceptual framework that links these concepts premised on the underlying of these three theories: (1) contingency theory (CT) development variables as constructs to understand the contingent factors of the adoption of FA; (2) social exchange theory (SET) to demonstrate collaborative activity; and (3) transactional cost analysis (TCA) to understand FA flexibility and its link to the performance indicators of lean or agile or leagile. An alternate theory, Principal Agency Theory (PAT) which supports contractual method with pre-specified terms was also considered. Premised on prior knowledge of the collaborative FA practises on food-aid of an inter-governmental HROs based in Malaysia, multiple in-depth case studies was performed on the procurement and supplies of two food-aid variants, namely the modular and non-modular form, for a period of three years from the year 2015 to 2017 across the aforesaid country.

To investigate the links of the concepts and the underlying complementary theory perspective, this study employed mixed method strategy within the case studies: Firstly, an analytical hierarchy process (AHP) was performed to understand the procurement and supplier relational strategy for each food-aid variant produced on existing body of knowledge's Purchasing Portfolio Model; secondly, the findings are then corroborated with the triangulation of data from interviews, observation, and documentary substantiation, in which the findings were tested for replication and analytical generalisation based on within-case and cross case analysis; and thirdly, to assess the practical aspect of the collaborative FA implementation. Notably, the study outlines a three-phase research program to confirm the construct and associations of the proposed conceptual framework.

Analysis of the AHP and Purchasing Portfolio Model indicates that there are three variants of humanitarian food-aid items requiring different buyer-supplier relationships: (1) Pre-purchased modular food-aid for pre-positioning at forward operating base (FOB) procured through competitive bidding for remote inaccessible areas with relationship limited to the contractual stipulation; (2) collaborative emergency purchase FA (EPFA) for fresh food and packed meals during disaster occurrence at disaster relief centres which is classified as bottleneck item and requires a localised buyer-supplier relationship to secure supply with tolerance to small variation in price volatility and to reserve minimal stock ; and (3) modular food as first response meal item or initial food kit (IFK) based on government to government (G2G) relationship or strategic relationship to secure supply for large geographical coverage, fixed prices, reserve capacity that is high yet are flexible for replacement of for near expiry items. Except for the competitive bidding commodities, it is noted that both collaborative EPFA and FA are purely relationship based.

Next, analysis of within-case and cross case, the result confirms of the construct and its association of FA, buyer-supplier collaboration contingency response, and leagile in the initial conceptual framework. The findings led to the development of a refined conceptual model that supports the advocated complementary theory perspective of the study, in which the links is professed based on the intersection of TCA, CT and SET theories, and that evidently provide new insights of how CT which could act as contingent for TCA operationalisation complemented by SET. In the final analysis on practical aspect, the study established that the challenges of implementation of the two

types of collaborative FA in existence varies and that it is more profound in EPFA as compared to FA.

The theoretical implication includes on addressing the gap of the study, in which the study confirms that collaborative FA mechanism use for engagement of HROs with small suppliers (transactional) suppliers for humanitarian aid. Secondly, with regards to small and localised suppliers, this study also suggest that an incentive based or pre-specified contracts as advocated by previous studies may be substituted with collaborative FA to reduce risk of supply shortages; thirdly, in advocating presently under research SCM performance indicator of lean, agile and leagile, as plausible non-financial indicator for future studies; and fourthly, in advocating the adopted combined CT-TCA-SET as one of SCM complementary theoretical lens for humanitarian aid procurement and supply situations.

Similarly, the practical implications of the study include prospect of collaborative FA as viable alternatives for humanitarian aid practitioners, as well as to wider context involving other phenomena. More importantly, in understanding how FA could benefit HROs to reduce risk and securing supplies. In essence, the study suggests that ‘trust’ as key element in collaborative FA for practitioners’ to ensure successful collaboration with suppliers. Correspondingly, policy recommendations for HROs to include formalisation of collaborative FA, supporting pre-selected suppliers to engage in reserve capacity as means for disaster preparations, and, encouraging critical information sharing between parties for mutual reciprocity of the collaborative FA.

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## **CONFERENCE PAPER PRESENTED**

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## **LIST OF ABBREVIATION**

AHP	Analytical Hierarchy Process
ARP	Abductive Reasoning Process
CBRNE	Chemical, Biological, Radiological, Nuclear and Explosive
CDF	Civil Defence Force
CIPS	Chartered Institute of Purchasing and Supply
CT	Contingency Theory
DSW	Department of Social Welfare
DIREX	Disaster Relief Exercise
HRO	Disaster Relief Organisation
DRC	Disaster Relief Centre
EM	East Malaysia
ECR	Efficient Consumer Response
EPFA	Emergency Purchase Framework Arrangement
FA	Framework Arrangement
FOB	Forward Operating Base
FDRM	Fire and Rescue Department Malaysia
HLSCM	Humanitarian Logistics and Supply Chain Management
IFRC	International Federation of Red Cross
IPRP	Instant-Purchasing with a Return Policy
IFK	Initial Food Kit
MOU	Memorandum of Understanding
MDTCA	Ministry of Domestic Trade and Consumer Affairs
MRP	Malaysian Royal Police

NADMA	National Disaster Management Agency
NGO	Non-Governmental Organisation
NPO	Non-Profit Organisation
NSC	National Security Council
OC	Open Contract
PAT	Principal Agency Theory
PPBC	Pre-Purchasing with a Buy Back Contract
PPOC	Pre-Purchasing with an Option Contract
RBV	Resource Base View Dependency
RDT	Resource Dependency Theory
SC	Supply Chain
SCM	Supply Chain Management
SDS	Strategic Deployment Stocks
SET	Social Exchange Theory
SKU	Stock Kit Unit
TCA	Transactional Cost Analysis
UN	United Nations
UNISDR	United Nations Office for Disaster Risk Reduction
UNSAS	United Nations Standby Arrangement System
UNSC	United Nations Security Council

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## DEFINITION OF KEY TERMS

***Collaborative Framework Arrangement (FA).*** FA is referred as a procurement method that promotes pre-purchasing mechanism to be applied to pricing particular requirements during the period of the framework. FA consist of agreements, contracts, and Memorandum of Understandings (MoU). Collaborative FA denotes employing collaboration in a buyer-supplier relationship as a pre-purchasing mechanism of the FA.

***Contingency Response.*** A hybrid type of response that includes both *pre* and *post* disaster response, in essence one that operates proactively for low values of disaster intensity, activates a reactive response if the intensity exceeds a certain threshold.

***Complementary Theories.*** Adoption of an inter-disciplinary theories to provide an in-depth explanation of a phenomena.

***Humanitarian Aid.*** Disaster is referred to a sudden, calamitous event that seriously disrupts the functioning of community or society and causes human, material, and economic or environmental losses that exceed the community's or society ability to cope using its own resources. In this sense, the humanitarian aid is the activity undertaken by relief agency for the purpose of alleviating the suffering of vulnerable people.

***Flexibility.*** Flexibility is an adaptive response to environmental uncertainty

***Leagile.*** A hybrid supply chain which combines lean and agile supply strategy. Lean refers to the process of upstream of the decoupling point (postponement) and those downstream as agile .

# **CHAPTER 1: INTRODUCTION TO THE STUDY**

## **1.1 Introduction**

Natural disasters bring tremendous suffering. After (and even during) disasters, the humanitarian community responds against the clock to ease the suffering. For example, the earthquake in Haiti or the devastating Aceh Tsunami in 2004 which affected 14 countries and confirmed death toll of more than 240,000 lives. In this instance, the role of humanitarian relief organisations (HROs) such as United Nations such as World Food Program (WFP) and UNICEF, non-profitable organisations (NPOs) such as the International Federation of Red Crescent (IFRC), and participating neighbouring, regional and global support from countries is critical in disaster response to bring new hope to the surviving victims through food, medical aid, and shelter.

## **1.2 Overview of the Problem**

Procurement goals for aid organizations are to ensure fast, agile and efficient responses (Taupiac 2001). Taupiac (2001) also advocates that in the humanitarian relief procurement process emphasis is placed on speed and availability in order to save lives; therefore, procurement costs also tend to be high since speedy delivery is the primary concern. Previous studies have shown that these procurement related problems are due to disaster uncertainty and procurement system which is not abreast of disaster requirement (Durch et al. 2003; Ponnusamy 2010; Aguirre and Abrisketa 2009). In addition to this, disaster uncertainties (scale, nature, where and when it happens) present challenges to a procurement system that relies on calculated requirement based on organization needs and significant lead times prior to delivery. Hence, international disaster relief agencies embark on improving procurement through approaches such as the use of pre-approved suppliers, forecasting supplies needs, moving supplies to disaster prone area through logistics hub and establishing network of suppliers.

In addressing the issue of efficiency and effectiveness in the face of uncertainty, many organisation and researchers agree on the value of flexibility. For example, Jahre,

Jensen, and Listou (2009) argue that in dealing disasters, the humanitarian context is categorised as “clearly unpredictable, turbulent and requiring flexibility”. Prior studies have established interconnectivity between the functions of procurement and the supply chain, which includes concepts of flexibility, collaborative relationship, lean and agility (Lamming 1996; Balakrishnan 2004; Storey et al. 2006). In terms of managing an effective supply chain especially when with the uncertainty of market demand, suppliers use a flexible approach to managing a variety of product offering through decoupling point and postpone of the final product. Hence, it could be ascertained that to achieve efficiency and effectiveness in dealing with uncertainty, academics and practitioners are responsible to promote a flexible approach instead of relying on one fit solution or standard method.

To meet the need of flexibility, literatures reports of an increasing number of HROs adopting flexible procurement method in which generic items may be pre-positioned or reserved by the supplier, and when disaster intensity is known (which sets the base requirement), supplies are tailored for a speed delivery. Storey et al. (2006) describes this as using the contingent method in fitting supply chain characteristic to product strategy. To support the system, HROs employs framework agreements with their suppliers, in which pre-approved supplier negotiate pre-specified terms during disaster preparedness stage, which guarantees availability, quick delivery, and cost-effective procurement of critical items after disaster occurrence. Framework agreement or in its new holistic definition, the framework arrangement (‘FA’) (CIPS 2015) have already been used by many western and international HROs. Despite this, there are few studies that explains the FA use in the context of procurement and supply of humanitarian aid. Moreover, less is known of its use in the dynamics of the disaster responses, and how such the use of FA translates to efficiency and effectiveness in its supply chain management (SCM).

In like manner, many relief organizations have used FA to procure relief items. For example, the IFRC established FA with suppliers for basic items in 2001, and secured pricing or commodities for two years, guaranteed quality and quantity, and agreed delivery terms (IFRC 2014) . Similarly, based on seminal work of Lu, Goh, and Souza (2014) on eight international HROs based in Jakarta, Indonesia, and the findings revealed that most of the HROs adopted FA with their supplier as efficient means of managing their supplies due to lack of funding. The study notes that HROs reduced its

pre-positioning stocks while leveraging on relationship based on contract for fixed price but the tenure is only for 6 months. Some suppliers have agreed on the pricing on certain range taking into consideration of inflations for a longer relationship. Similarly, Balcik and Ak (2014) in promoting the use of FA in humanitarian aid supplier selections suggested the use of a flexible quantity contract with minimum purchase requirement and agreement terms settings which includes consideration of impact disaster level to minimum reserve capacity by supplier, lead time discount rates and quantity discounts rates. The study shows that supplier selection decisions and cost are more sensitive to the changes in agreement setting with high impact disasters.

### **1.3 Research Gap**

Amid the beneficial of FA as an incentive contract, the research gap could be traced in the background of its utilisation. This study argues that while efforts has been made in understanding FA a feasible option of an incentive contract, there is still paucity of evidence on research and practical empirical on the role of collaborative FA in humanitarian aid. For example, Balcik and Ak (2014) also argued that small organisations may not use quantity discount due to small orders, and will benefit from the use of collaborative agreements. The authors' suggested that future work on examining the effects of collaborative agreement on procurement cost and responses, and under which under the condition the agreement will be beneficial. In like manner, based seminal work of Chakravarty (2011) in evaluating contingency relief response that include both *ex-ante* and *post-ante* capacity and supply acquisition, the author advocated that buyer must communicate to update orders of relief supplies to retailers based on disaster strike probability and intensity, and also that it include the supplier in an incentive contract to become a more effective member of the collaboration.

As there is scarcity of empirical on collaborative FA in the humanitarian aid context, a study in this specific field may offer incremental insights of the use of FA. Moreover, studies have also indicated to include HROs' practitioners driven initiatives to understand SCM (Gunasekaran, Patel and McGaughey 2004). As in the case of OC implementations in Taiwan, hence addressing collaborative FA challenges and policy directives would be beneficial for future studies.

Secondly, previous study focused on large suppliers focusing on FA as incentive contract, as such this limits the generalisability to its application to small suppliers, generally occupying rural areas arguably comprising major disaster areas. In fact, study have indicated an increase in the number of small to medium size disaster involving mainly the Asia continent countries such as China, Philippines and Indonesia, in which an increase in reliant on local suppliers to the disaster areas is noted (Fenton, Goodhand and Vince 2014). To point out, the countries' reliance on localised suppliers, in which the bulk of it is based on small suppliers in rural geographical area may limit the options of pre-specified terms usage for reserve capacity, therefore test the present understanding of an incentive contract generalisation. Thirdly, product specificity to modular based are rarely linked to small suppliers. Under those circumstances, this dimension presents the magnitude of challenges to the generalisation of FA real-case scenario in the humanitarian aid context, representing a specific problem area for this study.

In addition to this, a quick grasp of present body of knowledge contends that there is a deficit in humanitarian logistics and supply chain management (HLSCM) studies on humanitarian aid performance, in which the SCM concept of lean, agile or leagile is gradually being recognised by certain academia as plausible performance indicators. The call for more humanitarian aid performance gauge is critical for the donors and tax payers. It may benefit this study to further help the mass to understand collaborative FA role in contributing to the efficiency and effectiveness of a humanitarian relief activity. As a reflection, literature also argues that leanness and agility inherent in HRO processes indicate a high probability of increased efficiency and effectiveness when associating it with disaster relief response (Scholten, Scott and Fynes 2010). Beside this, the current body of knowledge also seeks further evidence to understand the use of flexibility as strategy to address uncertainties. Studies suggest that lack of uncertainties is one of SCM complexity, and that the ability to deal could reflect performance (Hickson et al. 1971). As uncertainty and reducing risk is the antecedent for the specific strategy employed by firm, it represents a dimension of collaborative FA to innate is worth investigating

## **1.4 Rationale of the Study**

The author professes that studying the gap is important to the development of academia and practitioners' understanding in the adoption of FA in humanitarian relief context. Previous studies have contributed in identifying FA as plausible prospect to address procurement and supply challenges in humanitarian aid. In doing so, the current HLSCM body of knowledge understood a few aspects of FA. For example, Balcik and Ak (2014) in promoting the use of FA in humanitarian relief supplies with the use of quantity flexible contracts, and Lu, Goh, and Souza (2014) findings on FA fix pricing mechanism affecting HROs' shortens the relationship tenure with its supplier as compared to pricing on certain range, and a balance exist between FA and spot purchasing focusing on critical items.

Hence, it appears that FA in humanitarian relief is a fertile area for more studies to be conducted, and as procurement is a critical aspect to this field, it is therefore professed that this study's effort in addressing the gaps may benefit future academia and more importantly the practitioners. On the contrary, the risk of not addressing these gaps may potentially results in further loss in the procurement and inventory cost of HROs, continuation of HROs lags in strategic approach for efficiency and effectiveness of the relief activity, and prolonged dilemma of lack of understanding amongst practitioners of HROs. These associated risks are in contrast to the rapid improvement need that is indispensable in the field of HLSCM which deals with human lives and is highly dependable on donors' funding.

## **1.5 Aim and Research Questions**

The purpose of this study is to address the identified gaps as outlined in section 1.3. For this purpose, the main aim is to explain how collaborative FA could be SCM performance (agile or leagile) driver in the procurement and supply of humanitarian aid. The main research question of the study:

*How Collaborative FA could be an agile or leagile driver for the procurement and supply of humanitarian food-aid?*

This study is demonstrated by developing a proposed conceptual framework of the procurement and supply for humanitarian aid that exhibits the linkages between the concepts: (1) the use collaborative FA (instead of an incentive contract); (2)

contingency response, and (3) SCM performance. More importantly, the key tenet is to demonstrate theoretical development that are based on inter-discipline theories advocated by scholars of SCM and humanitarian aid studies to explain this phenomenon. Correspondingly, the first objective of the study is to identify key component of humanitarian aid items that motivate the use of collaborative FA based on the underlying nature of the preferred buyer-supplier relationship of its actors. Therefore, the first research question (RQ1) is stated as following?

*How existing procurements strategies impact on the competitive priorities of lean (cost and quality) and agile (time and flexibility) at component level and how this leads to buyer-supplier relationship tendency and the procurement strategy adopted?*

Secondly, this study investigates on how the interlink are established between the concepts of FA, buyer-supplier collaboration, contingency response approach, and supply chain performance of lean, agile and leagile, based on constructs of SCM complementary theories. In essence, the linkages could offer a feasible alternative of contractual FA to FA that are based on relational values between HROs with localised small suppliers for sourcing and securing food-aid before and during the occurrence of disaster. Hence, RQ2 probes the following:

*How leagile is achieved using collaborative framework arrangement which promotes buyer-supplier relationship and flexibility of supplies in a proactive and reactive response?*

Finally, this study also intends to identify the challenges and proposes suggestions of how future use of FA could support humanitarian in particular for food-aid. This corresponds directly to the proposed conceptual framework and considers previous body of knowledge that contends lack of scrutiny of existing humanitarian aid procurement and supply mechanisms. For this reason, the RQ3 of this study examines following:

*What are the challenges and practical issues (regulation and contract management) of the conceptual framework?*

## 1.6 An Overview of the Methodology Chosen

To support the conceptual and theoretical links, case study research method is advocated as the key research question as highlighted in Section 1.5 is based on ‘how’ type of question, and the fact that it focuses on contemporary events to understand complex social phenomena (Yin 2014). Government based HROs in a Southeast Asian country, Malaysia, was selected for the study premised on the followings: (1) existence of collaborative FA for HROs supply of food to victims since 2011, and recent increased of its usage since 2014 high impact flood disaster; (2), the particular country acknowledges logistics and averting bottlenecks as humanitarian aid challenges, and that speed, efficiency, and good coordination as key elements of disaster response; and (3), based on observation by Transparency International, a worldwide watchdog group that highlights the country’s issues in relation to transparency and processes in the procurement for emergency responses to natural disasters and other such events (Hui et al. 2011; Wiehen et al. 2006).

As such, in terms of method, the intended case study exhibits a purposeful sampling technique. In addition, as case study is closely related to relativist paradigm, a pragmatic perspective will add value to inquiry strategies of the study especially for triangulation of evidence to support the explanatory (“how”) question of the phenomenon. Moreover, with motives of grasping an in-depth understanding of the little known use of collaborative FA, tapping practitioners perspective and observation of the real phenomenon will be certainly considered for the triangulation of evidences.

As in most case study, analysis will be based on replication logic for similar cases, whilst cross-case synthesis for contradicting cases. This study considers at least seven cases for replication logic, and the eighth case for cross-case synthesis. These will be supplemented by narrative and content analysis (procedure for qualitative data to identify themes and relationship to the study). Next, to ensure quality of this research, steps that will be taken includes: (1) Preparing case study database to establish the chain of evidence of multiple sources of data; (2) preparing reviews by key informant for the transcription and relevant chapter of the thesis draft; (3) keeping abreast with internal consistency requirement to ensure data fit together in a coherent picture; and (4) reducing too deductive approach of the conceptual framework and consider

balancing with inductive approach. Finally, this study is guided by a case study protocol, and the ethics approval of Curtin University.

## **1.7 The Significance of the Study**

The significance of this study is attributed to its contribution to: (1) Theory and knowledge; and (2) practise and policy. The sub-section will illuminate these expected contributions of the study.

### **1.7.1 Theory and Knowledge**

The present body of knowledge lacks the empirical evidence on collaborative FA use for procurement and supply of humanitarian aid items more specifically, concerning the dilemma surrounding small and localised suppliers of humanitarian aid. This study could offer academia and practitioners on the general definition of the use of collaborative FA across the board. Furthermore, it is believed that this study could supplement the current literature of the phenomena on a wide range of aspect of the collaborative FA, which includes its workable governing structure, settings, processes as well as practical insights of areas where it could be further improved. In addition, this study could provide the empirical means of generalising the use collaborative FA to other fields or phenomena.

Next, it is also generally accepted that the SCM field lacks the theoretical support. In fact, the general use of FA has little known theoretical underpinnings. Hence, this study could contribute to academia to fill a specific corner of the theoretical vacuum with the proposed conceptual framework. The relationships between the concepts and constructs may provide incremental insights to the present body of knowledge on collaborative FA's antecedent, its' use in the context contingent response, and its effect on SCM performance. In addition to this, this study may add to empirical evidence on lean and agile, as plausible SCM performance indicator. Finally, this study could possibly extend the current theoretical lens of SCM studies on complementary and borrowing perspective that incorporates middle-range theories in explaining the SCM of humanitarian aid. That is to say that this study may offer a new perspective of the current SCM complementary perspective (Halldórson, Hsuan and Kotzab 2015;

Halldorsson et al. 2007) with an alternative component of theories namely contingency theory, transactional cost analysis theory, and social exchange theory.

### **1.7.2 Practise and Policy**

In term of practise, firstly, practitioners could operationalise the collaborative FA for SCM performance, therefore re-emphasizing its role and traits for future procurement and supply of humanitarian aid as it will incorporate data from HROs practitioner. As highlighted earlier, some of the Asian countries are still dependable on their government as HROs as oppose to western practise in which non-profitable organisations (NPOs) such as IFRC plays a crucial role in humanitarian relief activity. Therefore, the role of governmental HROs coupled with reliant on localised suppliers specifically on the use of collaborative FA and as such could provide an interesting examination of the settings for future use.

In addition to this, practitioners may have a better understanding of the mechanics of collaborative FA and its key influencing factors. In other words, this study may provide the specific area of focus for the HROs practitioners, for example on how trust and reciprocal benefits may be incorporated into their current standard operating procedures (SOPs), circulars and engagement with suppliers to encourage reserve capacity and other preparation. Other benefits include that practitioner could leverage on reciprocal benefits arising from the collaborative FA practise to reduce their procurement cost, inventory cost, increase flexibility as well as lead time to victims. In addition to this, this study may provide public better insights regarding government spending on humanitarian aid missions, and how efforts can be concentrated to improve the efficiency and effectiveness of future operations.

Secondly, in terms of policy recommendations, it is believed that this study will provide practitioners with relevant policy changes befitting the adoption of collaborative FA. For example, possible policy considerations in relations to this may include regulation changes to reduce bureaucracy or promote an exemption from paying certain product/service tax that could increase the price of supplies of collaborative FA. In addition, the policy recommendations may include improvement on managerial approach to collaborative FA implementation such as documentation process and information sharing with its partners.

## **1.8 Limitation of the Study**

All research are flawed to some extent (Standing 2012). However, each study needs to minimize its limitation to ensure the credibility of its content and novelty. The relevant case studies to be performed are premised on collaborative FA practice in a single Southeast Asian country. Despite this, the subject of the study, the collaborative FA is seen as feasible solution and motivation for the involvement of small scaled supplier generally in the disaster locality, for the supply of humanitarian aid. Hence, despite the limitation, the prospect of investigating this under pretext research problem presents strategic opportunity in increasing understanding on collaborative FA' use.

## **1.9 Structure of the Thesis**

The format of the thesis adopts case study reporting style as advocated by Golde-Biddle and Locke (1997); Yin (2003) and Pan and Tan (2011). However, instead of six standard chapters, this study is presented in seven chapters to enumerate more logical flow and comprehensibility. The order of the chapters are as follows:

***Chapter 1 - Introduction to the Study:*** This chapter introduces the complexity of procurement and supply of humanitarian aid, the background information of the phenomenon - collaborative FA and its benefits, and the associated problem area. Next, the purpose of the study highlights the aims constructed to address the identified gaps, followed by a section of research questions that correspond to the purpose of the study. This chapter also includes an overview of the chosen methodology to provide empirical support for the research questions and ultimately addressing the main aim of the study. Lastly, this chapter will include the expected incremental insight for theory development, and on its practical use for academia and practitioners.

***Chapter 2 - Literature Review:*** The Literature review/analysis chapter provides a broad picture of the humanitarian aid and disaster SCM management, in which key terms and concepts such as disaster responses, uncertainty and flexibility, supply chain dynamics comprising lean, agile and leagile strategies, and SCM measurement indicators of cost, quality, flexibility and timeline are explained. Equally important is that the literature reviews points to the adopted theoretical lens and underlying theories to explain the present phenomena, the key constructs and how it could be measured

and identifies potential proposition of the study. A range of journal articles, books, press release, websites and conference proceedings will be explored for this chapter.

***Chapter 3 – Research Design (Conceptual Framework, Goals and Research Questions):*** Chapter 3 and 4 is essentially the Research Design Chapter and are the additional of the chapters from the norm of six chapter thesis. The idea to add this chapter is to provide better clarity in the discussion and to provide detail description of the approach of the overall study that includes the ontology and epistemology perspective, the conceptualisation perspective, research questions, and, propositions of the study. Chiefly, this chapter represents the nucleus of the study.

***Chapter 4 – Research Design (Method and Validity):*** This chapter provides the justification for adopting using case study, and the sampling logic, methods, design and data collection phases. The selection of mix-method approach, explanatory investigation, and description of how this study utilises the instruments comprising quantitative analytical hierarchy procedures (AHP), and qualitative data such as interviews, observation and secondary data are explained. In addition, the chapter also details out data analysis techniques, and its validation approaches. Finally, this chapter also highlight steps taken to ensure quality and rigour of the study.

***Chapter 5 - Data Collected, Analysis and Results:*** This chapter provides a full description of the case background, data collection process and outcome from the technique comprising AHP, narrative and content analysis of interviews, observation and documentary evidence presented in graphs and tables to enhance readability. This will be followed by replication logic analysis steps. This chapter is expected to highlight concepts and the corroborating evidence for the constructs of the study.

***Chapter 6 - Discussion:*** Once the results are known, detail discussions of the key findings linked to the relevant research questions are addressed in this chapter. Presentation of the re-defined conceptual framework, its concepts relationship and approving/disapproving the proposition will be an essential part of this chapter. Next, the explanation of how the existing literature corroborates or differs from the conceptual framework for analytical generalisation of the study. The most important step is the synthetization of the construct's associations, which explains how the study extends or differs to and from the theoretical lens.

***Chapter 7 - Conclusion:*** This conclusion chapter reviews the substance of the study, the RQs, and, the inter-links of the concepts and theory. This is then followed by a discussion of the implication of the study, in terms of contribution to theory and knowledge, and practise and policy. Next is acknowledging the limitation of this research and based on the identified limitation is the suggestion for future research is done. The study finally concludes.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction to Humanitarian Aid SCM

Humanitarian supply chain management is defined as ‘the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods, materials, and money as well as related information from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people’ (Thomas and Kopczak 2005). Humanitarian logistics and supply chain management study have been on the uprise due to the complexity and challenges of disaster relief activities, attributed to the growing numbers of disasters. Authors, (Tatham and Christopher 2014, 1) describes the importance of why logistician role are focussed in this instance:

be in the context of a rapid or slow onset disaster or emergency – the imperative is to procure and move the required material (water, food, shelter, clothing, medicines, etc.) from point A to point B in the most efficient and effective way possible. But although simply stated, the reality is hugely complicated and indeed, costly – not least because of the difficulty of forecasting when and where the next crisis will occur.

Despite its lack of focus in recent studies, the role of procurement as an enabler to the supply chain management is not to be underestimated. In fact, procurement activities account for 65% of expenditure within disaster relief logistics (Blecken and Hellingrath 2008). For instance, humanitarian relief and aid organizations procured an estimated US\$50 billion worth of goods and services from local and international suppliers while the UN increased its procurement by around 40% between 1996 and 2000 (Taupiac 2001). Hence, recent scholarly works also focus on relief efforts in gearing for procurement and delivering these supplies promptly.

In addition to this, with resource restriction and scarcity of donors, and government funding, relief organizations are expected to raise their bar on efficiency, effectiveness, and transparency. These are ‘value for money’ concepts and have been instrumental in the promotion of improvement to humanitarian supply chain management (Blansjaar and Stephens 2014).

The stakes are high (often life and –death) as the demand is unreliable. Apart from the incomplete supply and transportation information, Beamon (2004) argues that active performance measurement systems are lacking. Part of the reason for such complexity rests on the fact that HROs’ procurement and supply management are different from most commercial or public procurement because disasters are unpredictable and that uncertainty in these cases rules out exact forecasting procedures commonly prescribed in the latter’s procurement. For example, Taupiac (2001) indicated that in the humanitarian relief procurement process emphasis are placed on speed and availability in order to save lives; therefore, it also tends to be fairly expensive since quick delivery is the main concern. Jahre, Jensen, and Listou (2009) point that one major challenge to humanitarian logistician is the striking the balance between the ability to quickly respond versus the need to be cost efficient when in crisis.

In addition, there are also other issues associated with disaster relief, for example, quality of product and services, and flexibility especially concerning how supply fits the gradual intensity of a multi-stage on-set disaster. As an example of the former, based on the evaluation of 1994 Rwanda crisis, the report concluded that there were estimated 100,000 avoidable death. However, the fatalities occurred as a direct reason for poor performance of disaster relief agency which included lack of standards and weak systems of accountability (ODI 1995)<sup>1</sup>. In describing the importance of quality, Larson (2014) elaborates that while poor quality in the commercial realm can mean the loss of sales, poor humanitarian service quality e.g. long delivery times, dirty water or expired medicine, can mean lost lives.

Disasters are complex and present challenges for relief effort feasibility if the response is not dynamic with stagnant organisation structure. These includes the disaster relief agency’s ability to handle fluctuation of unpredictable demand and ability to supply to alleviate suffering, to manage a complex coordination of supply network, to share information and limitation in funding as well as resources. Thus, to be able to respond to these set of challenges, a conventional system may be unreliable. By being robust and bridging the gap, this can be achieved through contract management, cooperation, ingenuity, and flexible approach (Moore, Carvalho and Taylor 2014).

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<sup>1</sup> ODI is known as UK’s think tank on international development and humanitarian issues, especially with regards to policy and practise that lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods in developing countries.

## **2.2 Humanitarian Relief and Responses**

The section highlights the definitions of disaster and describes associated relief activities, responses stages and the related risk management.

### **2.2.1 Definition**

Disaster is defined as “a sudden, calamitous event that seriously disrupts the functioning of community or society and causes human, material, and economic or environmental losses that exceed the community’s or society ability to cope using its own resources” International Federation of Red Cross (IFRC) adopted by Natarajathinam, Capar, and Narayanan (2009, 537). IFRC classifies disasters into five main categories: natural (e.g. drought), hydro-meteorological (e.g. floods), technical (e.g. industrial accidents such as a chemical explosion, nuclear explosion and accidental release of some hazardous material), geological (e.g. earthquakes) and human-related (e.g. epidemics and population movement). For simplicity, disasters are classified as either man-made; major wars, industrial incidents, terrorist acts which include the hazards of Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) or natural disasters; floods, wildfires, storms, volcanic eruption, earthquake and landslides.

### **2.2.2 Natural Disaster and Humanitarian Aid**

Thomas and Kopczak (2005) argue that the occurrence and impact of natural disasters are expected to greatly increase in the future. For instance, the United Nations Office for Disaster Risk Reduction (UNISDR)<sup>2</sup> reports that from 2010 to 2012, disaster has cost USD 1.7 trillion in damages, affected 2.9 billion people and killed a staggering 1.2 million people (UNISDR 2013b). The frequency of natural disasters has increased from approximately 60 per year to a surging 310 (UNISDR 2013a) and this is expected to increase five-fold in the next 50 years (Thomas and Kopczak 2005). To date, approximately 94% of major natural disasters occurred in developing countries (World

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<sup>2</sup> UNISDR is a dedicated secretariat to facilitate the implementation of International Strategy for Disaster Reduction (ISDR) and is mandated by the UN General Assembly. The secretariat coordinates international efforts in disaster risk reduction, guide, monitor and report the implementation of the Hyogo Framework of Action.

Bank 2001). UNISDR (2013a) also reports that flood is the highest frequency natural disaster, recording 40% of the world disaster statistics in 2012 with 64% of people killed in that year being from Asia. This puts the importance of the humanitarian relief function into context, commonly involving the intervention of the individual country's disaster relief agencies with the assistance of International Humanitarian Organisation (IHO) and local disaster relief, both government and non-governmental organisations (NGOs). The HROs function involves preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance (Thomas and Kopczak 2005).

### **2.2.3 Disaster Stages and Responses**

Tatham and Houghton (2011) cites Safran (2005) disaster management cycle in explaining the humanitarian context of cyclical nature of disaster preparation and response. Generically as reflected in Figure 2.1, the disaster management cycle is divided into three categories: prevention phase; transition phase; and lastly the recovery phase. Firstly, the prevention phase, the steps include adequate contingency planning designed to prevent, mitigate and increased preparedness.<sup>3</sup> According to UNHCR, without adequate contingency planning, managing disaster will not be systematic can be costly which may result in loss of unnecessary lives, as well as duplication of efforts and wastages of resources (Buatsi and Mbohwa 2014). Next, in the transition phase, which involves an immediate impact of the disaster, the disaster relief agencies will have generally managed to organize necessary resources to rescue such people that can be rescued and to provide the initial support (comprises food, water, and shelter) for the survivors (Tatham and Kovacs 2007). The final stage, which is the recovering phase, the aim is “build back better”, which means to improve the lives of those affected by the disaster and to learn from present impact for a better future disaster management (Tatham and Houghton 2011). However, this research entails a closer look on emergency preparedness on supply positioning which includes a pre-disaster and post-disaster phase.

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<sup>3</sup> Contingency planning is defined as a forward planning process, in a state of uncertainty, in which scenarios and objectives are agreed, managerial and technical actions defined, and potential response systems put in place in order to prevent, better respond to, an emergency critical situation.

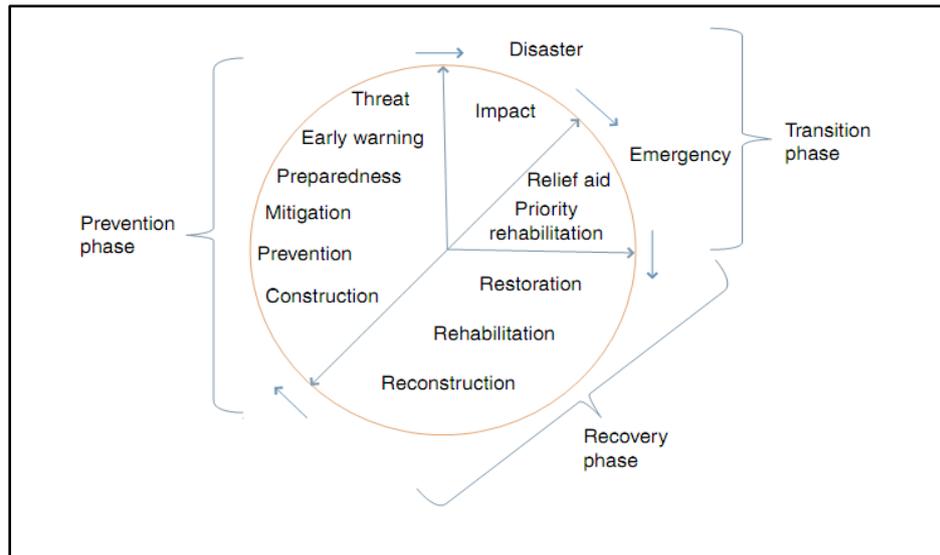


Figure 2. 1: The Disaster Management Cycle

Source: Safran (2005, 22)

The interest of this study is on prevention and transition phase. The former occurs in pre-disaster period as the HROs adopt either a proactive or contingency strategy as response mechanism. In contrast, during transition phase, HROs is faced with rising in demand and there is little use of new solution. A summary of the disaster responses and supply scenario is presented in Table 2.1.

Table 2.1: Phases of Disaster Management and Responses (Pre and On-set Scenario)

Disaster Occurrences	Phases	Supply Scenario	Reference
Pre-disaster	Preparation	Proactive Strategies: <ul style="list-style-type: none"> <li>Reduce vulnerability of disruptions</li> </ul> Contingency planning: <ul style="list-style-type: none"> <li>Ex-ante (proactive) and ex-post (reactive) procurement and supply</li> </ul>	(Stecke and Kumar 2009; Lu, Goh and Souza 2014)  (Chakravarty 2011)
On-set	Response	Reactive Response: <ul style="list-style-type: none"> <li>Estimate number of victims, required resources, and good and services required</li> <li>Deployment of working party</li> <li>Deployment of supplies and services</li> <li>Creation new supply chain</li> </ul>	Tomasini and Wassenhove (2009)  (Lu, Goh and Souza 2014).

## 2.2.4 Disaster Response and Risk Mitigation Strategies

In their discussion risk mitigating strategy, Stecke and Kumar (2009) classify risk mitigation strategies for disruption of supply chain vulnerabilities as proactive, advance-warning and coping. Actors of HROs aim at reducing the vulnerability and probability of disruption in a proactive approach through forecasting, purchasing and storing at strategic bases to mitigate effect of disruption in the supply chain through upon building ex-ante capacity (Knemeyer, Zinn and Eroglu 2009). However, the risk of redundancy and leftovers are high if the forecasted disaster occurrence is less than predicted. In contrast, HROs that adopt reactive measures face the risk of high procurement cost due to emergency purchases and additional cost that is factored by the supplier such as labour and transportation (Chakravarty 2011). Since both proactive and reactive response are essential to saving lives, scholars have advocated a hybrid approach known as contingent response. Contingency response is proactive during commencement of disaster, and activates itself into a reactive response if the disaster intensity exceeds a certain threshold (Craighead et al. 2007). The association of the responses and mitigating strategies is shown in Figure 2.2.

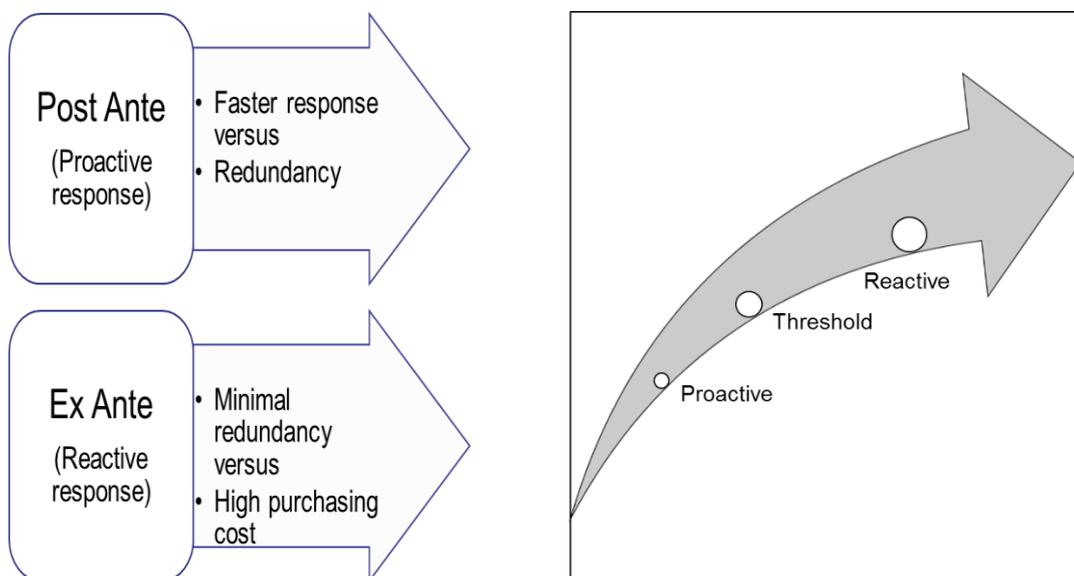


Figure 2. 2: Summary of Association between Disaster Response, Associated Risk and Mitigation

Source: (Craighead et al. 2007); Chakravarty 2011)

The onset of business trends such as reduction of suppliers, lead time, inventory, and product life cycle, as well as the increased use of outsourcing on long global supply chains, has increased the risk in supply chains, making them more vulnerable to the crisis (Norman and Jansson 2004). In addition, Natarajarathinam, Capar, and Narayanan (2009, 536) explain that several instances include natural disaster like hurricane Floyd that flooded Daimler-Chrysler plant in Greenville in 1999. Hence, the authors concludes that these disaster occurrences have led to a rise in research on supply chain disaster management (Sheffi 2001; Martha and Subakrishna 2002; Monahan, Laudicina and Attis 2003; Hale and Moberg 2005; Norman and Jansson 2004; Natarajarathinam, Capar and Narayanan 2009).

### **2.3 Supply Chain Management**

This section explores SCM concepts of lean and agile strategy as performance measurement, owing to the lack of in the procurement, and supply of HROs in disaster relief activity.

#### **2.3.1 Definition**

Supply Chain Management (SCM) is the flow of materials through procurement, manufacture, distribution, sale, and disposal, together with the associated transport and storage (Lysons and Farrington 2006). Whilst, humanitarian logistic is defined as the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people. The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance.

Humanitarian logistic is an under-explored area in research and practice (Jahre, Jensen and Listou 2009). The understanding that logistics accounts for some 80% of disaster relief operations affirms its critical role in saving lives and improving living conditions. The authors described that with the increased numbers of natural and man-made disasters, organizations face challenges in the limitation of trained logistician and technology systems, which according to Thomas and Kopczak (2005) only a handful

aid agencies have reacted to produce an advanced logistics and supply chain operations, so far.

Larson (2014) differentiates business logistics to humanitarian logistics by indicating that business logistics seek to achieve profit, whilst a humanitarian logistics seek social impact and face a greater challenge in working with diverse group of stakeholders as well as coordinating aid agency, supplier, and local/regional actors. The logistical function involved in the operations of the responding humanitarian or peacekeeping intervention includes pool transportation, procurement, inventory, and distribution, before, during and after the crisis.

SCM supports the role of logistics in the humanitarian role so that their actions become not only fast, but agile and efficient (Merminod, Nollet and Pache 2014). Therefore, efficient relief supply chains are critical and SCM and logistics serve as a link between better disaster preparedness and response, between procurement and distribution, and between headquarters and the field (Thomas 2004). Disaster relief requires an establishment of a temporary SCM due to its nature; therefore, the response is tailored to meet such requirement through strategies common to fast moving item supplies.

### **2.3.2 SCM Priority Focus Area**

SCM is perceived as an emergent academic as well as in practise. Analyst argues SCM is about influencing behaviour in particular directions and in particular ways (Storey 2007) and for it to mature as a discipline, progress is vital in the illuminating domain of theory and practise in which theirs could be a possible gain by reconceptualizing it in a particular way. For example, Harland (1999) suggests SCM to a wider definition as ‘supply strategy’, which includes operation management, purchasing, and supply management, industrial relationship marketing and service management. Meanwhile, Storey (2007) described an idealised supply management characteristic as summarised in Table 2.2:

Table 2.2: Summary of Supply Management Characteristics

Supply management characteristics	Seamless flow from initial source (s) to final customer
	Demand-led supply chain (only produce what is pulled through)
	Shared information across the whole chain (end to end pipe visibility)
	Collaboration and partnership (mutual gains and added value for all, win-win; joint-learning and joint design and development)
	IT enabled
	All product direct to shelf
	Batch/pack size configured to rate of sale
	Customer responsiveness
	Agile and lean
	Mass customization
	Market segmentation

Source: Storey (2007)

Studies on SCM literature generally narrate between description, prescription and trend identification. More recent studies in SCM have suggest there is a growing trend in the following area:

- (a) Promoting collaboration rather than competitiveness  
(Storey et al. 2006; Matthyssens and Bulte 1994; Carr 1999) via rationalisation of supplier networks and the development of “collaborative” or “partnership” relationship between buyers and suppliers (Balakrishnan 2004);
- (b) Concerns the impact of SCM to various functions such as purchasing (Storey 2007, (Andersen and Rask 2003; Wisner and Tan 2000), which promotes the lean supply approach (Lamming 1996) in providing more merit into the SCM horizon;
- (c) Promoting agility, a flexible approach when dealing with uncertainty of market demand by managing fragmentation and variety of products/service offering through decoupling points and postponement of final product;
- (d) SCM differentiation techniques such “Quick Response” (QR) and “Efficient Consumer Response” (ECR) and;

- (e) Promoting contingent method rather than best practise approach, in fitting supply chain characteristic to product strategy (Storey et al. 2006).

### **2.3.3 SCM Complexities and Strategy**

This section characterises SCM complexities based on uncertainty, risk and the adopted coping mechanism, and moving forward, the strategies as discussed in the literatures include flexibility, buyer-supplier collaboration and the SCM coordination contracts.

#### **2.3.3.1 Uncertainty**

Uncertainty was defined as a lack of information about future events, so that alternatives and their outcomes are unpredictable and, the ability to deal with the these uncertainties for adequate task performance is referred as coping (Hickson et al. 1971). The authors went on describing coping with uncertainty by prevention, forecasting, by uncertainty, by information (by forecasting), and by absorption (action after the meet) Knight (1921), amongst the pioneer in defining risk, distinguished uncertainty (unknown risk) from risk (known risk), where the latter was referred as measurable uncertainty where probability of different outcomes is known. Rowe (1994) categorised uncertainty into four dimensions: temporal (uncertainty in future and past states); structural (uncertainty due to complexity), metrical (uncertainty in measurement) and translational (uncertainty in explaining results and communication).

Uncertainty exists in many forms which also includes current economic and global environment, diseases or even a bomb threat. Uncertainty affects the internal and external business environment in which firms compete and change continuously. Davis (1993) identified uncertainty as a major influence on the behaviour of an SCM especially because it is not adequately handled by managers. He identified supplier performance, manufacturing process, and customer demand as sources of uncertainty. Alderson (1957) suggested flexibility as a response to demand uncertainties. Traditional approaches to strategy under uncertainty have been argued to be downright dangerous (Courtney et al 1997), which means that flexibility is a necessary part of the game.

### 2.3.3.2 Strategies for Dealing with Uncertainty

Authors in the past have suggested that organizations cope with uncertainty by creating certain parts specifically to deal with it, specializing other parts in operating under conditions of certainty, or near uncertainty (Cyert and March 1963; Thompson 1967; Hickson et al. 1971). In dealing with uncertainty, this study focuses on three frequently cited strategies commonly referred in SCM and disaster management field: (1) flexibility; (2) buyer-supplier collaboration; and (3) SCM coordination contracts.

#### *Flexibility*

Flexibility is an adaptive response to environmental uncertainty (Gerwin 1993). Some authors conclude that the best form of response strategy to uncertainties in manufacturing are flexibility and agility (Chandra and Grabis 2009; Jeeva and Dickie 2009; Wadhwa, Mishra and Saxena 2007). Commonly prescribed in manufacturing, flexibility makes the most sense if the business strategy is focused on producing high variety products. Gerwin (1993) argues that a strategic perspective of manufacturing flexibility as having six dimensions of flexibility: mix, changeover, modification, volume, re-routing and material flexibility. Moving in onto SCM perspective, Stevenson and Spring (2007) argue that flexible supply chains are able to adapt effectively to disruptions in supply whilst maintaining customer service levels.

Beamon (1999) argues that an uncertain environment requires vital supply chain flexibility, consisting of operations, logistics, information, network, and suppliers. However, supply chain flexibility is complex and multi-dimensional as argued by Garavelli (2003). Meanwhile, Jeeva and Dickie (2009) suggest that conflicting objectives of supply chain entities may result delays, excessive or lack of inventories, uncertainties in production capacity/capability, distribution problems, wasted resources, and poor service to customers. Hence, the present trend of studies focuses on the mechanism to deal with complexity.

For example, Li and Qi (2008) suggest in a framework to assess supply chain flexibility that its robustness, self-adaptability, and network alignment are important factors. One significant finding on supply chain flexibility is that procurement

flexibility itself can lead to a better supply chain performance (Aprille, Garavelli and Giannocarro 2005). Meanwhile, Jeeva and Dickie (2009) emphasize that procurement flexibility provides the ability to strategically respond to changing internal and external environments to ensure sourcing, purchasing and supplies are continuous in order to sustain the value adding process.

Flexibility itself is measured by the importance of volume flexibility (preventing stock outage when demand surges), modification flexibility (enabling a high variety and customization of product) and technological flexibility (presenting opportunities for new product development) (Drake, Lee and Hussain 2013). The measurement of degree the strategic nature of flexibility could be used in determining a relationship performance in terms of speed, quality, quantity, and cost. In addition to this, some authors also view that a flexibility model in supply chain should consist of internal flexibility elements such as behaviour, and external flexibility elements (based on customer's visibility) which are the actual perceived performance (Oke 2005).

### ***Collaboration between Buyers and Suppliers***

There are considerable SCM studies that focuses on understanding dyadic relationship of buyer and supplier. In essence, there are two types of relationship widely acknowledged: Firstly, a loose relationship, which was characterized by vertical contracting and arms' length relationship; and secondly, tight relationship or traditional contract, which encourages collaboration and horizontal sharing of resources between partners, service-based professionalism, stakeholder orientated softer management approach (Waring, Currie and Bishop 2014; Greve and Hodge 2005; Krause 2014). In relation to this, Kovács and Spens (2007) introduce the information sharing concept from to the study of humanitarian aid.

Strategic collaboration is critical for SCM success, especially in entity relationships (Burnes and New 1997). It provides risk sharing and synergy by using external stakeholders' expertise and specialised skills. Alliances also fail because of inter-partner diversity. Strategic partnerships can be enhanced by integrating more organisation within the upstream supply channel to improve quality and operating efficiencies. The increasing involvement of the third party carries additional opportunities for cost savings, service improvement, and increased utilisation of

resources such as labour and equipment for both partners. In this sense, SCM activities must be able to adapt to changing strategic collaboration relationships while maintaining flexibility.

### ***SCM Coordination Contracts***

Cachon (2003) suggests that to achieve an optimal supply chain performance, firms need to coordinate by contracting a set of transfer payments that ensure each firm's objective becomes aligned with the overall supply chain objective. This is possible with the following conditions: a supply chain coordinated contract resulting in the actions of such chain performing in a "Nash equilibrium"; contracts having sufficient flexibility, by adjusting parameters, to allow for any division of the supply chain's profit among the firms; and finally, identifying and managing which contracts are worth adopting. In support of this, Cachon (2003) suggests that there is five supply chain coordinating contracts; wholesale-price, buyback, revenue-sharing, quantity flexibility, and rebate.

The author also recognises and defines an "option contract" as a combination of buyback and quantity-flexible contracts. Each of these contracts is well defined: *wholesale* as charges per unit with possibility of an infinite horizon extension, where inventory is not salvaged and orders are delivered before sales with a prospect of additional order; *buyback*, closely aligns to return policy however distinguished by salvage value difference between buyer and seller; *revenue-sharing* where the supplier charges per unit purchased and the retailer gives the supplier a percentage of his revenue; *quantity-flexibility*, in which the supplier compensates the retailer for his losses on unsold units through a credit note issuance; and finally, *sales-rebate contracts* where the suppliers gives retailers a rebate on units sold above a threshold. The mechanism used to evaluate which contracts coordinate supply chain is based on risk neutrality, administrating cost, parameter negotiation and the compliance regime, either a voluntarily or forced compliance.

### **2.3.4 Performance Measurement of SCM: Lean, Agile and Leagile Lens**

This section explains the evolution of SCM performance measurement indicator to adoption of performance concepts such as lean, agile, leagile, and, rationalise its usage

for the procurement<sup>4</sup> and supply for humanitarian aid. The performance measurement tool also complements the measurement for FA, as discussed in Section 2.5.

#### **2.3.4.1 The Evolution of Performance Measurement in SCM**

Morgan (2007) describes the development of performance measurement to at least five identifiable phases of evolution. Firstly, before the year 1900, performance measurement was dominated by transaction cost and profit determination based on the traditional “buy-cheap-sell dear-make profit” perspective. Secondly, in the years of 1900 up to 1970, performance enhanced to include operations and value adding principles. At the centre of this era was the efficient resource utilisation as competitions and new product/services developed and measurement were centred on the work-time measure to define, predict and standardise work systems for manufacturing organizations. Thirdly, for the period of from 1970 onwards to 1990, performance measurement included process, quality, and customers focus. This was an era where quality revolution was the spotlight and process improvement driven by quality which included process matching to customer requirement, design quality, capability of the standard required, and the era of principle and achievement of continuous improvement.

Fourthly, after the year 1990 to year 2000, performance measurement was enhanced to give a balanced view of the organisation. This was known as the “lean” decade thriving from the just-in-time manufacturing era of the 1980s. In this phase, lean was achieved through cost reductions enabled by thorough information systems which led to refinement and integration of resource and cost management. Next, for the fifth and current phase after the year 2000, is the dawn of the “Agile” systems in which flexibility and integrated supply chains are the key enablers. In short, the performance measurement exploration reflects the emergence of the lean and agile era. There has been a steady growth of studies employing the term lean and agile, however more efforts are needed to understand its role in performance measurement for supply chains.

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<sup>4</sup> SCM represents both the supply side (purchasing and supply management) and demand side (physical distribution management).

### 2.3.4.2 Lean and agile concept

The term lean stemmed owing to the rise of automobile industry (Womack, Jones and Roos 1990). According to Naylor, Naim, and Berry (1999), in the manufacturing context, lean states all non-value adding activities or made, must be eliminated. Whilst, in an agile manufacturing, a high level of rapid reconfiguration is emphasized. The authors argued that lean and agile paradigms differ most importantly in their emphasis on flexibility for market responsiveness. In the supply chain context, Naylor, Naim, and Berry (1999) rate essential characteristics between lean and agile and conclude that lean supply system seeks optimization, whereas agile systems seek responsiveness. Whilst in terms of product and demand, lean comprises a predictable demand, low variety, and short product life cycle as oppose to agile with low product demand, high on variety and usually are long life cycle type of products. The various strategic supply chain approaches are dependent upon the combination of supply/demand characteristics as shown in Table 2.3.

Table 2.3: Strategic SC Approaches based on Supply/ Demand Characteristics

Strategic approaches	Supply characteristics		Demand characteristics	
	Short lead times	Long lead times	Predictable	Unpredictable
<b>Kanban</b> -continuous replenishment	√		√	
<b>Lean</b> -plan and optimise		√	√	
<b>Agile</b> -quick response	√			√
<b>Hybrid</b> -Decouple (postponement)		√		√

Source: Christopher (2005)

Following this, Christopher (2005) suggests that an agile supply chain is contingent upon the following rules:

- Communication about the situation to partners;
- Creation of a net with suppliers;
- Postponement projection;
- Low-cost stock;
- Construction of a dependable logistics system through the creation of a stable net with 3PLs; and,
- Formation of a team to implement the emergency plan.

### 2.3.4.3 Determining lean or/and agile approach

It could be argued that tension exist between lean and agile philosophies. There are three general positions on lean and agile philosophies, with general understanding that both addresses the same competitive priorities (cost, quality, service, flexibility): (1) lean and agile as mutually exclusive; (2) lean or agile as mutually support strategies; and (3) leanness must be precursor to agility (Krishnamurthy and Yauch 2007; Goldsby, Griffis and Roath 2006; Jin-Hai, Anderson and Harrison 2003; Gunasekaran, Lai and Cheng 2008). In addition, Morgan (2007) in citing the work of authors (Harrison and Van Hoek 2005) as shown in Table 2.4, questions the details of what is to be measured when a lean system is supplying in an agile system. Whether the strategic target is lean, or agile, the performance measurement system is essentially the same and that is to give managers the information they need to manage the resources at their disposal profitability and responsibility.

Table 2.4: Comparison of Characteristic of Lean and Agile Supply

<b>Characteristic</b>	<b>Lean</b>	<b>Agile</b>
<b>Logistics focus</b>	Eliminate waste	Customers and markets
<b>Partnerships</b>	Long term, stable	Fluid clusters
<b>Key measures</b>	Output measure such as productivity and cost	Measure capabilities and focus on customer satisfaction
<b>Process focus</b>	Work standardisation, conformance to standards	Focus on operator self-management to maximise autonomy
<b>Logistic planning</b>	Stable, fixed periods	Instantaneous response

Source: (Harrison and Van Hoek 2005)

### 2.3.4.4 From lean, agile to hybrid perspective of leagile

Present literature concentrates on emerging lean and agile to have the best of both worlds through a hybrid supply chain know as Leagility. Leagility, a combination of both lean and agile, is a hybrid supply chain strategy, and one gaining considerable support and understanding. As pointed by Alderson (1957), cited in Jahre, Jensen, and

Listou (2009) pg. 1014, one strategy to reduce risk-uncertainty cost is to postpone the differentiation of goods; that is to delay value-adding activities. This maximises flexibility in the face of demand uncertainties. Naylor, Naim, and Berry (1999) refer this as the process of upstream of the decoupling point (postponement) and characterised as lean and those downstream as agile.

Mangan, Lalwani, and Butcher (2008) suggest that leagility in situations in which replenishment lead time is long and demand is unpredictable. The inventory is held in a generic form and configured only when the precise customer requirement is known (Christopher and Towill 2001), as shown in Figure 2.3. Another variation in the application of leagility is the type of product. For example, Vonderembse et al. (2006) show that a standard product may benefit from adaptation of a lean supply chain throughout its life cycle, while an innovative product during infancy stage and finally, leagile during maturity.

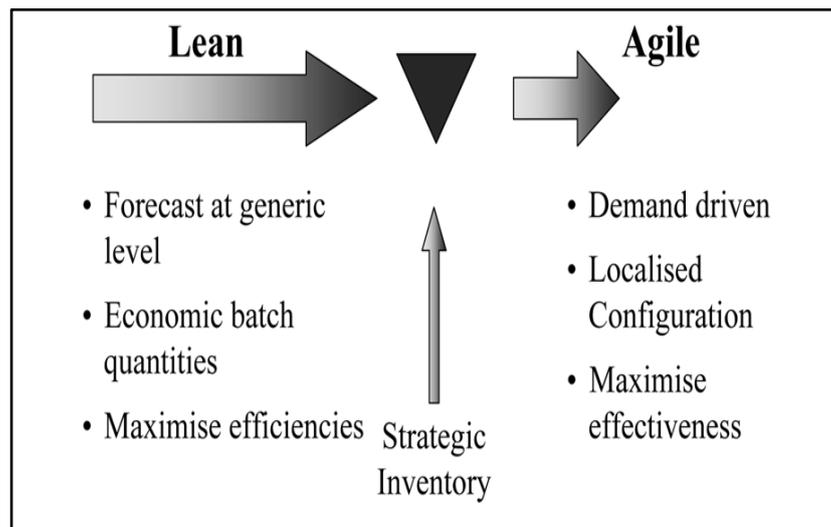


Figure 2. 3: The Decoupling Point

Source: Christopher and Towill (2001)

‘Postponement’ in manufacturing is generally applied through re-designing of the product, and the form and identity of the product are held at an aggregated level for as long as possible. However in logistics, postponement requires that forward movement that is delayed in time with the aim of finding the best location for the de-coupling point, which for a given service level, minimises the cost of inventory handling and increases the scale of economies in manufacturing (Jahre, Jensen and Listou 2009).

Meanwhile, Gaudenzi and Christopher (2015) provided a practical guidance of the most relevant drivers of agility and leagility, and practical insights about agility and leagility in different sectors as shown in Tables 2.5 to 2.6. Notably, the authors emphasize that the potential ways of combining lean and agile vary significantly among industry and correspondingly of its leagility drivers. This study observes and recognises that at the time of this review, there is a lack of studies and practical insights demonstrating how leagility can be implemented in humanitarian relief supply chain, and in particular in identifying the potential drivers.

*Current body of knowledge lacks of case studies and practical insights demonstrating leagility as potential drivers in humanitarian relief supply chain*

Table 2. 5: Drivers of Agility and Leagility

<b>Divers of leagility</b>	<b>Contributions in the literature</b>
Designing modular solutions (outcomes)	Browning and Heath (2009) Hellström and Wikström (2005); Fisher (1997)
Flexible manufacturing (operations)	Inman et al. (2011), (Lee 2004), Narasimhan, Swink, and Kim (2006)
R&D Demand planning orientation (operations)	Yunsook and Hartley (2011), Metes, Gundry, and Brandish (1998)
Multiple sources in procurement operations	Azadegan et al. (2013), Goldsby, Griffis, and Roath (2006)
Virtual enterprises/cross functional teamwork (internal organisation/network)	Cao and Dowlatshahi (2005), Shah and Ward (2003), Sahin (2000), Segerstedt and Oloffsson (2010)
De-coupling point between lean processes and agile business unit (operation/network)	Krishnamurthy and Yauch (2007), Wikner and Rudberg (2005)
Cooperation with partners (network)	Goldman and Nagel (1993), Jin-Hai, Anderson, and Harrison (2003)
Vertical integration (network)	Briscoe and Dainty (2005)
Project Management orientation	Gaudenzi and Christopher (2015)

Table 2. 6: Practical Insights about Agility and Leagility in Different Sectors

Sectors	Agility and leagility drivers most described in these sectors	Literature references
Electronics	Flexible manufacturing	Scott et al. (2002)
Automotive	Virtual enterprise/Cross-functional teamwork; Designing modular product solutions	Jayaram, Vickery, and Droge (2008)
Food	De-coupling point	Van der Vorst, Dijk, and Beulens (2001)
Fashion	Virtual enterprise/Cross-functional teamwork	Garcia-Arca and Prado-Prado (2010), Bruce, Daly, and Towers (2004), Brun and Castelli (2008)
Manufacturing -OEM	Flexible manufacturing	Krishnamurthy and Yauch (2007), Inman et al. (2011)
Construction	De-coupling point, strategic alliances	Chen (2012), Briscoe and Dainty (2005) , Segerstedt and Oloffsson (2010)
Chemical	Virtual firms, Designing modular product	Guisinger and Ghorashi (2004)
Telecommunications	PM orientation	Gaudenzi and Christopher (2015)

Source: Adopted from Gaudenzi and Christopher (2015)

### 2.3.5 Lean, Agile and Leagile as Performance Measurement

The combination of lean and agile thinking into the concept of ‘leagility’ is described as an evolution to supply chain (Gaudenzi and Christopher 2015). However, it is noted that the measurement for the hybrid concept of leagile first introduced by Mason-Jones, Naylor, and Towill (2000) presents a real challenge due to the fact that present SCM literature does not fully provide management guidance for its practical implementation (Gaudenzi and Christopher 2015). Nevertheless, one fundamental philosophy of such merger is to provide a link between the goals of agility (the capability to be responsive and flexible market-oriented), low-cost production (the inclusion of minimal wastages) and effective supply chain (Naylor, Naim and Berry 1999). In addition, leagile benefits for an effective and efficient management of internal operations as well as being responsive (Olhager 2003; Narasimhan, Swink and Kim 2006; Olhager, Selldin and Wikner 2006).

As cited previously, the study by Gaudenzi and Christopher (2015) provides a short *tour d’horizon* on leagility in a case study of a telecommunication company and the project management practices as means agility enabler. The study confirms of the

leagile metrics: (1) efficiency based on cost and utilisation of resources, and (2) effectiveness driven by responsiveness and gauged by customer satisfaction. In addition to this, the study also offers another perspective of the typical leagility principles of lean that is focused on variability and standard process in the upstream, and agility focuses on late assembly configured to individual customer requirement at the downstream of the the supply chain. In essence, the study supports that the union of leanness and agility which combines push-and-pull strategies (Gunasekaran and Yusof 2002; Simchi-Levi, Kaminsky and Simchi-Levi 2008), effective and efficient management of internal operations (Olhager 2003; Narasimhan, Swink and Kim 2006), relationship within supply chain (Wikner and Tang 2008), balancing efficiency and responsiveness (Olhager, Selldin and Wikner 2006), and reducing the risk of stock-outs or over-stocks (Gaudenzi and Christopher 2015).

Financial indicators have been traditionally used to assess organization performance. However, as pointed out by Wu, Chuang, and Hsu (2014) that these indicators do not iron out non-financial performance such as quality, and important SCM strategies adopted by the organization, for example by using the classification of SCM strategies with nature of product classification (Fisher 1997, Lee 2002), in which, efficient SC are for functional type product whilst responsive SC for innovative type product. Gaudenzi and Christopher (2015) argue that quality, lead time, cost and service as essential competitive elements for all organizations. In relation to procurement and supply, some the competitive elements mentioned by Gaudenzi and Christopher (2015) have been customised to reflect a more comprehensive approach of a measurement tool. For example, the lean and agile purchasing portfolio modelled by Drake, Lee, and Hussain (2013) has studied how league fits with the assertion of functional and innovative product needing lean and agile supply correspondingly. The supply option is based on two-dimensional impact factors: lean, being impacted by cost and quality; and agile, being impacted by flexibility and time. A summary and taxonomy are presented in Tables 2.7 and 2.8.

Table 2. 7: Two Dimensions of the Lean and Agile Component Model

<b>Factors influencing leanness</b>	<b>Factors influencing agility</b>
<i>Quality factors</i>	<i>Flexibility factors</i>
1. Component durability	1. volume flexibility
2. Component reliability	2. Modification flexibility
3. Component innovation	3. Technological capability
<i>Cost factors</i>	<i>Time factors</i>
1. Purchasing cost	1. Delivery speed
2. Inventory cost	2. Delivery reliability
3. Quality cost	3. Development speed

Adapted from: Drake, Lee, and Hussain (2013)

Table 2. 8: Leanness and Agility Competitive Priorities Measurement Taxonomy

<b>Strategy</b>	<b>Competitive Priorities</b>	<b>Measurement unit</b>	<b>Reference</b>
Leanness	Quality	Durability	(Krause, Pagell and Curkovic 2001)
		Reliability	
		Innovation	(Burt 1989)
	Cost	Purchasing	(Olsen and Ellram 1997)
		Inventory	(Childerhouse and Towill 2000)
Quality		(Pitt and Lei 2000)	
Agility	Flexibility	Volume	(Drake, Lee and Hussain 2013)
		Modification	
		Technology	(Christensen and Bower 1996)
	Time	Delivery speed	(Christopher and Towill 2000)
		Delivery reliability	
		Development speed	

Other measurement tool includes flexibility measures to distinguish lean and agile, includes on Mix Flexibilities and Volume Flexibilities (Naylor, Naim and Berry 1999) and seminal work by Purvis, Gosling, and Naim (2014) to extend flexibilities in lean and agile supply networks through investigation on Vendor Flexibilities and Sourcing Flexibilities. However, as procurement being the case of interest for this study, the portfolio purchasing competitive priorities presents a viable option for selection as a tool in lean and agile determination. A recent model is the lean and agile purchasing portfolio model by Drake, Lee, and Hussain (2013). The purchasing model is for determining purchasing strategy at the component level of products to support business

strategy. The model classifies the product as either functional or innovative to determine their suitability for lean or agile supply. Using two case studies and an Analytical Hierarchy Process (AHP), the study extends the component level to include leagile and non-strategic supply options on the impact of four competitive priorities: cost, quality, time and flexibility as shown in Figure 2.4. The lean and agile purchasing model has its roots from the purchasing portfolio analysis elaborated in the next section.

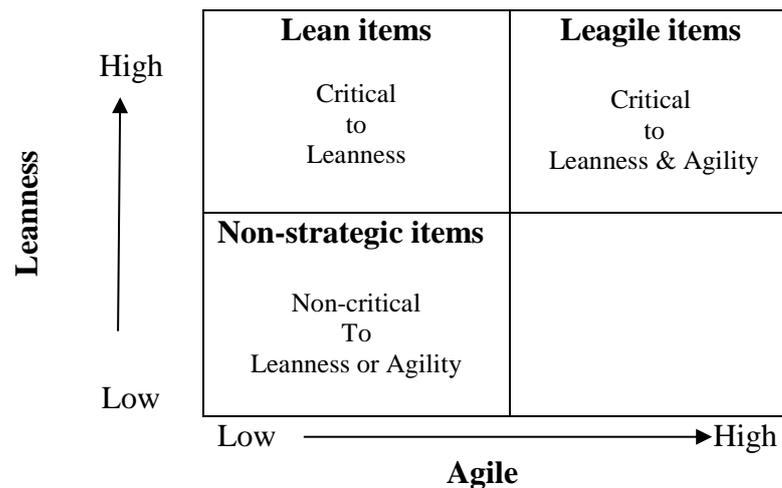


Figure 2. 4: Lean and Agile Purchasing Portfolio Model

Source: Drake, Lee et al. (2013)

### 2.3.5.1 Procurement Perspective: Purchasing portfolio approach

In the previous section, this study introduced the purchasing portfolio model or analysis, focusing on how purchasing strategy is aligned with the product type and the supplier strategy. This section briefly explains the relations of purchasing strategic thrusts in supply chain management and the justification of purchasing portfolio approach, in particular Kraljic's Portfolio Analysis, for multi-dimensional use which includes humanitarian aid.

#### *Purchasing as strategic trust*

Purchasing or procurement is evidently becoming an important concentration in commercial and public sector and closely related to its strategic reorientation. The advantages of closely knitting procurement and its strategic thrust are activities conducted at a lower cost with specialised supplier, the company/agency gaining

flexibility and attention directed to “core business” (Weele 2005). Amongst the range of strategies are lean manufacturing introduced by Womack, Jones, and Roos (1990) and extended by Lamming (1993), the “leveraged purchasing strategy” pioneered by Monczka and Trent (1991); (Monczka and Trent 1992); and, Purchasing Portfolio Analysis originally suggested by Kraljic (1983). This section overviews these three different strategies, and concentrates on purchasing portfolio analysis as a possible option to understand disaster relief items purchasing and supply strategy.

The first strategy, the lean manufacturing strategy is based on Porter (1980) competitive advantage strategy which are cost leadership, differentiation strategy, and focus strategy. Here, the lean concept is about creating competitive strategy by combining low-cost strategy and differentiation strategy. Lean management philosophy originated from the automotive industry and was based on multi-skill work orientation, comprehensive display of information for visibility and quick response, and, total commitment to quality (Womack, Jones and Roos 1990). In contrast, the Japanese automotive industry displayed the concept of lean management by reducing the supply base for parts and regular sharing of information between manufacturer and supplier, supplier with a layer structured of supply chain (include second-tier or more) and involvement of supplier in the early stage of product development and, targets were given to supplier in terms of quality improvement, lead time and cost reduction (Lamming 1993; Lamming 1996). The literatures also acknowledges that in lean management, the purchasing strategy is focused on differentiation strategy and supply management (Weele 2005; Monczka et al. 2011).

The second strategy is the leveraged purchasing strategy that is based on the idea that purchasing and supply management is an important business concern and is managed by following eight steps: (1) Deciding on insourcing or outsourcing; (2) develop commodity strategies, where purchasing is mostly spent; (3) establish and leverage world class supply base; (4) develop and manage supplier relationship based on whether the supplier categories of either a commercial supplier, preferred supplier or supplier partner; (5) integration of suppliers in product development; (6) supplier integration into the order fulfilment process; (7) supplier development and quality management; and, (8) strategic cost management.

The third strategy is based on Kraljic's portfolio analysis (Kraljic 1983). Syson (1992, pg. 213) describes Kraljic's portfolio approach as a breakthrough in the development of professional purchasing, representing the most important single diagnostic and prescriptive tool available to purchasing and supply management. The purchasing portfolio analysis stem on analysing different product groups which require different supplier strategy, and this provides indication for the right purchasing strategy for each product. The analysing of the product group and supplier base on two criteria: firstly, purchasing's impact on company profitability; and secondly, the degree of supply risk associated with the purchase of a specific item. This is then followed by a second analysis of four product categories namely strategic products, leverage products, bottleneck products and normal products. According to Weele (2005), this approach explains that partnership and competitive bidding should be seen as complementing each other, and that the four basic supplier strategies serves different objectives.

***Kraljic's Portfolio Analysis Expansion***

This section discusses in-depth of Kraljic's portfolio approach or matrix (Kraljic 1983), and highlights the advancement made, as well as critique and support for the approach. Kraljic's portfolio approach is illustrated by a 2 x 2 portfolio matrix which classifies product on the basis of two dimensions of profit impact and supply risk ('low' and 'high'), and classification of categories as shown in Figure 2.5.

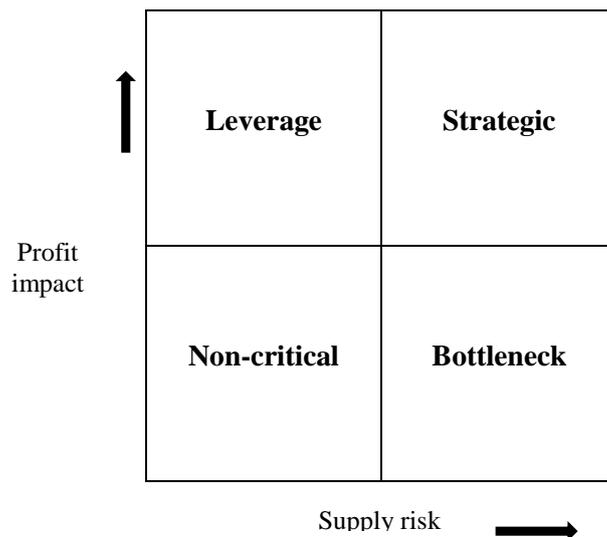


Figure 2. 5: Portfolio Matrix based on Profit Impact and Supply Risk

Source: Kraljic (1983)

Based on Figure 2.5, each of the four categories requires a distinctive approach towards suppliers. Non-critical item requires efficient processing, product standardization, order volume and inventory optimization. Leverage items allows the buying company to exploit its full purchasing power, for instance through tendering, target pricing and product substitution. Bottleneck item causes significant problem and risk which should be handled by volume insurance, vendor control, security of inventories and back up plans. By plotting the buying strengths of the supply market, three basic power positions are identified and associated with three different supplier strategies: balance, exploit and diversify. The general idea of the approach is to minimize supply risk and make the most of buying power (Kraljic 1983, pg. 112; Gelderman and Weele 2003).

In the foreground, initiating from the two steps description of analysing, Figure 2.6 (adapted from Weele 2005) shows the purchasing product portfolio and supplier in two quadrants. Figure 2.6 exhibits the position of the four products which are strategic products, leverage products, bottle neck products and routine products. The position of these types of products are in parallel to the second quadrant which comprise strategic suppliers, leverage suppliers, bottle neck suppliers, and routine suppliers. Each quadrant purchasing portfolios shows of the characteristics leading to its procurement method, and when compare parallel to the supplier quadrant reveals balance of power between the buyer and supplier.

For example, a leverage products is known to have large share of the end product cost price; however, the suppliers are various and switching cost is relatively small. The buyer engages an aggressive sourcing and tendering amongst a sample of prequalified suppliers. The switching cost aspect also means that long-term contract is not practised and element of 'spot purchasing' is also practised. The goal for the buyer under such arrangement is to adopt a multiple sourcing strategy and focusing on buying products at minimum price while maintaining the required quality as well as the continuity of supply. As such, because of the focus is on cost, the quadrant is at far upper left and the procurement strategy is based on based on competitive bidding for a preferred supplier category. Other quadrants' procurement strategy and supplier category is summarised in Table 2.9.

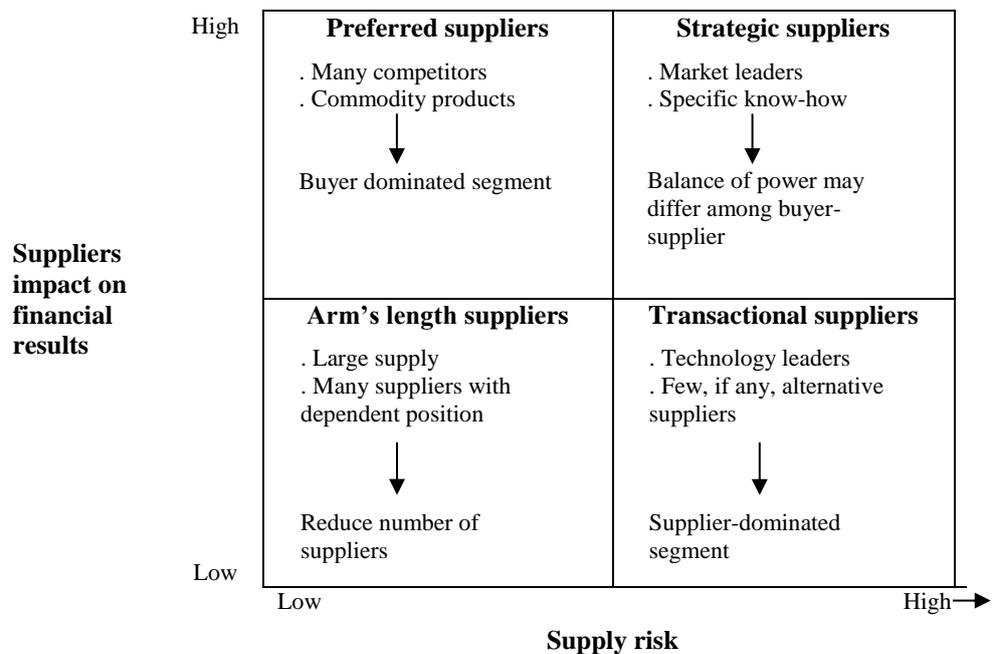
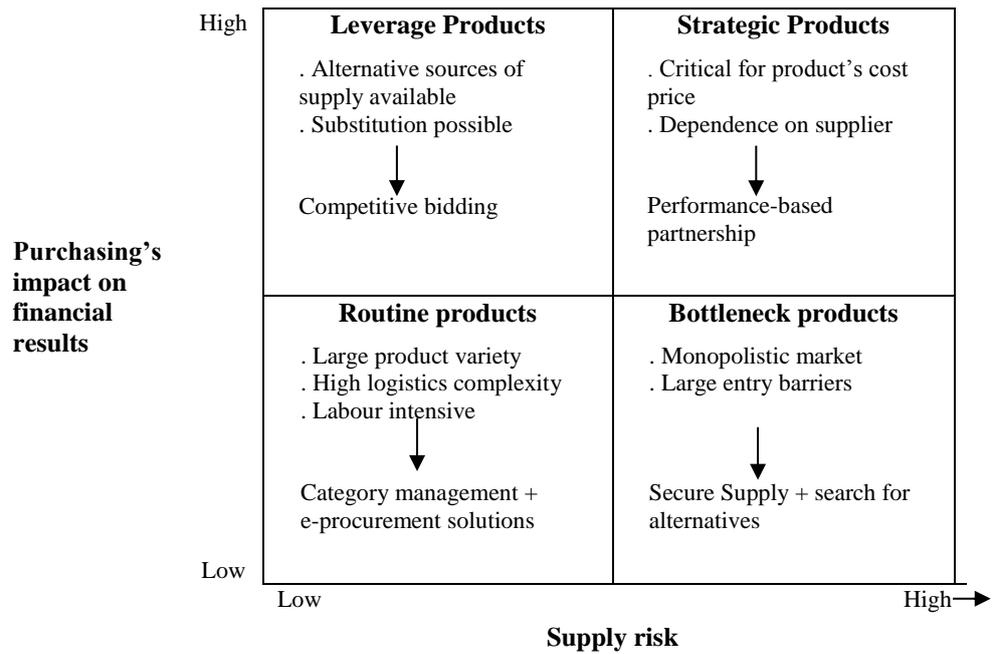


Figure 2. 6: Purchasing Product Portfolio and Supplier Portfolio

Source: Adopted from Weele (2005)

Table 2. 9: Basic Characteristics of the Four Supplier Strategies

<b>Procurement Strategies</b>	<b>Partnership</b>	<b>Competitive bidding</b>	<b>Secure supply</b>	<b>Category management and e-procurement solutions</b>
Objective	Create mutual commitment in long- term relationship	Obtain ‘best deal’ for short term	<ul style="list-style-type: none"> <li>Secure short- and long-term supply</li> <li>Reduce supply risk</li> </ul>	<ul style="list-style-type: none"> <li>Reduce logistic complexity</li> <li>Improve operational efficiency</li> <li>Reduce number of suppliers</li> </ul>
Suitable for	Strategic products	Leverage products	Bottleneck products	Routine products
Activities	<ul style="list-style-type: none"> <li>Accurate forecast of future requirements</li> <li>Supply-risk analysis</li> <li>Careful supplier selection</li> <li>‘Should cost’ analysis</li> <li>Rolling materials schedules</li> <li>Effective change-order procedure</li> <li>Vendor rating</li> </ul>	<ul style="list-style-type: none"> <li>Improve product/market knowledge</li> <li>Search for alternative product/suppliers</li> <li>Relocate purchasing volume over suppliers</li> <li>Optimize order quantities</li> <li>‘Target Pricing’</li> </ul>	<ul style="list-style-type: none"> <li>Accurate forecast of future requirements</li> <li>Supply risk analysis</li> <li>Determine ranking in Supplier’s client list</li> <li>Develop preventive measures (buffer stock, consigned stock, transportation)</li> <li>Search for alternative product/suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Subcontract per product group/product family</li> <li>Standardize product assortment</li> <li>Design effective internal order delivery and invoicing procedures</li> <li>Delegate order handling to internal user</li> </ul>
Decision level	Board level Cross-functional	Board level Purchasing	Purchasing Cross-functional approach	Purchasing Cross-functional approach

Source: Weele (2005)

### *Critiques and support*

This study also acknowledges that despite the widely acceptance of Kraljic's portfolio approach, there has been some criticism since its introduction. The issues raised are largely based on measurement issues and of its results: (1) operationalization of its dimension (Ramsay 1996); the selectin of variables and its measurement (Nellore and Söderquist 2000; Olsen and Ellram 1997); (2) the simplicity of recommendation, which is just based on two dimensions (Dubbois and Pedersen 2002); and, (3) failure of the portfolio models in analysing vital aspects for buyer-supplier relationships from a network perspective (Dubbois and Pedersen 2002).

Despite the criticism, numerous authors have provided justification for the critiques. An example, Gelderman and Weele (2005) argue that many counter arguments to the critiques (derived from qualitative perspective) are based on theoretical and conceptual studies. The authors proceed to provide empirical evidence that purchasing portfolio usage is associated with purchasing sophistication that is defined as the extent of which the purchasing function is included in the strategic decision- making process (Pearson and Gritzmacher 1990). Apart from suggesting that sophisticated purchasing should have an orientation towards collaborative relationship with suppliers, Gelderman and Weele (2005) also point out that future studies should include impact of portfolio usage to performance measurement.

Other compelling arguments to the critiques are as follows: (1) power and interdependence of buyer supplier relationship, Caniëls and Gelderman (2005) who argue that relationship which is characterized by high involvement of buyers and suppliers does not necessarily imply balanced power position between parties , but can yet be satisfactory, at least from the buyer's view; (2) managing a global supply base, Gelderman and Semeijn (2006) contend that Kraljic's portfolio approach appears to be useful for developing effective purchasing strategies as well for managing a global supply base; and, (3) on addressing measurement issues the purchasing portfolio analysis, Gelderman and Weele (2003) point out that there are three different measurements that could be employed namely consensus method, one-by-one method and the weighted factor score method.

In synthesizing the literatures, this study supports the argument by Weele (2005) which says, in developing purchasing and supply strategies, the balance of power between

the company and its key suppliers should be considered. In developing supplier strategy, several key questions need to be addressed. Examples of questions are: (1) how present purchasing strategy supports the business strategy as well as long-term requirement in understanding the balance of power between the business and its supplier; are the strategic product sourced from the best supplier; (2) what percentage of the purchasing requires long-term contract, and, of the short-term contract; and, (3) how to understand of the opportunity for collaboration with suppliers for product development, quality improvement, lead time reduction as well as the cost reduction.

### **2.3.5.2 Supply Perspective: SC Performance Metric**

SCM performance metric and measures as outlined in the literatures are based on four supply chain activities/process: (1) plan; (2) source; (3) make/assembly; and (4) delivery/customer (Stewart 1995; Gunasekaran, Patel and McGaughey 2004; Gunasekaran, Patel and Tirliroglu 2001). Gunasekaran, Patel, and McGaughey (2004) suggest supply chain performance metrics framework as shown in Table 2.10, and used ranks for measures/metrics to highlight the importance of performance for example, by categorizing SC activities into process level of strategic, tactical or operation, and measured based on importance such as highly important, moderately important and less important. In like manner, grounded theory research uses property and dimension to establish relationship between categorise (Corbin and Strauss 2008; Maxwell 2013). This is referred as to '*dimensionalise*' the categorise, in an attempt to differentiate the properties such as high, medium or low, enough or not enough, long or short, detailed or general, decreased or increased, improving or deteriorating, stable or unstable, and other similar performance indicator. These will be useful for adoption of this study in the coming chapters.

*SCM activities/process may be possibly measured using performance metric based on ranking of importance, or using dimension to its properties.*

Table 2.10: Supply Chain Performance Metrics Framework

Supply chain activity/process	Strategic	Tactical	Operational
<b>Plan</b>	Level of customer perceived value of product Variance against budget, Order lead time, Information processing cost, Net profit Vs Productivity ratio, Total cycle time, Total cash flow time, Product development cycle time	Customer query time, Product development cycle time, Accuracy of forecasting techniques, Planning process cycle time, Order entry methods, Human resource productivity	Order entry methods, Human resource productivity
<b>Source</b>		Supplier delivery performance, supplier lead time against industry norm, Efficiency of purchase order cycle time, Efficiency of cash flow method, Supplier booking in procedures	Efficiency of purchase order cycle time, Supplier pricing against market
<b>Make/Assemble</b>	Range of product and services	Percentage of defects, Cost per operation hour, Capacity utilization, Utilization of economic order quantity	Percentage of Defects, Cost per operation hour, Human resource productivity index
<b>Deliver</b>	Flexibility if service system to meet customer needs, Effectiveness of enterprise distribution planning schedule	Flexibility of service system to meet customer needs, Effectiveness of enterprise distribution planning schedule, Effectiveness if delivery invoice methods, Percentage of finished goods in transit, Delivery reliability performance	Quality of delivered goods, on time delivery of goods, Effectiveness of delivery invoice methods, Number of faultless delivery notes invoiced, Percentage of urgent deliveries, Information richness carrying out delivery, Delivery reliability performance

Source: Gunasekaran, Patel, and McGaughey (2004)

## 2.4 Humanitarian aid and SCM

A disaster response involves trade-offs of speed, cost and accuracy with regard to the type of goods, and their quantities, that are delivered (Davidson 2006). Therefore, efficient relief supply chains are critical, and SCM and logistics serve as a link between better disaster preparedness and response, between procurement and distribution, and between headquarters and the field (Thomas 2004). This section highlights of the humanitarian SCM strategies, the structure and recent development of the leagility concept in humanitarian aid.

### 2.4.1 Humanitarian Aid Supply Chain Strategies

Jahre (2017) reviewed and summarised strategies identified in the humanitarian logistics/operations and supply chain risk management literatures and proposed a framework for risk mitigation strategies for HROs as shown in Figure 2.7. The author also found that humanitarian actors use a number strategies in particular strategic, stocks, postponement, collaborations and that strategies in relation to sourcing and procurement lacks both research and practise contribution on supplier relationship. The framework points to two important synthesis: (1) The use of FA as strategy to mitigate risk through flexibility, postponement<sup>5</sup> and pre-positioning; and (2) collaboration to mitigate risk through supplier relations and information sharing.

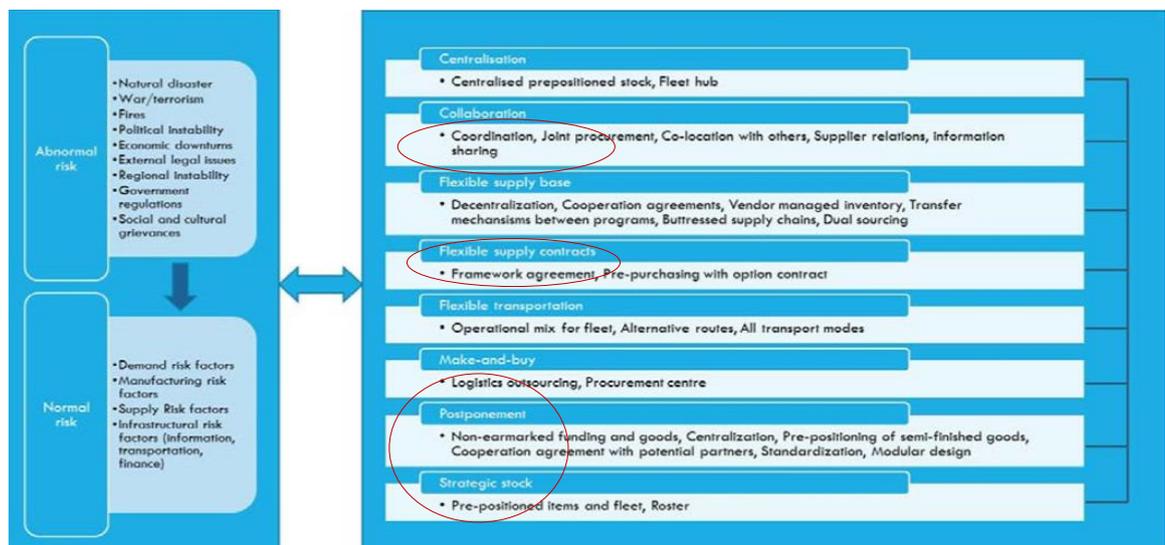


Figure 2. 7: Figure: Humanitarian Supply Chain Strategies

Source: Adopted from Jahre (2017)

<sup>5</sup> Pre-positioning of semi-finished goods, cooperation agreement with potential partners, standardisation, and modular designs (observed similarity with the concept of SCM leagility)

### 2.4.2 Humanitarian Aid Temporary Supply Chains

It is worth noting that humanitarian operations extensively use a temporary supply chains (TSCs) logistics model (Merminod, Nollet and Pache 2014), where supply chain members pool resources and get organized for the success of an *ad hoc* project. According to Merminod, Nollet, and Pache (2014), TSCs are unstable due to their temporary nature; however, they can be stabilized through the capability of anticipating crises and rigorous pre-positioning of logistical, human and IT resources. Merminod, Nollet, and Pache (2014) note that ‘anticipated responsiveness’ was a key factor in reducing response time. Anticipated responsiveness relies on three factors: first, it relies on the coordination among multiple stakeholders to improve the actors’ ability to intervene rapidly; second, by understanding the trade-offs between “adaptation and standardization”, where standardization involves finding commonalities across in crises situation for standard humanitarian aid items or standard procedures.

However, it is also observed that a standard product could be totally inadequate in some missions such as in the Kashmir earthquakes, where the emergency order had to be made for the lack of sufficient items and this caused delay in the deliveries to the affected survivors. Thus, the reason for an adaptation, where some products or supply chains will have to be flexible, catering to such factors as geography, infrastructure, geopolitics and number of victims. One of the best supply chain products for responsiveness was the creation of modular survival kits with features both a universal specific nature such as to the climate, religious or even sexual taboos of a community. These shelter boxes are one example of this kind of survival kits made available with short lead time for many humanitarian missions. The last factor, according to Merminod, Nollet, and Pache (2014) is the use of strategic planning to anticipate responsiveness. For example, Red Cross has used many crisis scenarios and efforts on integrated logistics support which result in a faster turnaround.

The TSCs discussed earlier are regarded as agile; however, they do not meet all the character attributes highlighted by Christopher (2000). Christopher (2000) highlights that TSCs has to clearly be very responsive to demand changes at a reasonable cost. For this, TSCs needs to be reconfigured due to a specific need and unknown duration, therefore, requires an advanced level of time and organizational stability. Additionally, a study by Cozzolino, Rossi, and Conforti (2012) further explores the specific stages

in humanitarian logistics process in which agile as well as lean principle are needed. They concluded that agile principles focusing on effectiveness exist in the restoring stage of World Food Program while lean principles with efficiency exist in the reconstruction stage. Another study in relation to humanitarian aid (NGO) by (Scholten, Scott and Fynes 2010) suggests that the commercial concept of agility when responding to disaster relief holds strong potential to increase efficiency and effectiveness. However, they are restrained by technology information especially involving NGO's back office.

### **2.4.3 Extending the Leagility Concept in Humanitarian Aid**

The decoupling point perspective is not limited to the physical flow of products alone (Purvis, Gosling and Naim 2014). Authors have recognised its value in use from sales to emergency rooms and even in the humanitarian aid context. For example, Krishnamurthy and Yauch (2007) used it in between of Sales and Service Department and Product Department; and in the professional healthcare service (Rahimnia and Moghadasian 2010) the decoupling point is placed between hospital rooms and treatment pipelines (for example for various types of injuries such as serious rupture and fractures). In humanitarian aid, Cozzolino, Rossi, and Conforti (2012) argue that in the specific stages of disaster relief operations, a lean supply chain aims to achieve a significant saving in cost, whilst an agile one focuses on (reducing) lead time (i.e. increasing speed).

Referring to a study on World Food Program, the author concluded that agile principles which prioritise effectiveness, exist in the restoring stage of the World Food Program, whilst lean principles, which emphasise efficiency, exist in the reconstruction stage of the program. Meanwhile, Scholten, Scott, and Fynes (2010), in a study on non-Government Organisations (NGO) suggested that the commercial concept of agility when providing for humanitarian aid holds strong potential to increase efficiency and effectiveness, which is however limited by technology restrictions, in particular on information involving NGO's back office. It is worth noting that efficient relief supply chains are critical, and SCM and logistics served as a link between better disaster preparedness and response, between procurement and distribution, and between headquarters and the field (Thomas 2004).

*Literature identifies FA, collaboration (buyer-supplier relationship, information sharing), pre-positioning and postponement (a leagile trait) as humanitarian aid SCM strategies*

## **2.5 Flexible Procurement Option for Humanitarian Aid**

This section entails the dynamics of procurement as preference to warrant flexibility in humanitarian relief context. The detail of this sections covers the definition up to recent advance of procurement in humanitarian relief.

### **2.5.1 Definition of Procurement**

There are various definitions of the term procurement. For example, Cox (1996) describes procurement management as a set of internal and external contractual relationship which is based on asset specificity of the relationships. Whilst, Vaart, Vries, and Wijngaard (1996) describe the procurement system as the process of obtaining material from outside suppliers which include activities like requirement planning, supply sourcing, negotiation, order placement and supplier coordination. The procurement discipline concerns the acquisition of goods or services in any way including borrowing, leasing, and even pillage, in return for a monetary or equivalent payment (Lysons and Farrington 2006). Others defined procurement as the preparation, award, and implementation/administration of contract for goods, work, and services (Wiehen et al. 2006).

### **2.5.2 Public versus Private Procurement**

Procurement could be asserted as an important component of business strategy for both private sector and public sector. Most private businesses see procurement as a strategy for reducing cost in particular on operating margin. Public procurement arguably has even bigger responsibility in ensuring procurement strategy meets the policy with regards to political, budget, public accountability and nationalist approach an individual country or of union of member states such as the European Union (EU) (Weele 2005). In fact, Walker and Brammer (2009) state that the nature and context of public sector purchasing differ from commercial practice. Public procurement concerns how public sector organisations spend taxpayers' money on goods and services and is guided by principles of transparency, accountability and of achieving value for money. Achieving value for money is a requirement under public governance of many countries such as Australia and the Commonwealth countries (CIPFA 2013; DFAT 2019). Although both practices are connected with reducing cost, risk management and achieving value, public sector procurement has the additional task of

achieving economic efficiency and effectiveness, proportionality, social, environmental and other benefits to fulfil the responsibilities of the government.

It is estimated that an approximate 16 percent of gross domestic product (GDP)<sup>6</sup> of country or member states is spent annually on public procurement for goods, services and projects. For example, a study concludes that a weak public procurement system will cause a major drain on the national budget and result in a loss of public funds (Othman et al. 2010) and illustrates the importance of upholding the principles of the public procurement. The magnitude of such public fund therefore has forced regulators to constantly review directives in order to spend its financial resources as efficiently as possible. For example, the EU reviewed its directives in 1976, 1988, 1993 and 2005 with the aim of providing some general rules that need to be applied when awarding contracts to supplier, specifically which public institution needs to work to the directives, types of award procedures, rules of technical specification where discriminatory specification are forbidden, advertising rules, and common rules of supplier selection as well as criteria that could be used to award the contract in a specific situation.

The procurement cycle includes needs assessment phase (demand determination), preparation phase (document preparation), contractor selection and award phase, contract implementation (phase) and final, accounting and audit phase. The procurement procedures includes: (1) open procedures, in which public institution submit tenders through contract notice and interested supplier may submit their proposal; (2) restricted procedures, pre-qualified suppliers submit tenders based on invitation by the public institution, and due to its time consuming nature some restricted procedures are expedited by using previous contract award for unforeseen circumstances, and (3) negotiated procedures, in which such procedures present a degree of freedom when too few suppliers bid, and as such public procurers could consult suppliers of their choices on the contract term includes technical, administrative and financial. However, all procedures are based on a non-discriminatory manner that is fair and promotes open competition which leads to a quality product at a fair price (value for money).

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<sup>6</sup> The amount of money relate to government procurement with EC exceeds 1,500 billion Euros in 2002 based on report IP/04/149 "Report on the functioning of public procurement markets in the EU: benefits from the application of EU directives and challenges for the future", January 2004.

Public procurements critiques include not only academician but practitioners particularly on the lack of flexibility of its procedures and that partnership relationships are not fostered as traditional procedures put the buyer in a position of power and control, for example, it is evident in the lack of communication on how to proceed in such relationship in the procurement directives. Moreover, the lack of flexibility and relationship stimulation hinders the strategy of SCM when dealing with uncertainty, which precisely requires the opposites i.e. flexibility, collaboration between buyer-suppliers, and a coordination contract. Although this may be the case, recent studies show that public procurement has improved to sustainable procurement which helps to ensure a strong, healthy and just society, living within environmental limits and promoting good governance (Walker and Brammer 2009). In adopting sustainable procurement, public procurement embraced procurement flexibility, the ability to respond strategically to changing internal and external environments to ensure that the sourcing, purchasing and supply of raw materials, component and parts continuously sustain the value adding process (Jeeva and Dickie 2009). One advantage of procurement flexibility is that it contributes to supply chain flexibility and improves supply chain performance. To achieve this, Swafford, Ghosh, and Murthy (2006) suggest that a firm must maximize its options on materials and quality of services such as delivery, quantity and lead time.

Next, public procurement also acknowledges the benefits if investing in collaborative relationship. For example, Eriksson, Atkin, and Nilsson (2009) argue that partnering approaches alter traditional procurement procedure in power and control especially in creating mutual respects, equity and information sharing. As an added example, authors (Eriksson, Atkin and Nilsson 2009; Barlow et al. 1997; Egan 1998; Chan, Chan and Ho 2003) also contend that partnering in construction when implemented successfully could bring about benefits of improved quality, safety, performance, sustainability, time and cost reduction. Similarly, a study by Erridge and Murray (1998a) proposed relationship based on a long term contract for waste disposal for a municipal council in the UK. However despite the development, this study acknowledges the authors (Eriksson, Atkin and Nilsson 2009) that such collaboration would require suitable procurement procedures and should be tailored for different situations. Hence, this will be discussed and deliberated in the next section.

### **2.5.3 Procurement Advancement in Humanitarian Aid**

According to Wang et al. (2015), supply and purchasing issues have long plagued practitioners and scholars. Supplies commonly required for humanitarian aid include water, medicine, heavy machinery, tents, blanket as well as food, and these are categorised either as perishable or non-perishable items (Dignan 2005; Wang et al. 2014). Beamon (2004) adds that relief supplies must have zero (or approximately zero) lead time, that high stakes (often life-and-death situation) are involved, the demand is unreliable, that there is associated incomplete supply and transportation information, and that effective performance measurement systems are lacking.

The response mechanism adopted by HROs often relates directly to its chosen procurement method. For example, when a disaster occurs, information about it is in two stages; it moves from literally unknown to a minimally sufficient level. As a result, HROs regularly rely on forecasting at the former stage and determining actual requirements at the latter. This determines either a pre-purchasing with inventory holding capacity (warehouse) at the beginning or with instant purchasing at the later stage to cater for realized requirements. The resultant for the pre-purchasing part of the practice is to obtain lower prices through traditional procurement. However, inventory holding costs increase in this situation as well. There is also a high tendency to redundancy and wastages. Instant purchasing produces just the opposite, with higher purchasing price due to time urgency and low inventory holding cost.

Additionally, looking into the reality in both purchasing practice, pre-purchasing often has a shorter associated lead time than instant purchasing. Practitioners suggest the adoption of either “instant-purchasing with a return policy” (IPRP) or “pre-purchasing with a buyback contract” (PPBC) to prepare relief supplies in advance of a disaster. Wang et al. (2015) argue either method solves the dilemma and propose “pre-purchasing with an option contract” (PPOC).

Wang et al. (2015) also suggest that the PPOC approach allows the buyer to lock in specific quantities from suppliers through payment of a specific premium before a disaster occurs. This strategy combines both instant and pre-purchasing approaches and is feasible since risk is reduced by delaying purchasing decision until disaster

information is sufficient to determine whether demand is achieved. In other words, the strategy places a coordinating contract with two parameters. First, an *option price* is paid by the retailer for an additional unit product which has been reserved by the supplier beyond the initial order. Secondly, the *exercise price*, the unit purchasing price when the buyer gets a second order if realised demand is more than the initial order. The authors conclude that the strategy benefits both buyer and supplier, especially when assessing the risk shared.

## **2.5.4 Framework Arrangement in Humanitarian Aid**

### **2.5.4.1 Definition**

Oladapo and Quinn (2016), in describing the origin of framework agreement refer to Article 32 of the EU Public Sector Procurement Directive (Directive 20014/18/EC, 31 March 2004) includes a provision for framework arrangement. The directive describes a framework arrangement as following:

An agreement with suppliers, the purpose of which is to establish the terms governing contracts to be awarded during a period, in particular with regards to price and quantity

Meanwhile, the UK government states that “framework agreement” is used when a public sector organisation know they are likely needing goods or services, but are unsure about what they will exactly need or when. In this agreement, they may set up a group of approved suppliers that they can use when necessary. The organization invites potential suppliers to put themselves for the framework and choose the one/s most able to do the work. Once the framework is set up, individual contracts are made throughout the period of the agreement. If there is more than one possible supplier on the framework, a ‘mini-competition’ may be held to decide who gets the contract. FA usually last for a maximum of 4 years” (United Kingdom Government 2015).

For comparison, open contracts (OCs) provide an alternative approach. OCs are also known as an indefinite-delivery contract as highlighted by Wang (2012). The Law Dictionary (Black 2015) defines an open contract as a contract of which does not describe the entire agreement between the two parties involved, with clauses or provisions that can be modified without mutual consent (usually by the vendor). An open contract is also known as an indefinite-delivery contract or open-end contract

(Wang 2012). The United States Federal Acquisition Regulations (FAR) defines it as “the appropriate type of indefinite-delivery contract may be used to acquire supplies and/or services when exact times and/or exact quantities of future deliveries are not known at the time of contract award” (FAR 2015, p.1).

Meanwhile, the Chartered Institute of Purchasing and Supply (CIPS) proposes the use of framework arrangement which promotes a mechanism to be applied to pricing particular requirements during the period of the framework (CIPS 2015). Framework arrangements consist of agreements, contracts, and Memorandum of Understandings (MoUs). The difference between framework contracts and framework agreements is that the former is an arrangement between two parties which commits one to buying at least a certain volume of particular goods or services from the other over a specified period; the latter is an agreement between two parties for the supply of unspecified amount of product over a specified period. For the purpose of the study, the researcher will use the term framework arrangement (FA) according to CIPS’ larger context definition.

Apart from this, Oyegoke et al. (2009) classify FA into binding and non-binding, and that FA are used where the parties do not wish to enter into a legally binding agreement but wish to create collaborative working environment. With collaborative FA, procurement have changed from one-off contracts to stream of similar contracts, client-contractor relationship changed from short term to long term, and traditional project based organizational structure of project teams to long term SC partnering relationship (Khalfan and McDermott 2007) .

#### **2.5.4.2 Evidence of using FA in Achieving Lean and Agility**

The commercial concept of agility when responding to disaster relief holds strong potential for increasing efficiency and effectiveness (Scholten, Scott and Fynes 2010). HROs understand that signing FA can speed up the procurement process in the emergency phase as the slower pre-bid process is conducted during normal times (Lu, Goh and Souza 2014). They invest time and effort during normal times for a fast response and speed up the ordering in the aftermath of an emergency. In addition to this, HROs rely on suppliers to prepare for emergencies as they recognise that they too may be short of funding for pre-positioning (Lu, Goh and Souza 2014). For example,

the International Federation of Red Cross (IFRC) states that FA are also an integral part of a global strategy for pre-positioned stock where suppliers agree to reserve and store an agreed quantity of commodities either at their premises or regional warehouses in Dubai, Kuala Lumpur and Panama (IFRC 2015a).

Perhaps, the only notable work on FA in humanitarian context is by Balcik and Ak (2014) on the supplier selection problem of a HRO that wants to establish FA or long-term agreements (LTAs) with suppliers. The study focuses on a quantity flexible contract in which the HRO commits to purchase a minimum total quantity from each framework supplier over a fixed agreement horizon, and in return, the suppliers reserve capacity for the HRO and promise to deliver items according to pre-specified agreement terms. In a prior study, Balcik and Ak (2014) argue that the main benefit of FA to suppliers is confirmed business over a particular period in a pre- and post-disaster situation, whilst for the HRO, this allows reduction in its warehousing and inventory cost and confine their space only to reserve critical supplies and equipment as their pre-positioning strategy. The authors point out that FA promote reliable business relationships to secure the right price, guaranteed quality, quantity, and agreed delivery terms for emergency supplies. The HRO commits to purchase from each framework supplier a pre-specified minimum total quantity during a fixed agreement which could be one or two more years.

The amount of each order is limited by the supplier's reserve capacity, fixed pricing schedule, and meet delivery requirement. If the HRO purchases under the minimum total quantity by the end of the agreement horizon, a penalty cost is incurred for the underage quantity. In addition, a fixed agreement fee is paid to the supplier as representative of the commitment that includes overhead and coordination costs, and parameters such as discount rates and geographical-coverage lead times. Using this scenario, Balcik and Ak (2014) developed a stochastic programming model that selected framework suppliers so as to minimize cost in a number of different settings. Their results suggested better outcomes when FA negotiated for larger reserve capacities for high-impact disaster and suppliers that could offer larger geographical coverage. Most notably, the study suggested that future work should investigate of the use of collaborative FA to reduce risk, cost and response especially for the case of small suppliers where the order size is small and the supplier may not be able to offer discounts. It is also worth noting that recent studies have also named collaborative FA

as future tool of humanitarian supply chain (Kwon and Kim 2018; Rodrigues-Espindola, Albores and Brewster 2017; Nurmala, de Leeuw and Dullaert 2017).

As comparison, this study notes of the study by Wang (2012) on OC in Taiwan that reveals OC was signed with fixed price but not the quantity for a period of 6 months to 1 year. This is in contrast to a framework agreement, which was usually for four years as in the case of UK government (United Kingdom Government 2015), and some HROs usually have a price range and a minimum purchasing quantity (Lu, Goh and Souza 2014; IFRC 2015a). The trade-off of the short tenure of the OC is demand flexibility. However, Wang (2012) describes the Taiwanese OCs system as chaotic with issues on regulation conflicts and suggests improvement on supplier performance capacity, unit price adjustment, performance timeline, quality, performance bond or default clauses and tighter audit systems. Nevertheless, despite the flaws detected in OC implementation in Taiwan, Wang (2012) points out OC is an important tool to save lives and has been widely used by developed nations, such as the U.S. and Japan, as it increases speed or agility of supplies during emergency.

*Literature evidently points for future work to investigate collaborative FA and the association with lean and agile, and leagile principles. In addition, the performance measurement tool in particular the Lean and Agile Purchasing Portfolio Model and the underlying Kraljic's Portfolio Analysis expansion is useful consideration for the study.*

## **2.6 Other Models Employing Lean, Agile and leagile**

Numerous procurement models have been associated with lean and agile. For instance, Erridge and Murray (1998b) used a lean supply model to test empirically the extent to which strategic procurement practise is understood and practised in the local government context and in this instance, the Belfast local council. The study concluded that lean supply is compatible with local government purchasing and significant savings along with better quality service had been reported. In the humanitarian context, Maon, Lindgreen, and Vanhamme (2009) introduced a dual cycle model for disaster relief, based on four-stage standard process model (preparedness, response, recovery, and mitigation) for disaster relief by the National Governors Association (1979) as emphasized by Kelly (1998). The model provides a simple understanding of SCM practices in disaster relief operations and focuses on the key cycles of disaster

management: a prevention and planning cycle, and a response and recovery cycle. The model as shown in Figure 2.8, provides a collaborative path and describes the stages of operations that may be overlapping. For instance, emergency response to preparedness where the primary procurement function is identified.

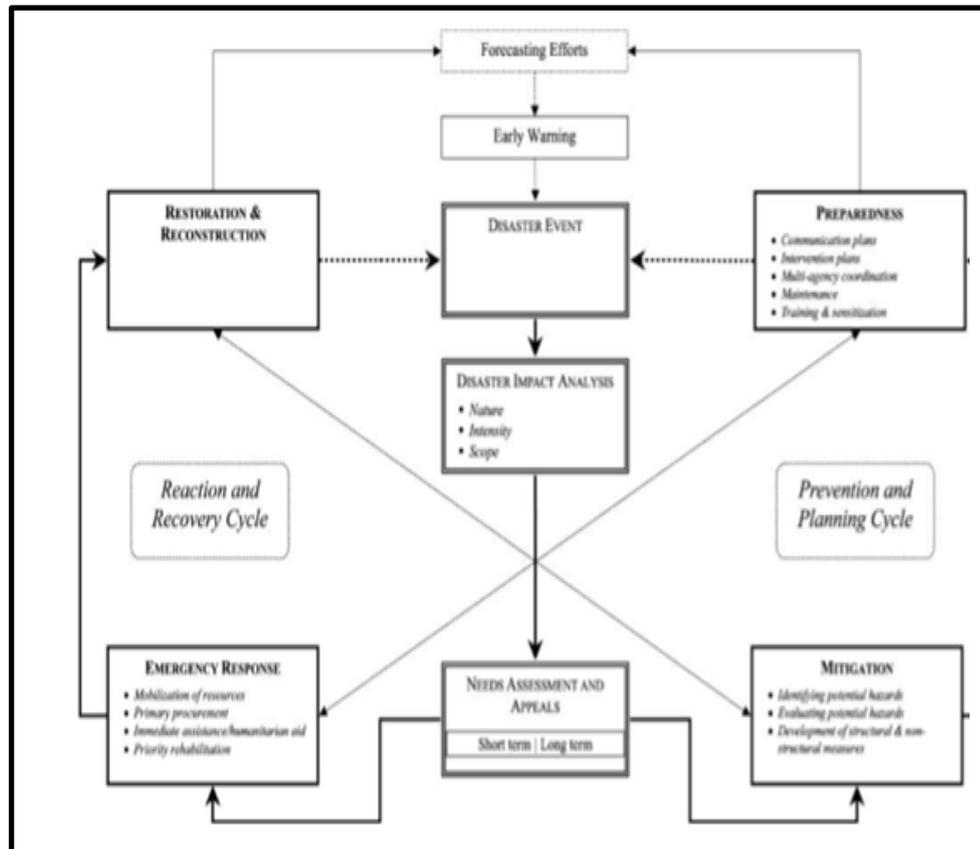


Figure 2. 8: A Dual Cycle Model of Disaster Relief Operations

Source: Maon, Lindgreen, and Vanhamme (2009)

support their model by describing strategic partnership, an SCM related dimension in the prevention and planning phase, as “still limited collaboration and coordination between relief actors as well as between relief actors and supplier networks. Important actors often have a strategic agreement with international suppliers of standard relief items (e.g. tents, blankets or survival kits). They further reiterate that the potential contribution of collaboration to disaster relief looking in a capability strategic perspective, includes access to corporate infrastructures and co-developed processes that help reduces response times and procurement cost substantially, because they entail agreements with disasters relief agencies’ suppliers, standard catalogues that

facilitate accurate communications of orders from the field and standardised measurement that recognise the reliability, efficiency and value of SCM practice. For instance, the Intel/Soleron-International Rescue Committee collaboration brought corporate expertise on disaster relief side allowed significantly streamlining procurement and creating processes to substantially reduce response time by reaching agreements with the supplier.

In addition, Chakravarty (2011) constructed a mathematical model and theorems for contingent relief response that includes both ex-ante and ex-post activity supply acquisition, collaborating with a various partner. With a contingent response, the buyer acquires a smaller capacity before the disaster and leverage the wait option by observing the intensity before acquiring additional capacity. Meanwhile, Falasca and Zobel (2011) introduced a two-stage stochastic decision model with recourse for procurement in an uncertainty inherent disaster relief situation. The model provides the mathematical formulation of estimation during the early stages of a disaster with adjustments regarding the actual requirement for assessment. Despite the less empirical evidence, the model provides efficient and effective order decisions for the supply of disaster relief.

Next, is the Malaysian Procurement Leanness, Agility and “Value for Money” Model (MPLAV) by Ponnusamy (2010) as presented in Figure 2.9. The model argued that an *ad hoc* procurement could lead to increase cost, increase lead time in supplier’s delivery especially on capital items purchases; and reduces transparency in “Best Value for Money,” a vital principle in the public sector procurement. The model suggests using past mission experience to forecast requirements and arrange this in templates for long lifecycle and short lifecycle items as strategic planning for the procurement. The next step is to use create advanced contractual arrangement with suppliers using lean principles information sharing as well as Just-in-Time (Erridge and Murray 1998b), to improve leanness; and; purchasing long life cycle items and storing it as strategic deployment stocks (SDS), to improve agility.

Although the model is not tested for its operational ability, it nevertheless presents academia with a contemporary understanding of governmental or civil service HROs procurement challenges and future directions. Moreover, the example provided from

the study replicates how a form FA<sup>7</sup> is operationalised as well as the implementation problems including cost volatility, reduced quality and untimely delivery. Most compellingly, the study offers some evidence in the use of SCM concepts of lean and agile for disaster response situations.

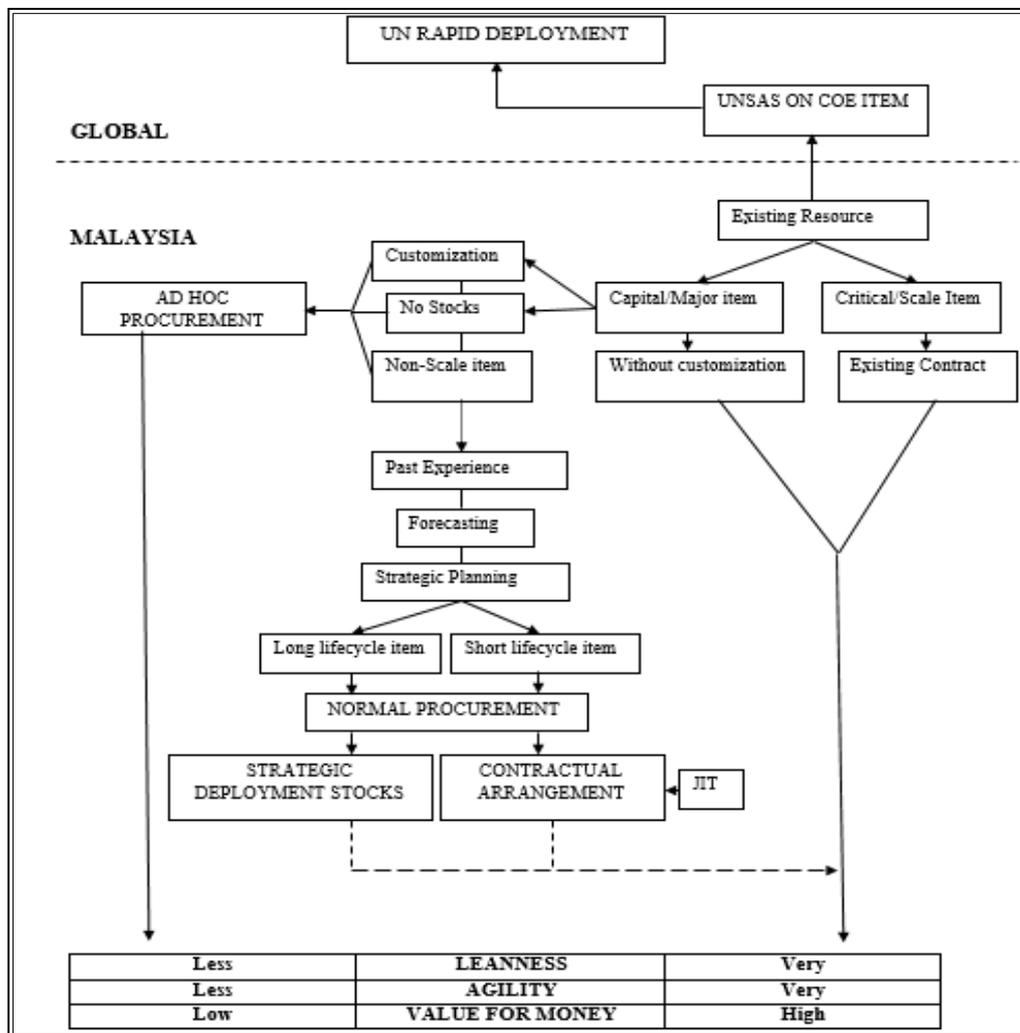


Figure 2. 9: MPLAV Model for UN Rapid Deployment

Source: Ponnusamy (2010)

## 2.7 Theorization: Complementary Perspective

This section highlights the logic used for this study to adopt complementary theories to explain inter-disciplinary phenomena of humanitarian aid purchasing and supply

<sup>7</sup> With reference to the United Nations Standby Arrangement System (UNSAS), which is an agreement between country and the UN for participation in a UN mission with the agreed resources (troops, military equipment and other supplies) and deployment timeline.

chain management. This study begins with a snap shot of theory definition, the logic of complementary theories adoption for the study followed by an in-depth explanation of the theory application in disaster relief operations, and supply chain management. Next, this study argues on the adoption of transactional cost analysis theory (TCA), contingency theory (CT), and social exchange theory (SET), as the principal theories for the complementary perspective of this research. In addition, based on gaps as presented by recent literatures, this study will also explain the contingencies for choosing the specific combinations of theories, using the contingency theory (CT) perspective.

### **2.7.1 Definition of theorization**

Theory assists us to understand the complexities of social life by offering insights and suggesting the direction of inquiry Neuman (2014, 56). The author (Neuman 2014) also explains that theory gives researchers' concept, provides basic assumption, directs to an important question, and suggests ways to make sense of data. In relation, theoretical concept, known as the building block of theory, are linked to theory with research data. Next, theories that have a collection of associated concepts that are consistent and mutually reinforcing are known as concepts cluster. In addition, the concept could either have a single or multiple dimension and are either abstract or concrete. This could be demonstrated through five major aspects of social theory: direction (deductive or inductive); the level of analysis (micro, macro or meso); theoretical focus (substantive or formal); a form of explanation (causal, structural or interpretive); and range of theory (empirical generalisation, middle range theory or framework).

### **2.7.2 Debate between Unified and Complementary theories**

Discussions and calls for academic and practitioner to increase the usage of theories in disaster relief supply chain management studies is currently a heated topic in the humanitarian supply chain management (HLSCM) domain. Researchers in the field of disaster management note that present studies still lack the use of theory especially on civil agencies in disaster aid (Nilsson, Sjöberg and Larson 2010). Arguments comprise the use of a unified theory (Mentzer, Min and Bobbitt 2004) to borrowing and complementing theories (Halldorsson et al. 2007) perspective to explain disaster relief

phenomenon complexity. In the united theory version, discussion surrounds the service processes in humanitarian aid. For example, Heaslip (2013) proposes the Unified Service Theory (USF) to help in decision making and guide various operational problems in disaster relief. USF is a prescriptive theory that describes why a service process is a service process. (Heaslip 2013, 124) adds on from the perspective of USF to examine one directional dimension, minimal beneficiary input, the role of DR agencies in the HLSCM (Miller et al. 2002; Oluruntoba and Gray 2009; Ertem, Buyurgan and Rossetti 2010a).

In contrast, the complementary theory perspective (Halldorsson et al. 2007) argue one cannot rely on one unified theory to explain inter-firm governance structure and management decision in supply chain. Hence, the complementary theories perspective or an integrative approach is suggested (Halldorsson et al. 2007; Lettieri, Masella and Radaelli 2009). In a re-visited version recently, Halldórson, Hsuan, and Kotzab (2015) further argue that because SCM is an inter-disciplinary concept, (Halldórsson and Skjøtt-Larsen 2004; Klaus 2009; Mentzer, Min and Bobbitt 2004) SCM suffers from a conceptual slack (Schulman 1993). Hence, the key to equipping SCM to cope with the emerging challenges is possible through the borrowing concepts and logics from other related fields.

More importantly, SCM must develop the ability to theorize and be defined as by which theory it is produced (Swedberg 2012), and Halldórson, Hsuan, and Kotzab (2015) propose that SCM theorization appears in various form including: (1) to motivate further theory development; (2) to apply a particular theory (single theory or two or more combination) on a SCM problem; (3) to allow application of a particular concept from a complementary theories on a SCM problem; and, (4) to use complementary theories to explain in a more detail aspects of a particular SCM concept. In formulating the right integrative theory for SCM, Halldorsson et al. (2007); Halldórson, Hsuan, and Kotzab (2015) advocate four prevalent inter-organization theories used to theorise SCM, in particular on a complementary perspective, namely the principal-agent theory (PAT), TCA, network theory (NT), and the resourced-based view (RBV). Additionally, this study also includes CT, SET and other prevailing theories for the synthesis because of its 'locus standi' in SCM related research and this will be explained later. These prevailing theories that occupy the

domains of humanitarian and disaster relief management, and the SCM will be discussed in the next section.

*Complementary theories are suggested for the study as humanitarian relief procurement and SCM is a multi-disciplinary field and is better explained in an integrative approach.*

### **2.7.3 Disaster Management Theories: From Chaos to Contingency Response Approach**

Kiel (1995) explains that mathematical aspects that come from chaos theory has proven to be useful in developing some disaster management techniques based on two evolutionary functions. Firstly, it offers to break systems' entrainment and suggests a behavioural change for survival. Secondly, chaos as a learning mechanism, allows systems to test their evolutionary potential. However, the application of this theory to disaster management needs further investigation especially concerning bifurcation points, the changing point at which order and predictability become unpredictability and chaos (Koehler, Kress and Miller 2014).

Similar observation from chaos theory perspective could be observed in disaster relief activities. For instance, delivering supplies to the disaster area is complex since demand is uncertain. In most cases, there are social and economic consequences of inadequate delayed supplies (Chakravarty 2011). In dealing with this complexity, procedure is driven by either a proactive or reactive response, seldom both. A proactive response is based upon building *ex-ante* or pre-event capacity based on predictability. In some cases of bifurcation point (Koehler, Kress and Miller 2014), relief organisation prefers for the acquisition and delivery of supplies to be made in real time (reactive response). However, both responses have associated risk and consequences. For example, in proactive response there is with possible outcomes of underutilised resources if the disasters do not happen as frequently as predicted, whilst in a reactive response, despite minimal redundancy issues as it is in real time however there is a concern on increased cost of purchasing (Knemeyer, Zinn and Eroglu 2009).

In dealing with the associated risk and consequences, more organisations adopt a contingent response, a hybrid type of response in which the organisation is proactive during pre-disaster and adopts to a reactive response when it exceeds a predetermined threshold in the onset of disaster (Craighead et al. 2007). This hybrid response has its

roots in the contingency theory (CT), in which the theory concerns with approaches in the organisational management. CT suggests that there is no one best way to manage the organisation because it is contingent upon several factors which could be internal and external to the organisation such as technology, politics, culture and climate (Zainuddin and Zainudin 2015, 10). Bryman and Bell (2011) explain that the theory relies on a number of assumptions that guides research: first, there is no best way to organize; second, one particular way of organizing under all conditions; and, third in order to be most effective, organizational structure should be appropriate to the type of work and the environmental conditions faced by the organization. The key tenet of contingency theory is that organizations strive to maximize efficiency by achieving some 'fit' between environment and structure.

CT has been applied in a multi-disciplinary area including leadership innovation, public sector accounting, and SCM. For example, The theory's application on leadership by Fiedler and Garcia (1987) is widely recognised. The theory suggests matching leaders with appropriate situations and illustrates the extent to which the leader's style fits the context that determines leader's effectiveness. Next, in the field of innovation, Gosselin (1997) suggests the adoption of innovation is easier in the organic organisation while the implementation of innovation is easier on the mechanistic organisation. Another example is in the public sector accounting where this theory is used when researching the transition and explaining the innovative process from traditional government accounting to a more informative system (Hassan and Bakar 2015, 144).

*Within the domain of disaster management, CT which advocates there is that no one best way fit in organizing for situations is widely recognised.*

#### **2.7.4 SCM Theories: Inter-Organizational Complementary Perspective**

Mentzer, Min, and Bobbitt (2004) suggest that SCM research occupies the space at the intersection of multi-disciplines including strategic management, purchasing, manufacturing, marketing, retail, and logistics. Studies indicate that almost 57 percent of the SCM and logistics journals use theories and that opportunity remains for scholars in the discipline to increase the use of theory and to include elements of theory used in new conceptual models, and constructs (Defee et al. 2010). The authors reviewed 683 papers published between 2014 and 2009, from five logistics and SCM

journals and summarised that there are approximately 25 theories in explaining SCM and the top dominant theories include the transactional cost, resource base view, Porter’s framework, contingency theory, resource dependence theory, social exchange theory and network theory. Table 2.11 explains the classification of the dominant theories in SCM.

The authors (Defee et al. 2010) argues that several theories were concentrated in two topic categories, relationship and purchasing. For example, SET was concentrated in relationship (46 percent) topic research and purchasing research (34 percent). Whilst, microeconomic theories such PAT and RBV were frequently found in relationship (24 percent) and purchasing studies (23 percent). However, they also concluded that purchasing and supply management still lacks theories and that the dominant theoretical perspective such as RBV-DCA, and TCA-PAT-NT will likely to increase.

Table 2.11: Dominant Theories in SCM Research and Application

No.	Theory	Gist	SCM Context	Reference
1.	Transactional Cost (TCA)	Transaction cost will be incurred by a firm in making an economic exchange in market	Opportunistic behaviour of firms engaged in SC may result in additional cost for monitoring of process and contracts	(Williamson 1975a; Coase 1937)
2.	Resource Base View (RBV)	Resource of any given firm is distinctive and unique	When resource is superior, performance of firm and SC is superior over competitor	(Barney 1991)
3.	Porter’s framework	The five forces: Threat of substitute product; bargaining power; threat of new entrants; bargaining power of suppliers; and, rivalry among existing competitors.	The five forces are a framework for understanding the competitive forces at work in an industry, and which drive the way economic value is divided among industry player	(Porter 1979)
4.	Contingency theory (CT)	An interrelationship amongst sub-system and its environment relies on the assumption there is no best way to organize especially under all condition and that the organization structure should be appropriate to the environment to be effective	The management of SCs are not fixed under all condition and the structure will have to be more adaptive to suit the environment	(Schoonhoven 1981)
5.	Resource Dependency Theory (RDT)	Key survival of a firm is through	Firms who hold power of resources needed in	(Pfeffer and Salancik 2003)

		acquisition and maintenance of resources	SC are able to ensure their partner comply with standards	
6.	Bullwhip effect	<p>“Beer game” illustration of order variability attributed to the participants irrational decision making.</p> <p>Four major causes of bullwhip effect:</p> <ol style="list-style-type: none"> <li>1. Demand forecasting updating</li> <li>2. Order batching</li> <li>3. Price fluctuation</li> <li>4. Rationing and shortage gaming</li> </ol>	Bullwhip effect is a consequence of the players’ rational behaviour within supply chain infrastructure, hence to exercise control a company needs to modify SC infrastructure	(Lee, Padmanabhan and Whang 1997)
7.	Principal Agency Theory (PAT)	Principal-agent relationship should reflect efficient organization of information and risk-bearing cost PAT indicates contract as most efficient under varying level outcome uncertainty, risk aversion, information	To determine optimal contract, behaviour versus outcome between the principal and the agent.	(Eisenhardt 1989a; Jensen and Roebuck 1983)
8.	Social Exchange Theory (SET)	Dyadic Buyer-supplier relationship, moving from transactional to relationship exchange.	Emphasizes on reciprocating benefits as the theory profess that people cooperate under the expectation that they will give and receive from the relationship	(Blau 1964)
9.	Game Theory	Key concepts:  Nash Equilibrium and coalition formation	A collection of mathematic models formulated by studying decision making in situation involving conflict and cooperation	Lucas (1972)
10.	Social Network Theory (NT)	Organisation is embedded within network of theory	As relationships between buyer-supplier moves from transaction to relational, this shifts SC focus for continuous improvement	(Thorelli 1986)

Source: Defee et al. (2010)

With this in mind, this study explores the following prevailing theories to best explain complementary theory perspective postulated for the study which includes:

#### **2.7.4.1 CT (Adoption for organizational aspect, disaster response, and SCM performance constructs)**

As in disaster management, CT occupies a considerable ground in SCM research. In SCM, CT hypothesises that the relationship between two variables is contingent upon some third variable. Contingency approaches to theory building represent an alternative to searching for universal principles, and instead of focusing on key situational relationships. These approaches reduce the vast array of combinations a researcher must consider by focusing research on key variables and inter-relationships. It proposes that the appropriate organization structure and management style were dependent upon a set of “contingency factors: (1) uncertainty; and (2) instability of the environment (Tosi Jr and Slocum Jr 1984).

In another context of SCM application, literatures suggest that contingency theory-building include steps that involves three types of variables: (1) contingency variables; (2) response variables; and (3) performance variables (Zeithaml, “Rajan” Varadarajan and Zeithaml 1988). Contingency variables represent situational characteristics usually exogenous to the focal organization or manager. In most instances, the opportunity to control or manipulate these variables is, at best, limited and indirect. In contrast, response variables are the organisational or managerial actions taken in response to current or anticipated contingency factors. Performance variables are the dependent measures and represent specific aspects of effectiveness that are appropriate to evaluate the fit between contingency variables and response variables for the situation under considerations. The steps typically result in contingency theories that focus primarily on outcome rather than on processes.

In addition to the variables, to better understand about CT, the following are three key dimensions of this theory: (1) effectiveness; (2) environment; and (3) congruency. Effectiveness, is defined as the degree in which an organization achieves a very limited highly desired outcome through adaptation and survival. In other words, organization that comes into terms with its environment, not only survives but are also effective (Aldrich, McLKelvey and Ulrich 1984). Tosi Jr and Slocum Jr (1984) argue that effective performance needs not to be too narrow to profit but considers other appropriate criteria such as market share, morale, growth, flexibility, efficiency and quality.

The next key dimension is environment. Early studies of contingency theorist examines the characteristics (e.g. uncertainty and rate of change) of market and technological environments affecting the internal structures of an organizations. Thompson (1967) argues the environment dimension along the homogenous/heterogeneous and stable/shifting categories. Likewise, Tosi Jr and Slocum Jr (1984) reason that a theory must include the array of environmental sectors with which an organization interacts. Finally, the third key dimension of contingency theory is congruency or fit. Contingency theory posits that firm performance is dependent on the “fit” between the structure and process; and the environment (Miller 1987; Thompson 1967; Lawrence and Lorsch 1967). Chiefly, contingency approach propose that performance is the fit between several factors: structure, people, technology, strategy and culture.

As in other organizational theories, there are some disputes of the theory. Critiques of contingency approach argue that three key dimension needs further sharpening (Tosi Jr and Slocum Jr 1984). While, Schoonhoven (1981) argues that in a conventional sense, CT is not a theory at all but merely an orienting strategy to conceptualise or explain a phenomenon. Despite these, the CT is arguably and widely accepted as the logic is compelling that there is no one best way to manage. The theory also gained considerable usage amongst SCM studies. Recent studies posit that this mid-range theory boundary conditions impacts trust and collaboration in achieving superior buyer-supplier performance, in particular of agility performance. Authors, (MacMahon and Peritt 1973; Luthans and Stewart 1977; Narayanan, Narasimhan and Schoenherr 2015) argue that identifying conditions around the phenomenon under investigation enables the development of richer theory, and accordingly this is in tandem with the perspective of contingency theory.

*Literature surveyed suggest the adoption of CT based on the three variable of contingency variables, response variables and performance variables, that reflects the direction of this study.*

#### **2.7.4.2 TCA versus PAT (Adoption of Framework Arrangement Construct)**

This study dwells further on the dominant inter-organizational theories that shape present literature on SCM. Firstly, a glance of the TCA. TCA advocate transaction as central to the theory, and that market versus hierarchical governance structure base on the level of opportunism of a relationship (Williamson 1975b). The key assumptions of the theory are bounded rationality and opportunism (Rindfleisch and Heidi 1997). Bounded rationality refers to decision maker's intention of being rational, however limited to the ability of managing and communicating information without error, and, this condition is seen as a problem during uncertainty. The next key assumption, opportunism indicates that human actors in the exchange will be guided by considerations of self-interest with guile (Grover and Malhotra 2003). In terms of constructs, the fundamental depiction of the theory includes asset specificity, uncertainty and governance mechanism.

Firstly, asset specificity refers to the transferability of assets that supports a transaction: human specificity (example training of staff for partner); and, physical specificity which refers to investment by supplier on tools, and for investment in information system. The next construct is uncertainty which refers to unanticipated changes in circumstances surrounding a transaction. These includes environmental uncertainty that reflects unpredictability, and, behavioural predictability, which includes performance evaluation and information asymmetry problem. The last construct are market and hierarchy that represent governance mechanism in its purest form. Market and hierarchy (the firm), each has different mechanism for coordinating the flow of the material and services through value chain. A vertical integrated entities direct this flow at the higher level in the management of hierarchy (Malone, Yates and Benjamin 1987; Grover and Malhotra 2003). As an example, Heidi (1994) argues that in a buyer-supplier relationship, the supplier manages the authority, procedures even incentives and these structures allow such decision on design, price, delivery and quantity. According to Rindfleisch and Heidi (1997), dependent construct is governance structure while the other three constructs are independent constructs.

In terms of measurement, Grover and Malhotra (2003) summarised past literatures as follows: (1) asset specificity can be measured as latent structure in the context of human asset specificity (Anderson 1985; Heidi and John 1990; Klein, Frazier and Roth 1989; Sriram, Krapfel and Spekman 1992); (2) environmental uncertainty can be measured on the unpredictability of the external environment (Heidi and John 1990; Anderson 1985); (3) behavioural uncertainty measured through seven-point scale monitoring the contractual performance of exchange partners (Williamson 1985; Anderson 1985) or assessing behavioural uncertainty as an issue of performance assessment; and, (4) governance mechanism measured by the degree of vertical integration (Balakrishnan and Wernerfelt 1986; Hu and Chen 1993; Levy 1985).

Halldorsson et al. (2007) contend that TCA perspective in SCM as coordination of transferred right. In this perspective, TCA could be employed to determine firm's boundaries and can be utilised to exhibit efficiency as the reason for entering inter-organizational arrangements (Williamson 1985, 1996, 1999). A firm may reduce its total transaction cost (*ex-ante* and *ex-post* cost of contact, contract and control by cooperating with external partner (Halldorsson et al. 2007). In this sense, firm should determine which activity to be performed within its boundary and which should be outsourced.

In addition to this, TCA has been well accepted to examine performance implications in buyer-supplier relationships (Williamson 1999; Williamson 2008). According to TCA, the decision to use either vertical integration/ hierarchies or market mechanisms depends on the relative monitoring costs that arise from bounded rationality, and from uncertainties due to partner's self-interest and opportunism (Kaufman, Wood and Theyel 2000; Buvik and John 2000). In addition, it is also noted that TCA theorem also expands in SCM governance in which the important constructs includes asset specificity, uncertainty and transaction frequency (Grover and Malhotra 2003).

As can be seen, asset specificity refers to physical sites, human and dedicated assets, and, is known as the instrumental attribute to transaction. Next, transaction cost is also influenced by the bounded rationality of a firm based on the behavioural assumptions as well as the risk of opportunistic behaviour of its partner through insufficient

information. To mitigate risk, trust between parties should be built based on calculated risk (Williamson 1996), and, the use of contract for partner commitments and as a mechanism to reduce risk of opportunism is necessary.

Contrarily, PAT and positivist agency theory, both has its roots from the agency theory. According to Jensen and Meckling (1976); (Ross 1973), agency theory extends the body of knowledge of the cooperating parties risk sharing on agency problem over the parties' difference of goals and risk preference. Eisenhardt (1989a) summarises agency theory domain as relationships that mirror the basic agency structure of a principal and an agent who are engaged in cooperative behaviour, but have differing goals and differing attitudes toward risk. More specifically, Eisenhardt (1989a) argues that agency theory concerns about two agency problems: firstly, the problem that arises when the goals of the parties are in conflict and the principal's high cost to verify the activity of an agent; and, secondly, the problem of risk sharing that arises when the principal and agent attitudes have towards risk.

PAT concerns about principal-agent relationship, in particular identifying and determining optimal contract, behaviour versus outcome between principal and the agent. In SCM studies, PAT aims to mitigate agency problems in particular due to separation of ownership and control of economic activities between the agent and principal, various problems that may arise between the parties such asymmetric information, outcome uncertainty, difference of risk aversion, self-interest behaviour and bounded rationality (Halldorsson et al. 2007). Hence, to enable such mitigating role in the agency problem, literatures advocate that SCM partners should create a contract with these attributes: firstly, to motivate the agent to act in the interest of the principal, a contract should include the right behavioural and outcome-based incentives (Eisenhardt 1989a; Logan 2000); and secondly, to mitigate misalignment, a contract should be balance in rewards and penalties (Baiman and Rajan 2002; Narayanan and Raman 2004).

*TCA is used to recognise firm's boundary to exhibit efficiency (reduced transaction cost) with inter-organizational arrangement and mitigates risk of opportunity with relationship, whilst PAT requires contract with right behavioural and outcome-based incentives to mitigate risk on agency problem.*

### **2.7.4.3 SET versus NT (adoption for buyer-supplier relationship collaboration constructs)**

The evolution of the social exchange theory (SET) was premised on cost-profit view for individuals or organisations as motivation to interact, and, behaviour for exchange with others are based on rewards or reciprocal benefits as in the case of SCM partners (Wei, Wong and Lai 2012; Luna-Reyes et al. 2005; Kwon and Suh 2005; Kale and Singh 2009; Emerson 1976). SET emphasizes on reciprocating benefits as the theory professes that people cooperate under the expectation that they will give and receive from the relationship (Blau 1964; Merminod, Nollet and Pache 2014). In contrast to a network perspective, SET from a dyadic perspective suggests that social attributes, such as trust and commitment, and reciprocity are key drivers of performance in exchange relationships (Palmatier 2008; Palmatier et al. 2013; Kozlenkova et al. 2017).

Some SCM studies point that there are four key issues often described as constructs that define SET integrative manner: trust, commitment, reciprocity and power (Narasimhan et al. 2009; Griffith, Harvey and Lusch 2006; Doney and Canon 1997; Zacharia, Nancy and Robert 2009), whilst others (Wu, Chuang and Hsu 2014; Myhr and Spekman 2005; Shue, Yen and Chae 2006) advocate that information sharing and collaboration between buyer and suppliers as SCM performance enablers based on SET. This study reviews these constructs of specific order before performing synthesis under the gap sections:

#### ***Trust***

Trust implies to the degree to which the relationship partners perceived each other as credible and benevolent (Ganesan 1994). The author professes that credibility refers to the extent to which a firm in a relationship believes the other party has the expertise to perform the task effectively, whereas benevolence transpires when one partner in a relationship believes that the other partner has intentions and motives that will benefit the relationships.

#### ***Collaboration***

Next concept, collaboration, in essence means the process mutual decision-making towards achieving common goals amongst members (Vachon and Klassen 2008; Smith et al. 2007). Collaborative activities could include dedicated investment, information sharing and joint relationship effort. Despite studies argues that collaboration among supply chain partners may result in greater economic benefits transactional exchange relationship (Paulraj, Lado and Chen 2008), however it's worth noting that collaboration at norm requires greater investment such as human resources and technology (Lambert and Knemeyer 2004; Nyaga, Whipple and Lynch 2010; Whipple and Russel 2007). Despite this, collaboration arguably is important in many business scenarios. One of which is when incomplete contracting exists because parties could not rely on the contractual mechanism, collaborative activities could serve as a mechanism for "working out" problems that may arise. In terms of achieving customer responsiveness, collaboration is contended as crucial step for superior agility performance in buyer-supplier relationship.

### ***Information sharing***

Equally important of these key constructs are the concepts of information sharing and collaboration between buyer and suppliers, and SET factors, has been advocated as SCM performance enablers (Wu, Chuang and Hsu 2014; Myhr and Spekman 2005; Shue, Yen and Chae 2006). Information sharing implies the extent that critical information is conveyed to a party's relations (Mohr and Speakman 1994). Information sharing may include early stages of product design, sharing cost information, future product development and sometimes even the supply and demand forecast (Cannon and Perreault Jr 1999). Incomplete information sharing amongst SC partners when happens, the result may produce a "bullwhip effect" with direct consequences of increased cost and reduced profit margin, and said to be critical factor in SCM (Narasimhan and Nair 2005). On the contrary, greater sharing of information was accentuated as means that could reduce uncertainty thereby improving the level of trust and commitment in relationship (Doney and Canon 1997; Kwon and Suh 2005; Anderson and Weitz 1992; Monczka et al. 1998).

### ***Commitment, reciprocity and power***

Firstly, commitment represents the beliefs of the partners in relationships that an ongoing relationship is important and worth working on for continuity (Morgan and

Hunt 1994). In addition, studies indicate that commitment could result in mutual gain between partners (Anderson and Weitz 1992) and performance improvement of the firms (Krause, Handfield and Tyler 2007; Prahinski and Benton 2004). Secondly, reciprocity and justice, and, power and relative dependence, are defined similarly. Griffith, Harvey, and Lusch (2006) and Narasimhan et al. (2009) argue that partner receiving a valued contribution in an appropriate response in a justice manner as well as the relative dependence between two partner in an exchange behaviour determines the relative power.

In contrast, NT centres on the relationships that a firm has with others and how these relationship affects a firms' behaviour and outcomes (Thorelli 1986). Central to this theory is the assumption that organization or firms are embedded within a network of relationships (Mohezar and Zailani 2015). Prior works adopted a relational exchange view as organisations move from pure transaction-based to relational interaction. The relational exchange viewed as a network or the dyadic buyer-supplier relationship (Halldorsson et al. 2007). Hearnshaw and Wilson (2013) argue that when modelling exchange relationships, critical connection are the presence of contract and various flow types including material flows, information flow and financial flow. These relationships provide constraint and opportunity for the organization. A weak tie between firms in a chain might signal two acquaintances that meet once for a short of time and may never interact with each other again. This type of relationships may have little incentive for responsible practise since the loss of this weak relationship is minimal. Likewise, in a strong relationship cooperation, trust, intimacy and empathy are developed between trading partners. In this affiliation, interaction is frequent with each party reciprocating trust and positive effect of the other.

The social network contrast with the type of sociological theory that defines society as built up of individuals and the actors could even be groups, companies or even countries. Social network theory models people as nodes on a graph, and their relationship as the edges of the graphs (Salleh, Moghavvemi and Sulaiman 2015). Thus, two people are directly connected if they have a relationship with each other; they are link way from one another. More distant relationship is modelled as paths through the graphs: a friend of friend is two links away. However, in a real-world

networks, key properties described as universal from a multi-disciplinary view (Barabasi 2009; Ramasco, Dorogovtsev and Pastor-Satorras 2004) is presented in Table 2.12.

Table 2.12: Comparison of the Key Properties of Supply Chain Systems versus Various Network

Network model	Characteristics path length	Network properties Clustering coefficient	Connectivity distribution
Efficient supply chains	Short	High	Power Law
Regular network model	Long	High	Constant
Random network model	Short	Low	Normal/Poisson
Watts-Strogatz model	Short	High	Depends on $\rho$
Barabasi-Albert model	Short	Low	Power Law

Source: (Hearnshaw and Wilson 2013)

Authors (Yin 2003; Barabasi 2009; Ramasco, Dorogovtsev and Pastor-Satorras 2004) contend that in an efficient network should have a short characteristic path length, a higher clustering coefficient and the presence of power law connectivity distribution. Hence, (Kajikawa et al. 2010) argue that shortening the long distance connection would be beneficial and increase the efficiency of the system. To understand the logic, the path length refers to average distance between any two nodes chosen at random. A short characteristic path length like information flows indicates that the supply chain is able to diffuse and circulate information rapidly throughout the entire system which facilitate more efficient material and financial flows (Hearnshaw and Wilson 2013) . Next, a connectivity distribution refers to the average number of connections possessed by each node in the network, and, a power law connectivity is referred as heterogeneous connectivity distribution of a small number of highly connected nodes and a large number of number of nodes with low number of connections.

Moving on to clustering coefficient, these represent network transitivity which is the average probability of two neighbouring nodes that are connected to a given local node are also connected to each other. This expressed as ratios between actual number of clusters and total possible number of transitive and intransitive clusters in a systems (Granovetter 1973). The determination of clustering coefficient in a supply chain is significant to provide oversight of a triadic relationship, and how dyadic relationship

can be affected by adjoining relationship. An example of this is the information flow on improving collaboration and reducing opportunistic behaviour (Choi and Wu 2009; Madhavan, Gynwali and He 2004). The relationship of ties between nodes may represent a flow of resources that can be material or non-material. The resources might include social support, emotional support, information, expertise, business transaction or even share activity. The four fundamental principles of models built using NT are: (1) the independent of actor; (2) relations or ties consisting in the flow of transfer of resources; (3) the constraining and/or enabling of individual actors by network; and (4) the generation of long-lasting ties and network by social structures (Stanley and Katherine 1999).

*Depending on the scope, most SCM literatures manifest dyadic relationship between buyer-seller/supplier, and triadic relationship which additionally includes other actors of the network.*

#### **2.7.4.4 Other Relevant Theories (RBV and RDT)**

RBV supports strategic involvement of various groups using different organisational level competencies to improve performance in order to obtain a competitive position in the industry (Barney 1991; Rugman and Verbeke 2002). Arguably the task of identifying dynamic capabilities and skills within the organisation are difficult to be done. However, as argued by authors (Gunasekaran, Patel and McGaughey 2004; Danese 2007), SC partners need to assess its own strength and weakness to decide the required level of collaboration, and that the SC collaboration collectively enhances the performance of SCs by means of resource dependency on each other and long term collaborative arrangements. It is also argued that the theoretical underpinning of RBV and RDT are foundations for further understanding of success of SC collaborations and long-term partnerships in the key aspects of SC collaboration (planning, execution and decision making).

Next, with regards to RDT, the basic assumption is that the SC cannot be responsive to the demand without cooperation and support from other SC partners. According to (Sarkis, Zhu and Lai 2011), RDT supports the dependency of SC players for demand information and inventory position from downstream retailers. The information will be collectively gathered amongst the SC partners for planning, production and

replenishments (Ramanathan and Muyldermans 2010). In relation to this study, the collaboration between these SC partners tends to be for long-term, seeking higher performance gains by depending each other (Pfeffer and Salancik 2003, 1978).

*This study argues that information sharing on dyadic relationship for humanitarian aid based on temporary supply chain as it is compatible on inter-firm collaboration.*

### **2.7.5 Evidence of Complementary Theory Perspective**

Complementary perspective on inter-organisational and multi-disciplinary is evidential on numerous literatures. For example, scholars refer SCM hybrid governance as an attractive option that allows for governance through contractual means (Williamson 1985; Oshri, J. and Gerbasi 2015), or governance through relational means (Heidi and John 1990; Cheng, Chen and Huang 2014). In explaining hybrid governance, Nyaga, Whipple, and Lynch (2010) explained that their work expands the foundation of the existing theory and TCA with social exchange theory (SET), which focuses on the norms of reciprocating benefits such that people cooperate under the expectation that they will give and receive from the relationship.

Secondly, Ruekert, Walker, and Roering (1985) put forward contingency theory to structure and performance of marketing activities at work unit level, by combining traditional organizational theory and TCA. The study suggests that performance outcome of a marketing activity is viewed as dependent on the nature of the task, the way in which the task is organised, and the nature of its environment. The contingency theory propositions as advocated by the authors pertains to organisation and efficiency, formalisation and efficiency, centralisation and effectiveness, and specialisation and adaptiveness.

Thirdly, Halldorsson et al. (2007) argue that while previous SCM studies lack the use of theory, there might be no “right” theory for the management of supply chains. Using the foundation of SCM as a management of inter-connected socio-economic activities and based on rationale that existing literatures discuss merely about how to design and manage SCM and not addressing the economic, strategic and socio-economic theoretical justifications. Therefore, the authors developed a middle-range theoretical frame of reference to explain SCM based on TCA, PAT, RBV and NT. The logic for

the selection of the theories was that middle range theories had broader theoretical range and use of many abstract concepts for formal theory.

For instance, the aforementioned authors denote the following SCM soundness: firstly, on PAT, SCM as mitigating agency problems; secondly on TCA, SCM as coordination of transferred rights of disposal; thirdly on NT, SCM as reciprocated interaction between institution; and, fourthly on RBV, SCM as coordination of relational assets. In addition to this, the theoretical frame used the new institutional economic perspective to explain the managerial arena of SCM based on two questions: first, how to structure a supply chain when perceived as institution, using TCA and/or PAT; and, secondly, what is needed to manage this structure, justified by utilising NT and/or RBV.

Table 2.13 represents the complementary theories' key assumptions, and application in SCM (Halldorsson et al. 2007; Halldórson, Hsuan and Kotzab 2015). The study also concluded by advancing a middle-range theoretical frame of reference for SCM as shown in Figure 2.10. The theoretical frame of reference which the authors profess could provide theoretical explanation of how to structure and manage supply chain is presented in two parts: (1) Lower part, which illustrates the managerial arena of SCM consisting prerequisites, interaction between structure, processes and management and outcome; and (2) the theoretical framework to analyse and explain the phenomena in the management arena of SCM.

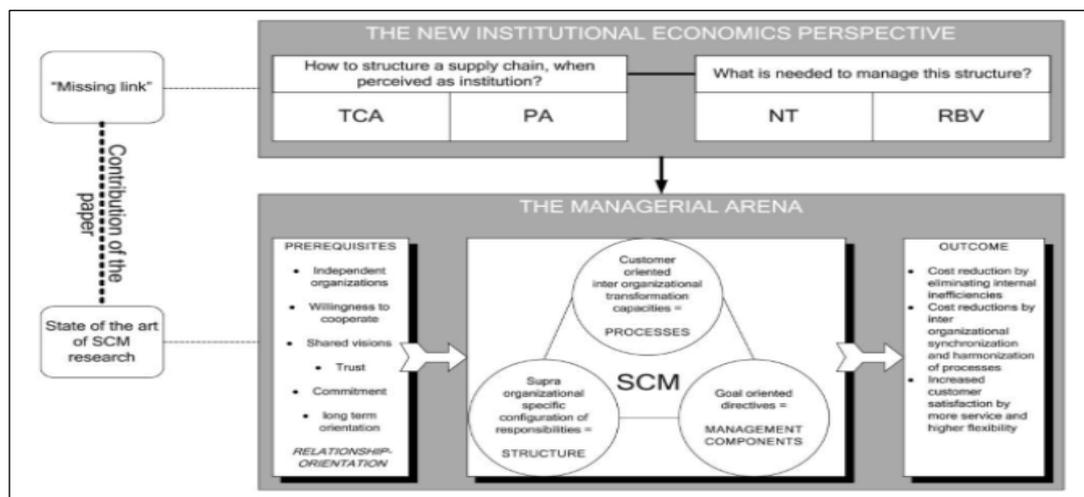


Figure 2. 10: A Middle-range Theoretical Frame of Reference for SCM

Source: Halldorsson et al. (2007)

Table 2.13: Comparison of PAT, TCA, NT and RBV

Characteristics	PAT	TCA	RBV	NT
Behavioural assumptions	Bounded rationality Asymmetric information Goal conflicts	Bounded rationality Opportunism	Bounded rationality Trust	Bounded rationality Trust
Key Problems	Design of the most efficient contract	Efficient governance structure	Resource heterogeneity for competitive advantage	Dyadic relationship embedded in network
Primary focus of analysis	Contract, incentives and alignment	Transaction attributes (e.g. asset specificity)	Resource attributes	Inter-firm relations
Primary function of relationship	Efficient division of labour (ownership/control)	Market failures	Access to complementary resources	Interface (resource ties: activity links; actor bonds)
Primary domain of interest in SCM	Alignment of incentives in dyads	Efficient boundaries of the firm	Access to complimentary resources	Exchange and adaptation process
Application in SCM	Vendor owned inventory Supply chain quality management Supplier risk Asymmetric relationships in supply networks Cost monitoring of supplies Agency costs and make-or-buy Separation of ownership and control in buyer-supplier relationship Explain why supplier may be unwilling to share insensitive information Lack of trust in supply chain relationships Goal conflicts between buyers and suppliers Outcome uncertainty and risk incentives and rewards in contract	Outsourcing information sharing between keys suppliers Supply chain structures Relationship contracting Supply chain governance Relevance and effectiveness of two collaborative strategies (i.e. direct investment in supplier development and close relationship building) Partner selection for strategic alliance Understanding international relationships with critical partners Adversarial relationship	Outsourcing VRINN and resource heterogeneity through collaboration that leads to 'distinctive visibility' in a retail manufacturing supply network. Collaboration to gain access to critical information and knowledge SCM as a resource of sustained competitive advantage of a firm Purchasing strategy for long-term competitive advantage Leveraging and bundling of resources obtained from suppliers Suppliers provide knowledge that can be used by the focal firm to build dynamic capabilities	Collaboration Trust Mutual dependency From chain to network Suppliers as resource providers of members of supply network Interactions and exchanges between firms Collaborative and conflicting relationships Continuous supplier-base assessment Minimize of adverse behaviour from supplier Rationale for developing relationships and benefits of collaboration Types of relationships Critical relationships success factors Supplier selection

Source: Halldorsson et al. (2007)

In conclusion, this study recognises the evolution of theory from single theory to unified application, and notably recent publication suggests an integrative approach to explain SCM of disaster management (Lettieri, Masella and Radaelli 2009). The empirical evidence provided by the studies as explained earlier, on the contrary is merely a snap shot of the use of borrowing or complementary theories perspective as proposed by Halldorsson et al. (2007). In reality, other disciplines are also mooting the move. For example, in the field of strategic management, authors (Bergh et al. 2010) extended the reputation-performance relationship with insights from multiple theories, whilst in policy studies the theories challenge the insistence on rigid universal scientific standard (Cairney 2013). Given these points, this study advocates the adoption of complementary theories perspective for this research.

## **2.8 Gaps in the Academic Literature**

This multi-faceted literature review on humanitarian aid and response mechanism, SCM, the adoption of FA, and lean, agile and leagile strategies for performance measures cover considerable conceptual territory. Another key point from this literature analysis as shown in Table 2.14 features the interconnection between humanitarian relief stages to procurement method adapted and in relation to the characteristics of the SCM performance concepts of lean, agile, and leagile. For the most part, it could be argued that the interconnection is still not well understood and therefore presents the opportunity for further investigation and an understanding of the phases of disaster management is shown in Table 2.14.

Finally, a summary taxonomy of this literature analysis is presented in Table 2.15. Based on Table 2.15, the thematic pattern of this literature review focusses on HROs, humanitarian relief, and SCM function of procurement and its method, and performance measurement. Prominent seminal works are discussed in Chakravarty (2011) on contingency responses and collaborative incentive contracts, Balcik and Ak (2014) on FA and collaborative FA, Beamon (2004) on SCM performance measurement, Jahre and Fabbe-Costes (2015) on modularity and SCM performance, and, Halldorsson et al. (2007) and Burcu Balcik et al. (2015) on complementary theory perspective for SCM and disaster relief. The study attempts to provide not only meaningful insights of the phenomena, but also for originality of a clearly presented

gap as well as for conceptual classification. In the foreground of this section, a discussion of the identified gaps will be depicted

Table 2.14: Effect of Supply Element and Strategic Supply Chain Description based on Type of Responses in Humanitarian Aid

Disaster Management Cycle	Response	Procurement Method	Leanness & Agility				Characteristic
			Quantity	Redundancy	Cost	Lead Time	
Prevention and Planning (Pre-disaster)	Proactive	Open Tender/ Competitive bid	Forecasted	High	Low	Fast (pre)	Lean high (lower cost, possible stock redundancy), Agile moderate (pre-position, low flexibility and supply supports pre > post disaster)
Prevention and Planning (During & post disaster)	Contingency	Framework Arrangement/ Emergency purchase (ad-hoc)	Forecasted, then Known	Low	Low	Fast (pre and post)	Leagile: Lean high (lower & flexible cost) Agile high: (supports pre-position, higher flexibility, supply support pre = post disaster)
Reaction and Recovery (Post disaster)	Reactive	Open Tender & or <i>Ad Hoc</i>	Known	Low	High	Fast (post)	Lean Low (lower stock redundancy, higher procurement cost) High Agile (low flexibility, supply support post > pre disaster)

Source: Author

Table 2. 15: Literature Taxonomy based on Major Theme of the Study

Theme	Author	Theory/Contribution
<b>Procurement and SCM issue in HRO (Problem Statement and RQs)</b>		
Collaborative FA	(Balcik and Ak 2014)	Lack of studies of the use collaborative FA for small suppliers' adoption
	Kwon and Kim (2018)	Collaborative framework agreement as investment in preparedness stage and as future research agenda.
Performance measurement	Beamon (2004)	Lack of performance measurement in humanitarian aid.
Weakness in Open Contract Management	Wang (2012)	Use of OC in Taiwan and its issues include regulation conflict, supplier performance and operational aspects.
<b>Conceptual Framework Development</b>		
Contingent Response	(Chakravarty 2011)	Contingent response is proactive response of low value until threshold and activate reactive response. A mathematical model for contingent response and suggest collaboration between actors and an incentive contract.
Humanitarian Aid SCM Strategies	Jahre (2017)	Pointed FA, collaboration (buyer-supplier relationship and information sharing), postponement, pre-positioning as strategies to mitigate risk in humanitarian operations
Preparedness strategy and FA	(Lu, Goh and Souza 2014)	Strategic planning focuses on preparedness strategies, and the use of framework agreement to leverage on responses.
FA (Supplier selection)	(Balcik and Ak 2014)	Provided the empirical of the use of FA for quick and cost-effective procurement of relief supplies. Methodologically used case study.
Linking product and buyer-supplier strategy	Kraljic (1983)	Kraljic's matrix for product category, procurement strategy and supplier-buyer relationship
Association of SCM agile to effectiveness and efficiency	Scholten, Scott et.al (2010), Cozzolino, Rossi, and Conforti (2012)	Linking lean and agility to effectiveness and efficiency in disaster response
Modularity, Lean. Agile. Flexibility and SCM responsiveness	Jahre and Fabbe-Costes (2015)	Framework for categorisation of modular & standard in humanitarian aid
Drivers of SC Agile/Leagile	Gaudenzi and Christopher (2015) Van der Vorst, Van Dijk, and Beulens (2001)	Summarized drivers of agility and leagile based on sectors (disaster management and humanitarian aid is still not explored in literature). Leagility twin objectives of reducing supply chain cost (lean) and responsiveness (agile) De-coupling point as leagile driver in food sector

Theoretical perspective		
Complementary Theories in SCM	(Halldorsson et al. 2007); (Halldorson, Hsuan and Kotzab 2015); (Burcu Balcik et al. 2015)	SCM is an inter-disciplinary concept, complementary theories to explain inter-firm governance and decision making.
<b>Concepts of the Study:</b> <ul style="list-style-type: none"> <li>• Uncertainty</li> <li>• Contingency response</li> <li>• SCM performance of Agile/leagile</li> <li>• Collaborative FA as SCM enablers/drivers</li> </ul>	(Zeithaml, “Rajan” Varadarajan and Zeithaml 1988). Morgan (2007) Rindfleisch and Heidi 1997) (Narasimhan et al. 2009; Griffith, Harvey and Lusch 2006; Doney and Canon 1997; Zacharia, Nancy and Robert 2009; Wu, Chuang and Hsu 2014; Myhr and Spekman 2005; Shue, Yen and Chae 2006)	<b>Constructs for the study:</b> Contingency theory-building and outcome based: <ul style="list-style-type: none"> <li>• Contingency variable (CV) (situational characteristics)</li> <li>• Response variable (RV) (response to contingency factors)</li> <li>• Performance variable (PV) (fit between CV and RV, measures effectiveness)</li> </ul> Transactional cost Analysis (TCA): <ul style="list-style-type: none"> <li>• Uncertainty, bounded rationality, asset specificity, governance to mitigate risk of opportunism through inter-firm relationship</li> <li>• Social exchange theory (SET):</li> <li>• Collaboration, information sharing, trust, commitment, power and reciprocity</li> </ul>
Methodology and performance measurement tools for Lean, Agile & Leagile		
Performance measurement tools for <b>procurement</b> to measure lean, agile, leagile based on strategic priority	Kraljic (1983); Drake, Lee, and Hussain (2013) Gaudenzi and Christopher (2015)	Lean and Agile Purchasing Portfolio Model Categorization of product into lean, agile, leagile quadrant on competitive based on strategic priorities: cost, quality, time and flexibility (expansion of Kraljic’ matrix)
Performance measurement for <b>Supply</b> (physical movement) based on lean, agile, leagile	Womack et al. (1990), Christopher and Towill (2001), Christopher (2005) Cuzzolino, Rossi, and Conforti (2012) Gaudenzi and Christopher (2015)	Lean SC (reduced waste and cost), Agile (focuses on speed, flexibility), Leagile [employs both lean and agile, a decoupling point (trigger) to move from lean to agile] Agile exists in restoring stage (for effectiveness) and lean in reconstruction stage (for efficiency). Typically, leagile achieved through de-coupling point. Lack of case studies demonstrating how practically leagile implemented Metrics for performance of SC leagile: lean (efficiency, SC upstream) and agile (effectiveness, SC downstream)
SCM responsiveness using standard & modular	(Jahre and Fabbe-Costes 2015a)	<ul style="list-style-type: none"> <li>• Narrowed the gap between the use standards and modular for SCM performance (Lean and Agile) and responsiveness.</li> <li>• Methodologically used case study.</li> </ul>
Construct measurement tool SC Performance Procurement performance metrics Case studies	Gunasekaran, Patel and McCaughey (2004) Corbin and Strauss (2008, 2015) Drake, Lee, and Hussain (2013) Van Der Lan et.al 2009; McLachlin et. al 2009; de Leeuw 2010; Abidi, de Leeuw and Klumpp 2014)	Non-financial measures, metrics to measure SC activities (lead time, quality assurance, cost savings initiatives, pricing against market, flexibility) based on assessment (high, moderate, low of importance) and strategic performance metric (contingency response Dimension and properties (high, low, moderate) for grounded theory Analytical hierarchy process (AHP) The method most used to investigate the topic of performance measurement and management in humanitarian supply chains is case studies.

Source: Author

## 2.8.1 Details of Gaps Identified

Based on the literature analysis and the summaries presented in the previously highlighted taxonomy, details discussion of the gaps identified from various literature sources is presented as follows:

### 2.8.1.1 Critique to the Gap provided by Existing Literature

Firstly, based on the seminal work of Chakravarty (2011) it is suggested that contingency response is an ideal response mechanism for more effective and efficient relief supplies. The gap provided by the study is that contingency mechanism will have to be supported by an incentive contract, and communication through collaboration. While this study supports collaboration as means to enhance efficiency in humanitarian as pointed by Balcik et al. (2010), the role of collaboration in the emergency preparedness phase is not well studied. However, it is unclear and that there is not enough evidence to suggest an incentive contract between buyer and seller supports efficiency and effectiveness in a humanitarian aid supply chain management.

Notably, there has been some effort done by academicians to address the use of incentive contracts for an efficient disaster relief supplies, for example, OC (Wang 2012) and PPOC (Wang et al. 2015). However, both papers on OC and PPOC do not explicitly address how procurement plays a role in establishing the contract working condition. On the contrary, consistent with the present development of contemporary HLSCM research, the use of FA convincingly has been used many recent literatures (Lu, Goh and Souza 2014; Balcik and Ak 2014), hence the phenomena offers an alternate mechanism to address an adoptive of contingency response for the disaster relief supplies of humanitarian aid.

*Overall Gap: The present literature lacks the use of FA instead of an incentive contract, to encourage information sharing through collaboration to increase efficiency and effectiveness of the humanitarian aid purchasing and supply chain of the relief supplies adapting to a contingency response. In addition, there is a scarcity in the body of knowledge of the working condition of the FA's.*

### **2.8.1.2 Existing Body of Knowledge**

Gaps under the existing SCM body of knowledge highlights the continuous work in understanding the effect of collaborative relationship and the emergent effort owing to the lack of performance measures in the discipline.

#### ***Collaboration between buyer-supplier in HLSCM***

Moving on to buyer-supplier relationship, this study is compelled to highlight that recent studies in SCM suggest that there is a growing trend of focus on promoting collaboration rather than competitiveness (Storey et al. 2006; Matthyssens and Bulte 1994; Carr 1999) via rationalization of supplier networks, and the development of “collaborative” or “partnership” between buyers and suppliers (Balakrishnan 2004). There is also a growing concern on the impact of SCM to various function such as purchasing (Andersen and Rask 2003; Wisner and Tan 2000; Storey et al. 2006). Besides, the growing trends is also given to promoting the lean supply approach (Lamming 1996) in providing more merit into the SCM horizon; promoting agility, a flexible approach when dealing with uncertainty of market demand by managing fragmentation and variety of products/service offering through decoupling points and postponement of final product and lastly, focus on supply chain differentiation techniques such “Quick Response” (QR) and “Efficient Consumer Response” (ECR) (Storey et al. 2006).

Analysts argue that SCM is about influencing behaviour in particular directions and in particular ways and for it to mature as a discipline, progress is vital in the illuminating domain of theory and practice in which there is could be a possible gain by reconceptualizing it in a particular way (Storey et al. 2006). For example, Harland (1999) suggests SCM to a wider definition as “supply strategy,” which includes operation management, purchasing, and supply management, industrial relationship marketing and service management. Storey et al. (2006) describe an idealized supply management characteristic includes shared information across the whole chain (end to end pipe visibility), collaboration and partnership (mutual gains and added value for all, win-win, joint-learning and joint design and development), batch/pack size configured to rate of sale, customer responsiveness, agile and lean, and mass customization.

Hence, relationship or collaboration are concepts widely recognised as gist in SCM related studies. Maon, Lindgreen, and Vanhamme (2009) further reiterate that the potential contribution of collaboration to disaster relief in a strategic capability strategic perspective includes access to corporate infrastructure and co-developed processes that help reduce response times and procurement costs substantially, since they entail agreements with disaster relief agencies' suppliers, standard catalogues that facilitate accurate communications of orders from the field and standardised measurement that recognises the reliability, efficiency and value of SCM practise.

*The existing literature profess of collaboration as potential for strategic value in SCM, however lacks in empirical in the field of disaster relief supply chain. Hence, this supports the identified gap above.*

### ***Lack of Performance measurement in HLSCM***

As humanitarian aid supply chain management was an adaptation of business supply network principles and practices, the concepts of lean-ness and agility, inherent in SCM to describe efficiency and effectiveness advocated for disaster relief lack of performance measurement (Beamon 2004). Scholten, Scott, and Fynes (2010) argues that disaster relief organization processes indicate a high probability of increased efficiency and effectiveness when associating it with disaster relief response. While existing literature on humanitarian aid response focuses on SCM, it is relevant to note that discussion on humanitarian aid procurement method such as collaborative FA is still under represented. In addition, another equally important point is that when discussing the interconnectivity between humanitarian aid and SCM, there is still a paucity of evidence connecting the SCM concepts of lean, agile and leagile to humanitarian aid activity.

*Gap 1: Present body of knowledge lacks humanitarian aid performance measurement through non-financial indicator of cost, quality, flexibility and time for SCM lean, agile and leagile and as described by Beamon (2004) leagile.*

As exhibit in the literature taxonomy of Table 2.15, recent studies by authors (Scholten, Scott and Fynes 2010; Maon, Lindgreen and Vanhamme 2009; Cozzolino, Rossi and Conforti 2012; Jahre and Fabbe-Costes 2015a) provide evidence of lean

and agile as performance measurement in humanitarian SCM. In addition to this, Gaudenzi and Christopher (2015) investigated agility and leagile drivers in the literatures and identified that sectors of electronics, automative, food, fashion, manufacturing-OEM, construction and chemical. In addition, prior studies have identified leagile drivers mostly as de-coupling, modular product solutions, cross functional teamwork and flexible manufacturing. The authors contributed to the body of knowledge by providing practical insights of telecommunications sectors and demonstrated project management as SCM leagile drivers through de-coupling process. Hence, this literature analysis identifies that there is a lack the practical insights from the field of humanitarian aid as well as understanding how FA could play a key role as SCM agile or leagile drivers.

### **2.8.1.3 Kraljic's Portfolio Approach and, Lean and Agile Purchasing Portfolio Model**

As argued earlier, the purchasing portfolio analysis stem on analysing different product groups require different supplier strategy and this provides indication for the right purchasing strategy for each product (Kraljic 1983). Under the extended model, the position of the four products which are strategic products, leverage products, bottle neck products and routine products are in parallel with the buyer-supplier relationship strategic suppliers, leverage suppliers, bottle neck suppliers, and routine suppliers. Each quadrant purchasing portfolio shows the characteristics leading to its procurement method, and when compare parallel to the supplier quadrant reveals balance of power between the buyer and supplier.

Correspondingly, the extension of Kraljic's portfolio approach to lean and agile purchasing portfolio model by Drake, Lee, and Hussain (2013) is to determine the purchasing strategy at the component level of products to support business strategy. The classification the product as functional due to its higher leanness characteristics, or as innovative product due to agility or leagility traits measured by four competitive priorities: (1) cost, (2); quality; (3) time; and (4) flexibility. Moreover, the literature also indicate that the following procurement methods based on type of product which are: (1) for leverage product, competitive bid is performed to obtain best deal; (2) for routine product, e-procurement is suggested; (3) for strategic product based on mutual

long-term relationship; and (4) for bottleneck product, secure supply and reduce supply risk strategy that is proposed.

Comparatively, the FA features promote buyer-seller relationship for efficiency and responsiveness (Balcik and Ak 2014), arguably fits its position as procurement method for strategic product and/or bottleneck products. In like manner of the previous argument, the present body of knowledge scarceness of practical insight of the purchasing thrust and buyer-supplier preference based on humanitarian aid relief supplies, as well as the predicament of FA to these product type quadrant, buyer-supplier preference, and agile or leagile quadrants.

*Gap 3: Scarcity of practical insight of humanitarian organisation's purchasing thrust and buyer supplier-preference based on relief supplies, and how FA fits to the understanding based on the existing models in the literature.*

#### **2.8.1.4 Theoretical Gap - Complementary Perspective**

Evidently, there are existing literature's shortages of complementary theory perspective to explain humanitarian aid SCM and the paucity of the combination of theories provide the opportunity to address the identified theoretical gap. Based on the discussion on the overall gap identified for study, the theoretical underpinning comprises a combination of CT-TCA-SET albeit alternatives of CT-PAT-SET. Furthermore, the development of such theories would add value to inter-disciplinary and inter-firm governance study perspective that has been on the rise in recent publications (Ruekert, Walker and Roering 1985; Halldorsson et al. 2007; Nyaga, Whipple and Lynch 2010; Cairney 2013; Heaslip 2013; Halldórson, Hsuan and Kotzab 2015).

*In relation to overall gap and complementary theories: there are existing literature's shortages of complementary theory perspective to explain humanitarian aid SCM, and the paucity in the combination of theories of CT-TCA-SET to alternatives of CT-PAT-SET.*

### 2.8.1.5 Concepts and Constructs

*Concepts: FA, buyer-supplier collaboration through information sharing, disaster responsiveness based on contingency, and SCM performance of lean, agile and leagile.*

The literature analysis suggests that contingency response promotes the application of leagility strategy in the procurement and supply of disaster relief supplies. This is based on the seminal work of Chakravarty (2011) and the gap presented. By incorporating concepts of FA (as opposed to incentive contract), and buyer-supplier collaboration (for sharing of disaster intensity information) into the contingency response to achieve lean, agile or leagile outcome. Contingency response explanation details out a proactive response by pre-positioning critical items in a pre-disaster phase and once information is realised about the actual demand of the disaster, the effort of meeting the lead time through speedier relief supplies is acted on as a “reactive action” in a post-disaster phase. Understanding this requires an understanding of how leagile is achieved and how the decoupling point is triggered. In achieving leanness while engaging a proactive response mode in the early stage of the disaster.

The aim is to reduce stockpiling of supplies and leveraging on FA’s mechanism of fixed pricing schedule with both supporting cost containment while maintaining quality. In addition, as disaster intensity peaks and supplies actual requirement calculated, the supply strategy converts to a reactive response mode where new and additional supplies are sent to the warehouse and the disaster area. Hence, using the FA mechanism on fixed pricing scheduled and maximised quantity order, agility is expected to be achieved at this stage. A disaster relief organisation is expected to achieve greater flexibility in the supply and speedier delivery, as a pre-purchasing contract is already secured in advance, therefore cutting red-tapes and saving on the possible premium priced for an ad hoc procurement.

Next, in terms of agility, ideal responsiveness is professed through flexibility and on-time delivery to cope with unexpected and respond to short-term changes (Christopher 2000). Finally, adopting the SCM leagility, authors used the information for de-coupling point to engineer leagile, and indicated that appropriate measures are needed to measure performance upstream ‘efficiency’ of the de-coupling point, and

downstream ‘effectiveness (Gaudenzi and Christopher 2015; Naylor, Naim and Berry 1999; Mason-Jones and Towill 1999). It is unclear how the concepts bridge each other, hence the postulation of this study.

*Studies lacks the linkages of concepts of FA, buyer-supplier collaboration through information sharing, disaster responsiveness adapting contingency, and SCM performance of lean, agile and leagile.*

**Constructs:** *CT (contingency variables, response variables and performance variables), TCA (uncertainty, bounded rationality, asset specificity, mitigating risk of opportunism), and SET (collaboration, information sharing, trust, commitment, power and reciprocity).*

To bridge the linkages as concepts, this study supports the argument made by Halldórson, Hsuan, and Kotzab (2015) that SCM theorization appears in various form including: (1) to motivate further theory development; (2) to apply a particular theory (single theory or two or more combination) on a SCM problem; (3) to apply a particular concept from a complementary theories on a SCM problem; and (4) to use complementary theories to explain in a more detail aspects of a particular SCM concept. Hence, following the SCM theorization proposal, the first theory is on contingency theory-building which includes steps that involve three types of variables: contingency variables, response variables and performance variables (Zeithaml, “Rajan” Varadarajan and Zeithaml 1988).

Next, TCA advocates transaction as central to the theory, and that market versus hierarchical governance structure based on the level of opportunism of a relationship (Williamson 1975b). The key assumption of the theory is bounded rationality and opportunism (Rindfleisch and Heidi 1997). Bounded rationality refers to decision maker’s intention of being rational, however limited to the ability of managing and communicating information without error, and, this condition is seen as a problem during uncertainty. FA, as argued, suits such governance is required to mitigate risk of opportunism arising from an inter-firm relationship arrangement.

Finally, information sharing and collaboration between buyer and suppliers and SET factors, has been advocated as SCM performance enablers (Wu, Chuang and Hsu

2014; Myhr and Spekman 2005; Shue, Yen and Chae 2006). In SET, the evolution of the theory was premised on cost-profit view for individuals or organisations as motivation to interact, and, behaviour for exchange with others are based on rewards or reciprocal benefits as in the case of SCM partners (Wei, Wong and Lai 2012; Luna-Reyes et al. 2005; Kwon and Suh 2005; Kale and Singh 2009; Emerson 1976). Whilst, when incomplete information sharing amongst SC partners happens, the result may produce a “bullwhip effect” with direct consequences of increased cost and reduced profit margin, and this is said to be a critical factor in SCM (Narasimhan and Nair 2005). Meanwhile, collaboration in SCM means the process of mutual decision-making towards achieving common goals amongst members (Vachon and Klassen 2008; Smith et al. 2007).

*The constructs provides a particular way to interconnect the concepts through interlocking three range theories. However, the present body of knowledge lacks the methodological and strategy of interlocking, and this further effort could possibly provide value-add to the development of complimenting theories perspective. One possible interlocking perspective is through performing case study, which evidently is a trend in humanitarian logistics and supply chain management domain.*

### **2.8.2 Summary of Gaps and Representation in Diagram**

Based on the previous detailed discussion, a summary of gaps identified is presented in Table 2.16. As exhibited in the table, the gaps from the multidisciplinary literature review is summarised and put into themes of FA, collaboration, performance measurement, complementary theoretical lens, constructs, and concepts. This study contends that while the list of gaps appears to be handful, nonetheless, are the quintessence in understanding the context of one aspect of the humanitarian relief phenomena. Furthermore, prior studies have demonstrated that it is possible to address more than one gap in a study. Hence, this fortitude will be the heart of this study.

The array of gaps identified in Table 2.16, although from separated sources, could be merged and presented in a combined perspective of a high value gap for the study as shown in Figure 2.11. In this figure, the less studied/known area is represented by the blue line. This is summarised that present body of knowledge lacks on the use of collaborative FA instead of an incentive contract, collaboration through information

sharing and buyer-supplier relationship, efficiency and effectiveness (measured through lean, agile, and, leagile) of the humanitarian aid purchasing and supply chain of the relief supplies adapting to a well-known contingency response mechanism.

Table 2.16: Summary of Gap from Academic Literatures

<b>Gap</b>	<b>Existing Academic Literature on SCM and Humanitarian Aid</b>
FA	Lacks empirical in the use of collaborative FA
Collaboration	Lacks empirical in buyer-supplier collaboration
Performance Measures	(1) Lacks empirical in the use of non-financial indicator i.e. cost, quality, flexibility and time (Lean and Agile)
	(2) Lacks empirical of FA as enabler of Agility/Leagile
	(3) Lack insights of the practicality of HRO's purchasing thrust and the prevailing buyer supplier preference relationships
Complementary Theoretical lens	Lacks empirical on other combinations of theories to explain humanitarian relief procurement and supply chain management
Constructs	CT (contingency variables, response variables and performance variables), TCA (uncertainty, bounded rationality, asset specificity, mitigating risk of opportunism), and SET (collaboration, information sharing, trust, commitment, power and reciprocity).
Concepts	Lacks empirical on linkages of FA, buyer-supplier collaboration, contingency response and lean, agile or leagile.

Source: Author

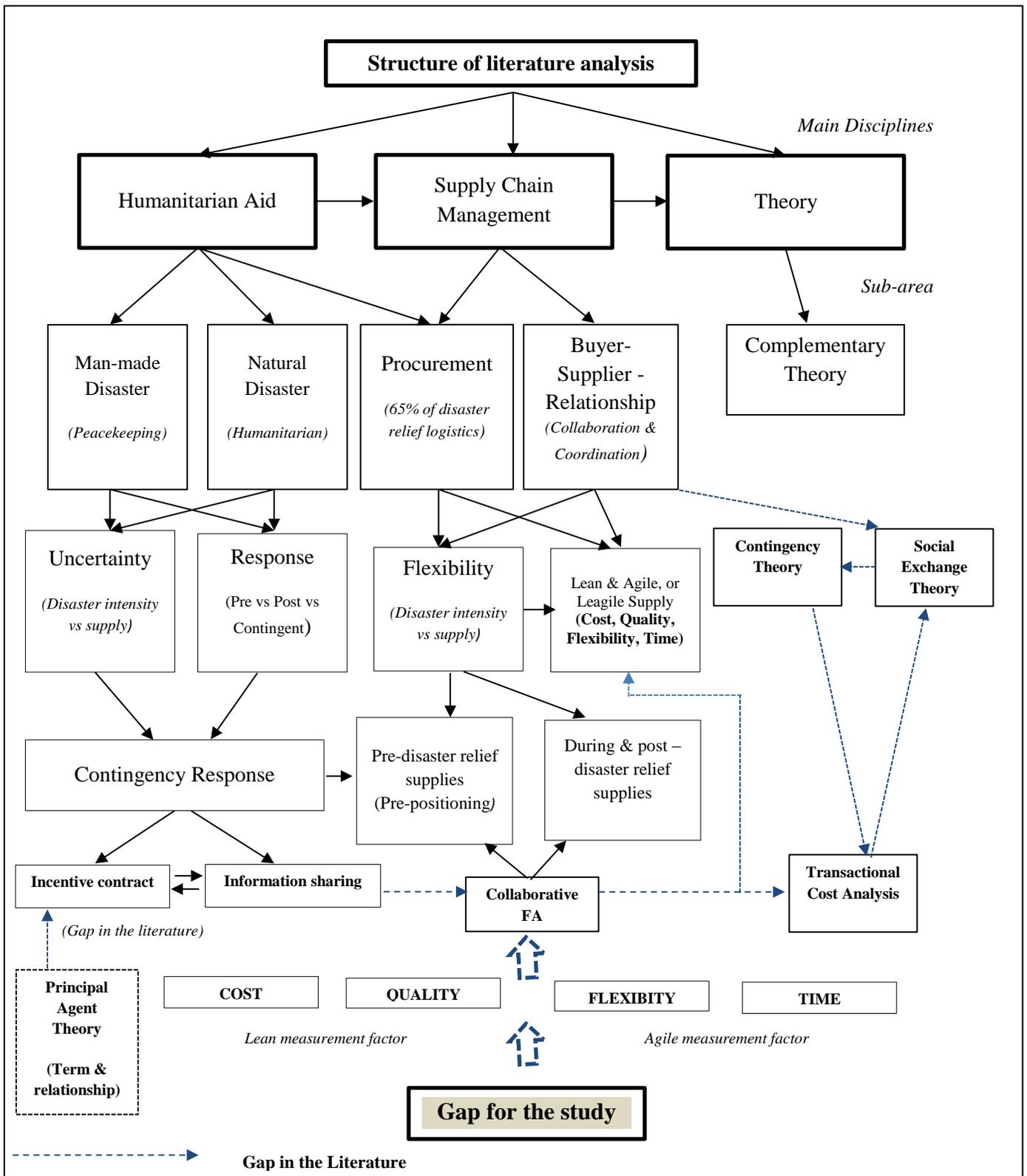


Figure 2. 11: Literature Map and Analysis Diagram for the Study

Format adapted from: (Standing 2012)

## **2.9 Chapter Summary**

This chapter started with a broad view of the phenomenon, and in doing so, has identified the key terms used for the study which are FA, buyer-supplier collaboration, information sharing, contingency response, and lean, agile or leagile SCM. By scouring a range of inter-disciplinary literatures of disaster management, SCM, and purchasing/procurement body of knowledge which includes an in-depth look of the underlying theoretical lens, the study was able to narrow down gaps in the literature on the specific phenomena of humanitarian aid purchasing and supply of relief supplies. Based on both support and critiques of the gap provided by Chakravarty (2011) for instance, incentive contract and information sharing in a contingent response to disaster relief supply, this study was able to capture a fundamental viewpoint and identify prevailing theories.

This literature analysis includes the benefits of addressing the gaps which could be promising to the HLSCM field. It holds strong probability to benefit the academia and add value to HLSCM body of knowledge especially in understanding the logic for the logistics field to continue borrowing theories from a variety of disciplines to explain humanitarian aid, and the methodological drive initiatives for such study. In addition, the adopted theoretical leans of CT-TCA-SET as opposed to CT-PAT-SET is deliberated with the specific concepts and constructs. The upcoming chapters will deliberate the propositions of the study, direct to important questions and suggest ways to make sense of the data for the study.

## **CHAPTER 3: RESEARCH DESIGN (CONCEPTUAL FRAMEWORK, GOALS AND RESEARCH QUESTIONS)**

### **3.1 Introduction**

The research design chapter is separated into two chapters: (1) Chapter 3: Details of the three important parts of the adopted design which are goals, conceptual framework and research questions (RQs); and, (2) Chapter 4: details out the remaining design elements in particular the method and validity. Given these points, the focus of this Chapter is to iron out the theorizing aspect and detailed discussions will be made on the purpose statement of the study followed by the formation of the conceptual framework and the research question/s.

### **3.2 Strategic Questions**

The theoretical understanding of this research is prescribed based on humanitarian aid procurement and SCM as multi-disciplinary field context. In deriving to the method to address the gap of this study, the author adopts the view of Crotty (1998) and Creswell (2000) to conceptualized model for research design based on these strategic questions:

- a. *What knowledge claims are being made by the researcher (including a theoretical perspective)?*
- b. *What strategies of inquiry will inform the procedures?*
- c. *What method of data collection and analysis will be used?*

Arguably, the knowledge claim postulated by this study is to address the gap based on the summary highlighted in Sections 2.8.1 and 2.8.2. The gist as provided by Balcik and Ak (2014) suggests that future work on collaborative FA as alternative to pre-specified term contracts, examining the effects of collaborative agreement on procurement cost and responses offers potential value HROs and small local based suppliers. The potential value to address this gap are as follows:

- i. Establishing lean and agile purchasing portfolio model-based relief item components as an extension of the seminal work of Drake, Lee & Hussain (2013), and Kraljic's extended Portfolio Analysis Approach;

- ii. Establishing conceptual linkages of collaborative FA based on buyer-supplier collaboration, contingency response, and lean, agile or leagile SCM, and adding to present body of knowledge on lean and agile factors as SCM performance measurement metrics;
- iii. Establishing the practical aspect of the above conceptual linkages; and
- iv. Establishing combination of theories to explain disaster relief procurement and supply chain management as an extension to the middle-range theoretical frame of reference for SCM as outlined by authors (Halldorsson et al. 2007; Halldórson, Hsuan and Kotzab 2015).

In effect, the journey of this knowledge development is kicked-off with the purpose statement, theoretical statement and theoretical proposition of the study.

### 3.3 Purpose Statement and Theoretical Proposition

In essence, the purpose statement constructed for the study is to extent the academic insight and practical knowledge of collaborative FA. More precisely, the purpose statement of the study is as follows:

*This study's purpose statement is to address the gap on the lack in academia and practical knowledge of use of **collaborative FA instead of an incentive contract for small and localised supplier**, in particular the use of the former as **driver/catalyst** to encourage collaboration through buyer-supplier relationship and information sharing to achieve **efficiency and effectiveness (measured using SCM lean, agile or leagile)** of the **procurement and supply of humanitarian aid (in particular food item)**.*

*The proposition includes rival explanations, the more it is been addressed and rejected, thus the stronger is the finding of the study.*

Based on the purpose statement, next, the theoretical statement and theoretical proposition is constructed to show theoretical orientation and guides this study methodologically. With this in mind, the theoretical statement and theoretical proposition are formed next.

Theoretical Statement:

*HROs prefer using FA instead of contracts, to secure food supplies based on buyer-supplier relationship and this is believed to be more efficient and effective in the humanitarian aid supply chain.*

This could be broken down to specific statements as follows:

- HROs adopts a procurement and corresponding buyer-supplier strategy differently for each humanitarian aid items to mitigate risk of uncertainties;
- HROs uses collaborative FA as driver to buyer-supplier relationship for a contingency response of distribution of supplies through small and localised supplier and this leads to achieving SCM performance; and
- Depending on the type of FA, the emerging use of collaborative FA for relational with small and localised suppliers may have practical challenges.

Theoretical proposition:

*The theoretical proposition of the study is the inter-link of CT-TCA-SET instead of CT-PAT-SET to explain procurement and supply of humanitarian aid SCM.*

The proposition includes rival explanations which means, the more it is been addressed and rejected, thus the stronger is the finding of the study is. Hence, the theoretical proposition advocated in explaining the present study is the interlink between contingency theory (CT), in particular referring to response progression and means, the transactional cost analysis theory (TCA) based on mitigating risk opportunism through FA, and the social exchange theory (SET) based on the relational aspect between buyer and seller.

### **3.4 Research Design Model and Conceptual Framing**

Research Design as described by Creswell (2014) as type of inquiry within qualitative, quantitative or mixed method approaches that provide specific direction in a research. Maxwell (2013) illustrates a general concept of design issues using an example of a 17<sup>th</sup> century Swedish warship, known as Vasa, which had sunk due to flaw in the way the different components of the planning and construction worked. Hence, Maxwell (2013) articulated further that in a good design, all components works harmoniously

and promote efficient and successful functioning. Hence, the postulation of this study is to address components in the designs to work harmoniously with each other.

Literatures identify notable research design models (LeCompte and Preissle 1993; Miles and Huberman 1994; Robson 2011; Maxwell 2013). However, an interactive model by Maxwell (2013, 5) commonly suggests for qualitative studies to demonstrate how components (goals, conceptual framework, research question, methods and validity) relationships are conceptualised in the present study. Maxwell (2013) reiterates Figure 3.1 with regards to relationship of the components, research question is placed in the centre to link between the two triangles. The author adds that the connection amongst the components are elastic and correspondingly is subjected to certain allowance of bending for demonstration of flexibility, which reflects the strength of a qualitative study. However, in ensuring effective design, the author suggests that constraints imposed by the different components not to be violated. Given these points, this chapter focuses its discussion on an important aspect of the conceptual phase which consists of goals, research questions and conceptual framework.

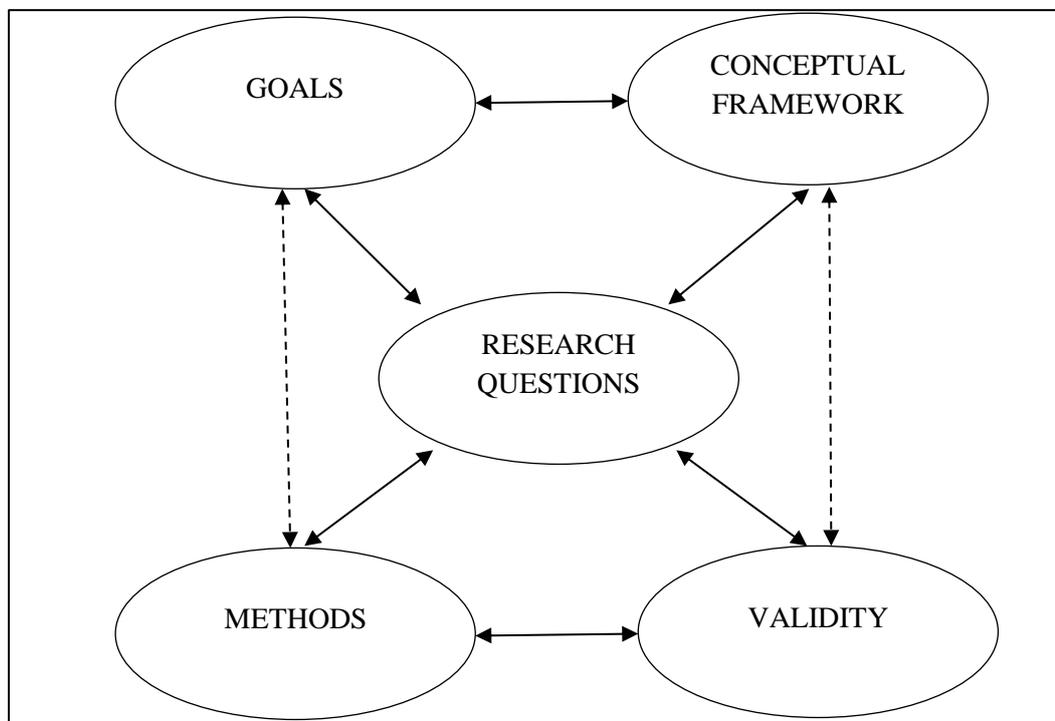


Figure 3.1: An Interactive Model of Research Design

Source: Maxwell (2013)

Discussion surrounding the conceptualising rationale encompasses the development of conceptual framework which involves key tasks such as formulating research problem, a grasp of the social paradigm, articulation of the key sources and concept mapping. The social paradigm perspective will be discussed briefly and elaborated in the next chapter. Firstly, conceptual framework is a system of concepts, assumptions, expectations, beliefs and theories that supports and informs research which is the key part of the study design (Miles and Huberman 1994; Robson 2011; Maxwell 2013).

Equally important is the debate on three key sources for developing the conceptual framework, as shown in Table 3.1: Firstly, experiential knowledge; secondly, existing theory and research; thirdly, and, pilot and exploratory research. The fourth source are the research questions. Generally, these sources could stand-alone or be combined for a more embedded design of the conceptual framework. Nonetheless, an oversight of the broader concept of these sources removes opaque for the construction of the conceptual framework.

Table 3. 1: Four Key Sources for Construction of Conceptual Framework

Source	Explanation	Reference
Experiential knowledge	Researcher's technical knowledge, background and personal experience.	(Berg and Smith 1988; Denzin and Lincoln 2000; Jansen and Peshkin 1992; Maxwell 2013; Strauss 1987; Reason 1994)
Use of prior theory and concept mapping	Limited theory use undermines research credibility.  Concept Mapping could make visible and clarify theory, its relationships and identify possible contradictory theory.	(Dressman 2008; Maxwell 2013).  (Miles and Huberman 1994; Maxwell 2013; Novak and Gowin 1984).
Pilot studies	Provides meanings from the participants/situations to alter conceptual framework.	(Light, Singer and Willet 1990; Maxwell 2013)
Research questions	Core component of linkages and focuses relationship goals and conceptual framework, as well as for methods and validity.	(Miles and Huberman 1994; Maxwell 2013)

Source: Author

### 3.5 Proposed Conceptual Framework

Based on the proposition of the study, FA is represented by TCA as HROs intend to reduce their total transaction cost by cooperating with suppliers. As argued previously in Chapter 2, this is a conceivable theory to examine performance implication in buyer-supplier relationship. For example, in the TCA context, the underlying understanding is that firms define clear boundaries before entering into an inter-organizational arrangement. In contrast, for a contract-based incentive based on PAT underpinnings, firms identify and determines an optimal contract consideration between the principal and the agent. The proposed theoretical preposition based on the former serves as an interlinking to the underlying concepts of collaborative FA, SCM performance enablers (gauged by lean, agile or leagile), HROs adoption of contingency response for supply, and the relational activity between the inter-organisational arrangements. Figure 3.2 exhibits the proposed conceptual framework of the study.

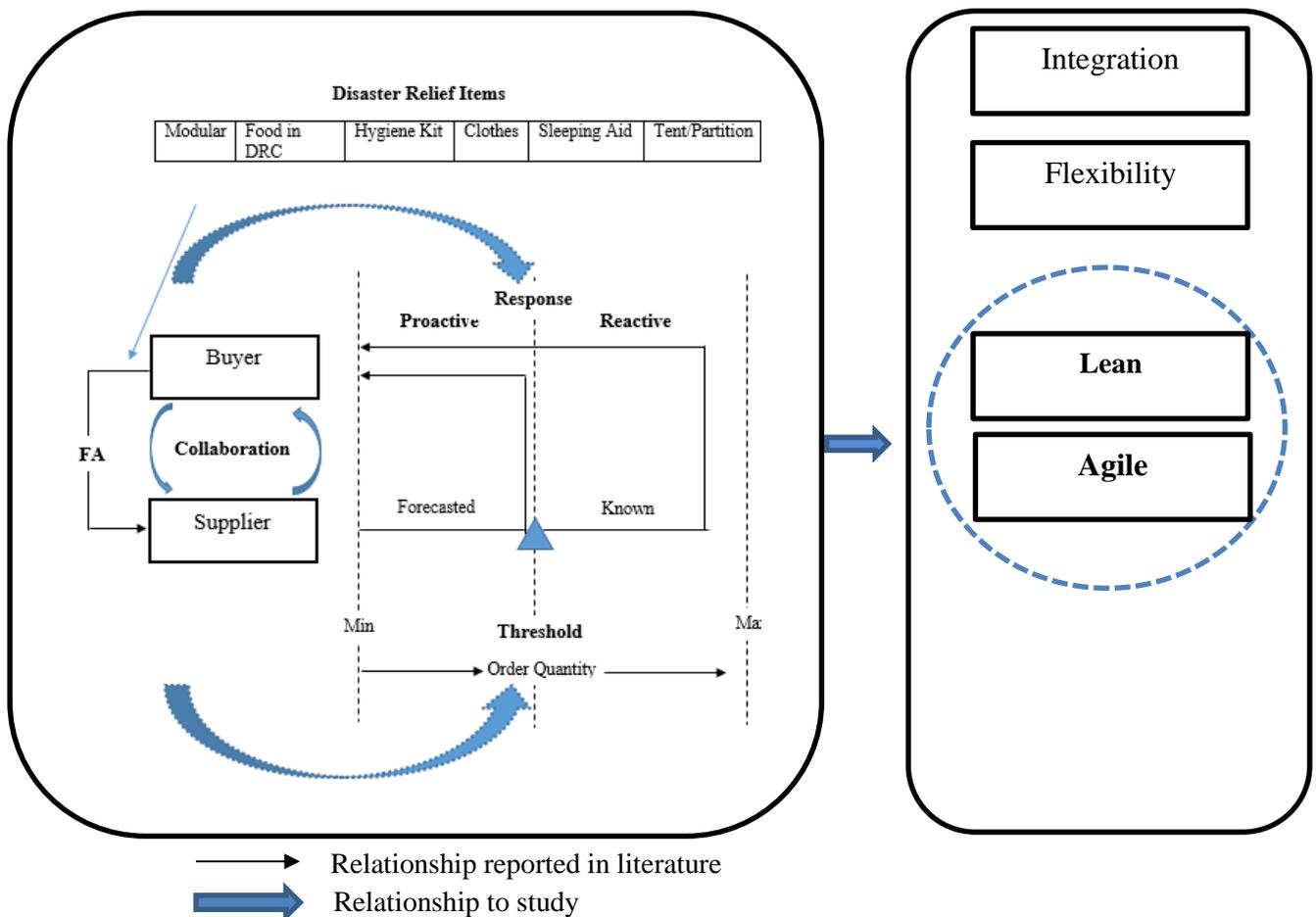


Figure 3.2: Proposed Conceptual Framework

Adapted from Chakravarty (2011) & Jahre and Fabbe-Costes (2015b)

### 3.6 Goals and Research Questions

The main research question is to address the gap of the study by providing a conceptual framework that shows linkages between concepts is posed as below:

*How Collaborative FA could be an agile or leagile driver for the procurement and supply of humanitarian food-aid?*

In essence, the linkages could offer a feasible alternative of contractual FA to FA that are based on relational values between HROs with localised small suppliers for sourcing and securing food-aid before and during the occurrence of disaster. In light of this, the following sub-aims are devised to achieve the key tenet:

#### **Aim 1: Determining Humanitarian Aid (Food Variants) Procurement Strategy and Buyer-Supplier Strategy**

##### Goal 1:

*Identify links between relief components to procurement strategy and buyer-supplier relationship tendency.*

##### Objective 1:

*To explain the tendency for buyer-supplier relationship approach by assessing existing purchasing strategies in disaster relief supply using lean and agile purchasing portfolio model.*

##### RQ1:

*How existing procurements strategies impact on the competitive priorities of lean (cost & quality) and agile (time and flexibility) at component level and how this leads to buyer-supplier relationship tendency and the procurement strategy adopted?*

RQ1 explores the relationship between the categorization of the humanitarian aid commodities into quadrants and the implementation of strategies recommended within these quadrants. This could be achieved by adopting Kraljic's matrix on buyer-supplier implementation strategy, and the Lean and Agile Purchasing Portfolio Model by Drake, Lee, and Hussain (2013) which classifies products based on cost, quality, time and flexibility to functional or innovative products as shown in Figure 3.3.

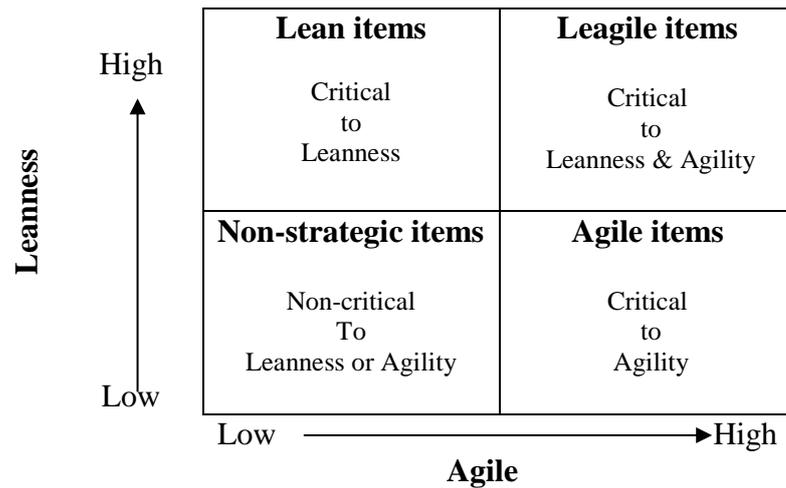


Figure 3 3: Lean and Agile Purchasing Portfolio Model

Source: Drake, Lee, and Hussain (2013)

However, as the model lacks the strategies perspective, hence this study may provide an understanding in combining commodity classification with the strategies described. As advocated, the way forward is by combining the strategies with the product classification (within each quadrants), this study is aided through the development of an understanding of how humanitarian aid procurement method could be drawn as shown in Table 3.2. For example, Table 3.2 informs of bottleneck items which are placed in agile quadrant (places priorities in time and flexibility) leading to a procurement strategy that emphasize on transactional based buyer-supplier relationship. In other word, a low level of involvement in the collaboration is required.

Table 3.2: Priorities for Buying Decision and Supplier Relationship

<b>Kraljic's Expanded Matrix</b>	<b>Drake, Lee and Hussin (2013)</b>	<b>Items Description</b>	<b>Competitive Priorities</b>	<b>Sourcing</b>	<b>Buyer-Supplier relationship type</b>
Leverage items	Lean	High expenditure & commodity type	Cost, quality	Many suppliers	Preferred supplier and collaboration
Bottleneck items	Agile	Complex specification & impacts operations	Flexibility, time	Few alternatives sources	Transactional or one-off contract (project based)
Strategic items	Leagile	Critical to operations & profitability	All four is highly important	Few qualified suppliers	Highly collaborative relationship and long-term contract
Non-critical items	Non-strategic	Many alternatives	All four is less important	Many sources of supply	Rare-negotiations and short-term contract

Source: Author

## **Aim 2: Development of the Proposed Conceptual Framework**

### Goal 2:

*To explain the association between procurement strategy, supply process and SCM goals (lean and agile).*

### Objective 2:

*To develop a conceptual framework that explains the need to use either an incentive contract or Collaborative FA for lean and agile of humanitarian aid SCM.*

### RQ2:

*How leagile is achieved using collaborative framework arrangement which promotes buyer-supplier relationship and flexibility of supplies in a proactive and reactive response?*

RQ2 examines humanitarian aid supply management in particular, scrutinising the processes of pre and post disaster strikes in an effort to capture empirical evidence of the use of FA. In addition, the study investigates the linkage of the use of FA to contingency response, and assess the impact of collaboration to the supply management of supplies. Figure 3.2 shows the preliminary conceptual framework representing the core of this study premises on the gap between the use of either an incentive contract or FA, and buyer-supplier collaborations to facilitate speedy cost - effective relief supply management.

With this in mind, the following sub-RQs of RQ2 explores the linkages of the proposed conceptual framework:

- i. How collaborative framework arrangement promotes pricing flexibility, quality, timeliness and flexibility?
- ii. How collaborative framework arrangement promotes buyer-supplier relationship and what is the impact?
- iii. How is leagile demonstrated?
- iv. How is de-coupling point formed?
- v. How does leagile supply connected to contingency response?

In relation to theoretical development, this study proposes the adoption of combination of theories to explain efficiency and effectiveness in SCM of humanitarian aid. RQ2 specifically provides the means for the exploration of these theories' dynamics and interlinkages. In explaining the relation of the theories, the study focuses on buyer-supplier relationship in either an incentive contract or collaborative FA and the response mechanism adopted by the humanitarian aid organisation. The choice between an incentive contract and collaborative FA shall be determined earlier by RQ1 which will also provide the specific details of the relief supplies that adopt either an incentive contract or collaborative FA as oppose to competitive bidding or direct purchase which is not the scope of this study.

### **Aim 3: Practicality of the Proposed Conceptual Framework**

#### Goal 3:

*To identify the challenges and improvement prospects of the proposed conceptual framework.*

#### Objective 3:

*To assess the practical aspect of the conceptual framework for future use.*

#### RQ3:

*What are the challenges and practical issues (regulation and contract management) of the conceptual framework?*

As has been noted, the use of OC or PPOC in previous studies is contended on the ground that it lacks scrutiny of its operational aspects. For this reason, this study attempts to accentuate the practical perspective of the conceptual framework notably covering the challenges in the regulation and contract management. To explain this, the following sub-RQs are postulated to support RQ3:

- i. What are the regulation and contract management challenges to implement the conceptual framework?
- ii. How can these challenges be addressed?

Hence, by exploring these two sub-RQs, it is therefore advocated that this study could be more exhaustive and it can reflect a better portrayal of the proposed conceptual framework.

### **3.7 Chapter Summary**

This chapter offer an overview of the design of the study, conceptualising and theoretical reasoning. At the core of this study, a proposed conceptual framework was presented along with research questions that needed to be addressed in order to establish the associations of the concepts and to understand the theoretical underpinnings of the study. In the forthcoming chapter, detailed explanation on methodology will be provided in order to demonstrate how each RQs will be tested using prevailing instruments identified in the literature analysis.

## **CHAPTER 4: RESEARCH DESIGN (METHOD AND VALIDITY)**

### **4.1 Introduction**

Chapter 4 addresses the remaining component of the adopted research design of the study: (4) Method; and (5) Validity. This chapter will discuss the ontological and epistemological understanding, and provide description of the chosen strategies for the study in addressing the “how” RQs central to this study. The RQs support the justification for using case study as the method to understand complex social phenomena, events, and processes. This will be followed by detail descriptions of the strategies adopted for theory development from the case studies along with research considerations such as data collection techniques, phases and ethical considerations. In the centre of the method discussion, this chapter will scrutinise the validity component of the research design.

### **4.2 Method (Part 1): Paradigm and Case Study Strategy**

This section discusses on paradigm, strategies for case study and theory development, the case rationale and sizes.

#### **4.2.1 Justification on the Choice of Paradigm**

Paradigm concepts perhaps mainly are depicted from the work of Thomas Kuhn (Kuhn 1970) in which the author describes paradigm as “ the entire constellation of beliefs, values, techniques, and so shared by the members of a given community” (175). Meanwhile, Maxwell (2013) highlights that at general level, paradigm or philosophical positions includes positivism, constructivism, realism, pragmatism and postmodernism, each embodying very different ideas about reality (ontology) and how knowledge is gain (epistemology). There are numerous schools of thought about knowledge claims. For example, Creswell (2000) suggests four paradigms: post-positivism, constructivism , advocacy participatory, and pragmatism.

Neuman (2006) describes positivist approach emphasizes on discovering causal law, careful empirical observations, and value-free research, while Creswell (2000) describes the constructivist perspective (i.e. the multiple meaning of individual experiences when meanings socially and historically constructed, with an intent of

developing theory or pattern) and advocacy perspective (i.e. political, issue-orientated, collaborative or change orientated to particular marginalised people). On the other hand, pragmatic knowledge claim arises out of actions, situations, and consequences rather than antecedent conditions. There is a concern with the application of “what works” and the solutions to problems (Patton 1990).

The term ‘paradigm wars’ was coined in arguing the adoption of specific methodological strategies on the philosophical beliefs and assumptions of researchers. In contrast to researchers in the quantitative approach who prescribes to philosophical positions and plan in advance to employ tools systematically, a growing number of researchers in the qualitative field have adopted a bricolage way. This widespread philosophical position is termed this as “critical realism” and combines two common sense perspective which are: first on ontological realism which means that there is a belief that real world exists independent of our perceptions and theory); and secondly, epistemological constructivist which explains the understanding that the world is inevitably our construction rather than a purely objective perception of reality, and no such construction can claim absolute truth (Denzin and Lincoln 2000; Kincheloe and Berry 2004; Kincheloe, McLaren and Steinberf 2011; Shadish, Cook and Campbell 2002; Maxwell 2011, 2013) . Other authors such as Green (2007) and Koro-Ljungberg (2004) supports this perspective as a combination of divergent mental models to expand and deepen, rather than simply confirming to a single understanding.

Based on the definition of the different paradigms, the knowledge claim for the current study follows a relativist orientation coupled with a pragmatic perspective. In a relativist realism, a researcher acknowledges multiple realities to having multiple means that observer depending as opposed realist, which assumes single reality (Yin 2003). Next, the research methodology perspective adopts a pragmatic approach for a mixed quantitative and qualitative (mixed or multi-method design) (Saunders, Lewis and Thornbill 2009; Guba and Lincoln 2005; Hallebone and Priest 2009; Wahyuni 2012). This strengthens the position of this study for adopting a mix method approach, which has been increasing used and accepted methodological approach in leading journals (Bryman and Bell 2011).

*This study adopts a relativist orientation coupled with a pragmatic perspective.*

#### 4.2.2 Case Study Strategy and Procedures

Sweeney, Grant, and Mangan (2015) propose that research design should increase the use of case study, grounded theory and action research, and that the design should encourage active involvement of professional into the research process. Furthermore, it is argued that the research design that is near a context, not only enhances theory development but enables the transfer of knowledge into business impact and organizational development (Murray 2014). Yin (2014) summarize the distinctive need for case to understand complex social phenomena, where it allows investigators to focus on a “case” and retain a holistic and real-world perspective. The boundaries between phenomenon and context may not be clearly evident. The inquiry of case study involves the following: firstly, the study rely on technically distinctive situation in which there will be many more variables of interest than data points and one result; and secondly, case study relies on multiple source of evidence with the need to converge for triangulations. The use case study method depends on three conditions, (a) the type of research question posed, (b) the extent of a control of a researcher has over actual behavioral events, and (c) the degree of focus on contemporary as opposed to entirely historical events. Three types of case studies for reseach includes explanatory or causal case studies, descriptive case studies and exploratory case study. How and why questions are more explanatory and likely to lead to the use of case study as research method because such questions deal with operational links needing to be traced over time.

According to Yin (2003), a case study is a widely accepted methodology for exploring areas where theory is still developing. In fact, present trend of humanitarian supply chain literatures employs case study or its triangulation techniques such as secondary data or semi-structured interview as a method. For example, case study on lean and agile perspective on commercial and humanitarian perspective (Drake, Lee and Hussain 2013; Gaudenzi and Christopher 2015; Rahimnia and Moghadasian 2010) and disaster relief (Cozzolino, Rossi and Conforti 2012; Scholten, Scott and Fynes 2010; Bakar, Osman and Bulba 2009; Wang 2012; Balcik and Ak 2014). On a more focused example, Balcik and Ak (2014) presented a case study focusing on the procurement of bottled drinking through FA between suppliers and HROs in Turkey. In the case of leagile, Cozzolino, Rossi and Conforti (2012) demonstrated leagile principles through a case study performed on the United Nations World Food Programme. Hence, as will

be demonstrated, the selection of the case study for this research depends on the research question and the “how” question posed in the present context of study requires an extensive and “in-depth” description of the social phenomena under study.

*The study adopts case study approach as the research question concerns the “how” questions and that the focus of this study is on a contemporary event.*

#### **4.2.2.1 Justification Multiple Design Structure**

The basic case study designs consist of either a single-case design or multiple-case design, in which more than a single case is required. Yin (2003, 2014, 2018) describe that there are four classification designs of case study: (Type 1) single-case (holistic) designs, (Type 2) single-case (embedded) designs, (Type 3) multiple-case (holistic) designs, and (Type 4) multiple-case (embedded) designs. The decision of the type of case and the necessary numbers relates to the question of being prudent to answer a phenomenon. In a single unique or extreme situation, or critical testing of existing theory, a single holistic design is usually considered. However, if within the same issue, there are various sub-units that could intrigue a researcher, a holistic single case study with embedded unit is desirable. Baxter and Jack (2008) argue that the ability to see within sub-units separately (within case analysis), between the different sub-units (between case analysis), or across all of the sub-units (cross-case analysis), serve to better illuminate the case.

In contrast, in a multiple case design, the researcher will analyse within and across settings. The goal of examining several cases is to understand similarities and difference between these cases. Yin (2003) explains of the two usages of multiple case studies: firstly, in predicting similar results (termed as literal replication); or secondly, to predict contrasting results for a predictable reason (coined as theoretical replication). Multiple case study design is known to be robust and reliable, however time consuming and costly to conduct. Whereas in a single case study, although less demanding, the drawback includes the researcher overemphasizing sub-unit instead of the holistic analysis. In fact, a single-case studies have received sceptical notion on its artefactual conditions (Yin 2014).

The author also recommends that researchers perform a multiple-case design as oppose to a single case study due the latter's vulnerability and former's more compelling and robust reputation. The theoretical attempt on both designs is theory building, with an additional theoretical replication through multiple case design. However, as multiple case design offers evidence on case based replication methods, Yin (2014) also points a compelling fact of a multiple-case study, which is it could offer a contrasting situation especially in a two-case study design. The idea here is not to seek a direct replication, rather a strong start towards theoretical replication.

Other research design considerations include the abductive reason process (ARP) and structured-pragmatic-approach (SPS). Firstly, ARP accentuate the pursuit for suitable theories to an empirical observation, a process termed as 'theory matching' in which Purvis, Gosling, and Naim (2014) coined by adapting from the work of Taylor, Fisher, and Dufresne (2002), Dubois and Gadde (2002) and Kovács and Spens (2005). The procedure involves three stages: a prior theoretical knowledge in stage 1, a real-life observation for theory suggestion in stage 2 and testing of a new theory for new knowledge in the final stage. The first two-stages are inductive and the third stage follows a deductive pattern. In short, ARP emphasizes a search for suitable theories to an empirical observation, attempts to find a new matching framework or extends the theory used prior to this observation (Andreewsky and Bourcier 2000).

Next, is the SPS research design that articulates general guidelines to actionable steps and addresses some unworkable conditions as well as relates on how flexibility could be achieved when conducting a case study research. Pan and Tan (2011) explains that SPS is operationalised based on eight steps that includes (1) access negotiation, (2) conceptualizing the phenomenon, (3) collecting and organizing the initial data, (4) constructing and extending the theoretical lens, (5) confirming and validating data, (6) conducting selective coding, (7) ensuring theory data model alignment, and (8) writing the case report. The SPS approach provides the less experienced a firm guiding hand to conduct a case study research. However, as pointed by the authors themselves, the procedures are more suitable for a single case study design. Despite this, some of the steps highlighted may also offer guiding steps for the current study especially the steps on accessing data, constructing the theoretical lens, and ensuring data model alignment. The same could also be said for the ARP design, which provides the context of relating real life experience for theory building explanation. Both of these steps

providing by these designs are essential for the current study, hence could be adopted and adapted.

Figure 4.1 shows the two-case study procedure (adapted from multiple case study procedure). The loop represents important discovery during one of the individual case studies as well as the event. Yin (2014) suggests that using “two-case” case study has more substantial benefit than using a single-case design. Two possibilities of outcome, either a direct replication or they offer a contrasting situation. Hence, this will be a catalyst toward theoretical replication and strengthening findings as compared to single-case study. In fact, a two-case study reduces such criticism of single case’s artefactual conditions.

*The study adopts a multiple case design for theoretical building based on literal replication or theoretical replication logic.*

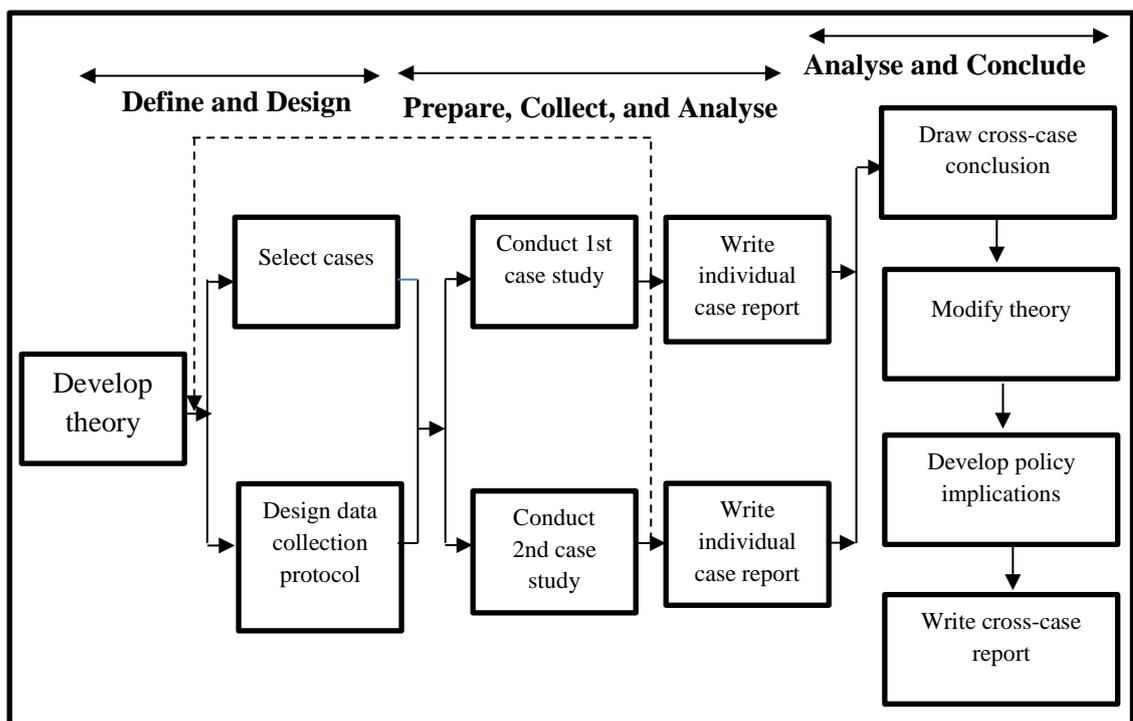


Figure 4. 1: Two-Case Study Procedure

Adapted from Yin (2014, pg.60)

#### **4.2.2.2 Justification for Mixed Method Strategy**

Creswell (2000) describes strategies of inquiry associated with quantitative approach, qualitative approach and mix-method approach (uses both quantitative and qualitative). The author explains that strategies associated with quantitative approach invoke the positivist perspective which includes true experiment and correlation that is in relation to surveys (using questionnaire and structured interview). Meanwhile, strategy associated with qualitative are ethnographies (study of intact cultural group in natural setting usually using observational data), grounded theory (researcher attempts to derive a general abstract theory using views and comparison of data for emerging categories and theoretical sampling of different group) and case study (researcher explore in depth of a program/event/process/one or more individual using a variety of data collection method).

Debate on adopting between qualitative and quantitative method for a study is arguably due to “mental model” (Green 2007) described as the values and knowledge of individuals involved in the decision making process. Maxwell (2013, 29) accentuates that in variance theory, quantitative researchers view realm in terms of variables and that explanation is feasible through statistical relationship between the variables. On the contrary, for process theory, researcher considers the world in term of people, situation, events, and the process that connect these. The explanation is based on an analysis of how some situation and events influence others.

In view of this process, the orientation concerning the world, focus on specific situations or people and the emphasis on description in which qualitative researchers view this as a strength in addition to the nature of its inductive approach. (Maxwell 2013) express that there at least six intellectual goal of a qualitative study: (1) understanding meaning for participants in the study, of the events, situations, experiences, and actions they are involved in; (2) understanding particular context within which the participants act, and the influence that this context has on their actions; (3) understanding the process by events and actions take place; (4) identifying unanticipated phenomena and influences; (5) generating new, “grounded” theory about the latter; and, (6) developing causal explanations.

Hence, the present study adopts a mix-method approach because of its philosophical assumption. The advantage of this approach is that it limits biasness with triangulation technique (convergence of cross qualitative and quantitative methods) and uses either, sequential procedure (seeks to expand findings with another method for example qualitative for exploratory purposes, following with quantitative, with large sample to generalise the findings), concurrent procedure (researcher converges quantitative and qualitative data to provide comprehensive analysis) or transformative procedures (researcher uses theoretical lens as overarching perspective within a design that contains both quantitative and qualitative data).

*A mixed method design was adopted for the study for convergence of evidence and limiting biasness through triangulation logic.*

Preparation for case study evidence can be complex, and that an exemplary case study should include designs and procedures. For example, for a rigorous case study, the design must include: a) propositions (which may or may not be present) (Yin, 2003, Miles and Huberman, 1994); (b) the application of a conceptual framework (Miles and Huberman 1994); (c) development of the research questions (generally “how” and/or “why” questions); (d) the logic linking data to propositions; and (e) the criteria for interpreting findings. In addition to this, an important component in performing case study involves the need for a protocol for the study, a pilot case study (if necessary), seeking ethics approval on how human subject is protected (covered in section 3.5 of this study), and considers the values and skills of an investigator.

### ***Case Study Protocol***

Case study Protocol contains instrument, procedure, general rules and its directed at a single point. Case study protocol is also seen as a major way of increasing reliability of case study research. It helps a researcher targeted on topic and forces to anticipate likely problems that may arise. According to Yin (2014), there are four section in establishing protocol: Section A, an overview of the case study (objectives and auspices, case study issues, and relevant reading about the topic being investigated); Section B, data collection procedures (procedures for protecting human subjects, identification of likely source of data, presentation of credential to field contacts, and other logistical reminders); Section C, data collection question (the specific question that case study researcher must keep in mind in collecting data and the potential

sources of evidence addressing each questions); and Section D, case study report (outline format of the data, use and presentation of other documentation, and bibliographical information).

### ***Pilot Test***

The goal of performing pilot case is to refine data collection plans in terms of the content of data and the procedures to be followed. Pilot case study could also provide some conceptual clarification. In general, convenience, access and geographic proximity can be the main criteria for conducting a pilot case. The pilot case data are often used in parallel with ongoing literature, so that the final research design is informed with both prevailing theories and fresh empirical observation. In addition, methodologically, pilot case also provides information on field questions and the field logistics.

#### **4.2.2.4 Source of Evidence**

The selection of case studies for examining contemporary event is associated to rely on six sources of evidence enlisted for case study research which includes interview, direct observation, participation observation, documentation, archival records, and physical artefact (Yin 2003, 2014, 2018). Most case studies include direct observation of the event being studied and interviews of the person involved in the events. Patton (2002) suggest combination of observations, interviewing, and document analysis, in which a researcher would be able to use different data sources to validate and cross check finding. In addition, validity is also increased as the weakness of one method is compensated by another (Marshall and Rossman 1989; Patton 2002). Figure 4.2 shows the design versus data collection, which provides the postulation of this study in relation to the design of the organizational and the corresponding data sources. Table 4.1 summarises the sources of evidence most relevant to investigate the research question and suitable for this case study design.

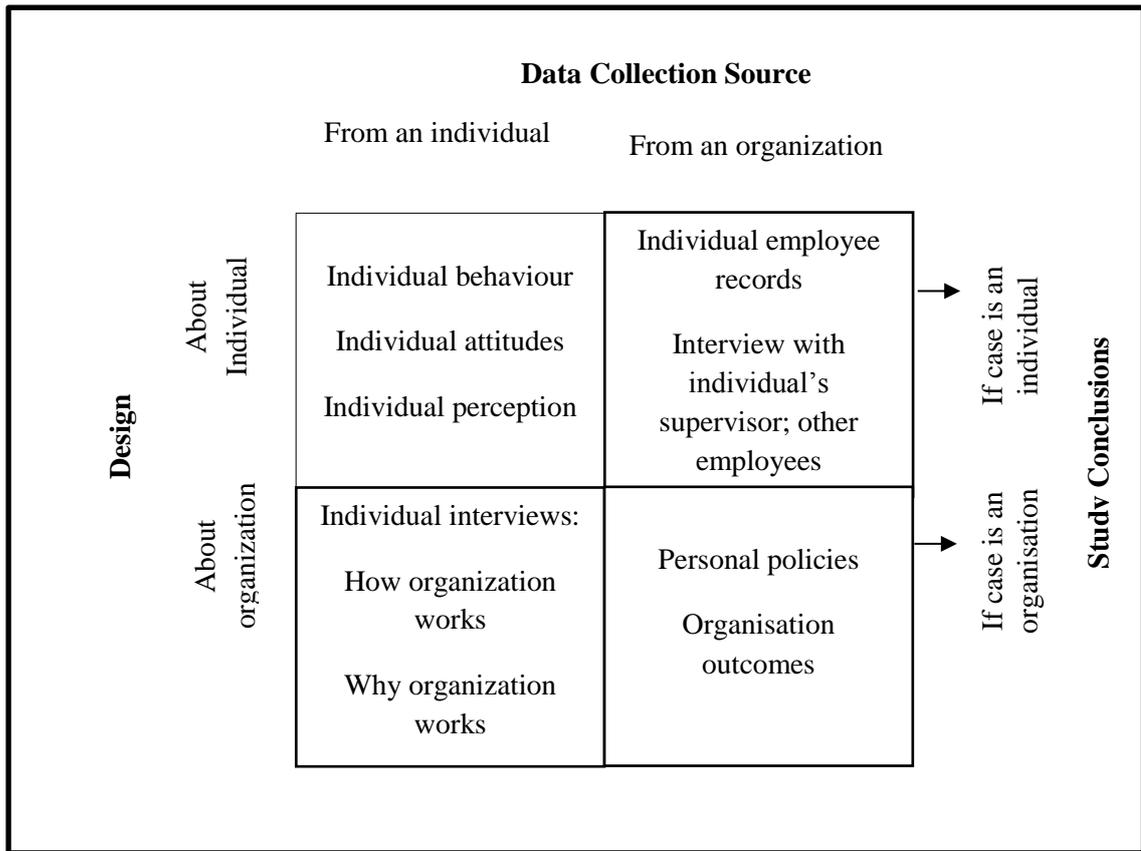


Figure 4. 2: Design versus Data Collection (Different Unit of Analysis)

Source: Adopted from Yin (2014)

Table 4. 1: Summary for Sources of Evidence Suitable for Case Study

Source of Evidence	Rationale	Triangulation	Limitation	Reference
Direct Observation	Capture real-world setting	All three sources can be corroborated through simultaneous process.	Time consuming and costly	Yin (2004; 2014; 2018)
Semi structured in-depth Interview	Provide Insightful explanation		May encourage biasness	(Kvale 1996); Rubin and Rubin (2011); (Kvale 1996) Yin 2014)
Documentation and archival record	Stable, specific, unobstructed source for a broad context of time		Accessibility issue and bias selectivity	Yin (2004; 2014, 2018)

#### 4.2.2.5 Strategy for Analysing Case Study Evidence

Yin (2014) explains strategies to reduce analytical difficulties: firstly, theoretical proposition guides the case studies; secondly, working the data from “ground up” does not begin with any theoretical proposition and are based on the “play with your data” notion as expressed by Yin (2014) which could yield useful concepts, analytical path, suggest relationship premised on inductive strategy and development of grounded theory; thirdly, developing case descriptive, stem from inability to utilise the first two strategies and could deliver appropriate explanation; and finally, examining plausible rival explanations, which includes craft rivals or real-world rivals. In addition to this, as a general rule, any strategy adopted should also include plausible rival explanation as described in Table 4.2.

Table 4. 2: Brief Description of Different Kinds of Rival Explanation

Type of Rival	Description of Examples
<b><i>Craft Rivals:</i></b>	
The Null Hypothesis	The observation is the result of chance circumstances only
Threats to Validity	e.g. history, maturation, instability, testing, instrumentation, regression, selection, experimental mortality, and selection-maturation interaction
Investigator Bias	e.g. “experimenter effect”, reactivity in field research
<b><i>Real-World Rivals:</i></b>	
Direct Rival	An intervention (“suspect 2”) other than the target (practise or policy) intervention (“suspect 1”) accounts for the results ( <i>“the butler did it”</i> )
Commingled Rival	Other interventions and the target intervention both (Practise or Policy) contributed to the results ( <i>“it wasn’t only me”</i> )
Implementation Rival	The implementation process, not the substantive intervention, accounts for the result ( <i>“did we do it right?”</i> )
Rival Theory	A theory different from the original theory explains the result better ( <i>“it’s elementary, my dear Watson”</i> )
Super Rival	A force larger than but including the intervention accounts for the result ( <i>it’s bigger than both of us”</i> )
Societal Rival	Social trends, not any particular force or intervention, account for the results ( <i>“the times they are a-changing”</i> )

Source: Yin (2000, 2014)

#### 4.2.2.6 Case Study Analysis Procedure

Next, data analysis is an important component of a case study and comprises of examining, categorising, tabulating, testing, or otherwise recombining evidence, to produce empirically based findings with considerations of alternative interpretations. Various ways have been suggested in initial analytical strategy. For example, Miles and Huberman (1994) suggested five possible ways: putting information into different arrays; making a matrix of categories and placing the evidence within such categories; creating data displays such as flowcharts or graphics; tabulating the frequency of different events; and putting information in chronological order. Next, Corbin and Strauss (2007) advocated the writing memos or notes of what is being observed in data, creating a graphic form that could be used for conceptualizing.

Meanwhile, Yin (2014) verbalizes “play with your data”, in search of emerging and promising patterns, insights or concepts. In essence, of any preliminary creations, it is important to note that the need to strategy involves revolving and repetitive involvement of the researcher’s original research question of the data, defensible handling and interpretation of data, ability to state findings and draw conclusion. Hence, Yin’s (2014, 2018) five known effective techniques for analysing case study may shed some light. The analysis technique includes pattern matching, explanation building, time-series analysis, logic models and cross-case synthesis. Table 4.3 briefly explains each of the five-analysis strategy as advocated by the author.

Pattern matching techniques evolution includes explanation building, time-series analysis and logic models. In contrast, for a cross case synthesis, the analysis is performed based on word tables that display the data from individual cases according to one or more uniform categories (Yin 2003, 2014, 2018). This is followed by a qualitative analysis of the whole collection of word tables to draw a cross-case synthesis on the profiling (whole set of categories or features). The cases with similar profiling could be considered for findings of replication, whilst profiling that results in different findings is considered as contrasting. Hence, the latter provides relation to rival explanation.

Finally, in considering all the strategy and analysis approach, Yin (2014) also encourages for a high quality analysis and suggests the followings: first, analysis

should attend to all evidence which includes development of rival hypotheses and exhaustively cover key research question; secondly, analysis should address all plausible rival interpretations; thirdly, analysis should cover the most significant aspect of the case study; and lastly, to use prior, expert knowledge in the case study, displaying awareness current thinking and discourse about the case study.

Table 4. 3: Brief Description of the Five Analysis Strategies for Case Studies

<b>Strategy</b>	<b>Objective</b>
1. Pattern Matching	Pattern matching between predicted (before data collection) with empirical based pattern from case study.
2. Explanation Building	A type of pattern matching, case study is on explanation building to stipulate set of causal links about it, “how” or “why” something happened.
3. Time-Series Analysis	Analysis is based on intricate pattern and include time-series. The logic is match between observed (empirical) and either theoretically trend before investigation or some rival trend.
4. Logic Models	Similar to pattern matching, logic model consists matching empirically observed events to theoretically predicted events, however in sequential and in cause-effect-cause-effect pattern.
5. Cross-Case Synthesis	Applies to multiple case studies, research syntheses aggregate findings across series of individual case study.

Source: Adapted from Yin (2014)

### ***Case Study Sub-Analysis Process and Aided Tools***

It is important to note that in most research, the back-end process provides the means for an analytical procedure to be thoroughly and meticulously conducted. Hence, this section of the chapter radiates of the entailed processes such as interview transcribing and the observations procedures, as well as the computer assisted tools.

### ***Transcribing Process***

Qualitative studies involve interviews and observation involves a lot of video and audio data, and these data need to be process into written form before further analysis (Bailey 2008). In addition to this, in qualitative studies, data collection and analysis are concurrent (Miles Huberman and Saldana 2014). In this concurrent process,

researcher usually makes reflection of the study and the aforesaid process also facilitate in framing research theory. The latter involves an analytical process and amongst its benefit to the researcher includes yielding important insights, data familiarization and encourages interpretive thinking. This study employs *Atlas.ti* software for transcription of interviews and as well other graphic data such as pictures, documentation/archival records and videos.

### ***Observation/Field Report***

The key tenet of a field report is to improve the understanding of the theoretical concepts through a method of careful and structured observation of, reflection about, people, places, or things that exist in their natural setting. Meriam (2009) describes that a field note needs to be highly descriptive; begin with time, place and purpose; list the number of participants and any meaningful characteristics and descriptions of the activities or behaviours of the participants and how the observer responds. When conducting observation, this study adopts some of the tips for taking notes which includes organizing short hand symbols to ensure focus is sustained, using small paragraphs with space below for researcher's reflection on the ideas, theoretical insights or for further investigations.

An important aspect to consider before conducting an observation is the sampling techniques. As mentioned before, this study is based on purposeful sampling. Sampling in observation is flexible and often continues until no new themes emerges or until it reaches data saturation. Hence, the sampling decision for such observation needs to consider richest possible source of information to answer the research question. A few sampling technique includes: Ad Libitum Sampling (observe whatever seems interesting at the moment and not structured); Behaviour Sampling (watching the entire subject or event and record specific behaviour of interest); Continuous Recording; One-Zero Sampling (useful for capturing data on behaviour patterns that start and stop repeatedly and rapidly, but only last for a brief period of time); and, Scan Sampling (taking census of the entire observed group of predetermined time periods and recording what each individual is doing at that moment).

### *Computer Assisted Tools for Analysis*

Computer-aided qualitative data analysis software (CAQDAS) is a tool for supporting the process of qualitative data analysis. Some of the reasons for choosing CAQDAS software are in its ability to structure and integrate large volumes of data, and most compelling evidence is increasing the validity of research results especially at the conceptual stage of an analysis (Friese 2014). The CAQDAS has advance coding skills and techniques including categorising large amount of data. This software differs from statistical outputs as it is not the end output. Despite this, the output generated may possibly determine if a meaningful pattern is emerging from the analyses.

*ATLAS.ti* belongs to the genre of CAQDAS and offers similar capabilities as in other existing software. Some of the functions include qualitative data management, transcription, coding and linking of themes function using diagrams. *ATLAS.ti* software is based on NCT model for qualitative analysis (Seidil 1998) as shown in Figure 4.3. Friese (2014) expands the model and named it as computer-assisted NCT analyses. The model components, NCT stands for noticing things, collecting things, and thinking about things. The components are elaborated as follows: noticing, refers to process of finding interesting form of data or coding; followed by, collecting, in which codes are grouped based on similarities and differences which leads to renaming of the code; and finally, thinking, that is the act of finding pattern and relations in the data. Despite the elaboration made in linear explanation, the analysis is often made moving and back forth between the components (Friese 2014). In relation to the model, researcher's early assessment suggest that the software features fit the current study's analysis especially on the description and conceptual analysis need.

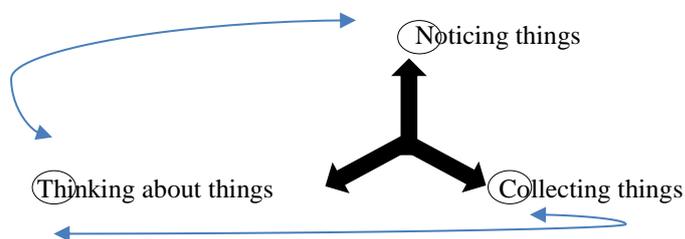


Figure 4. 3: The NCT Model of Qualitative Data

Source: (Seidil 1998)

In addition, at a micro level, another analysis feature that the software could assist is on developing properties and dimension of categories. Authors (Corbin and Strauss 2008, 2015) presented properties and dimension in code tree without software and supports the use software for future researchers especially on grounded. Yin (2014) argues that conducting case studies could be challenging and as such suggests for researcher to keep an array set of evidence (critical to case study strength), in addition to the large collection of verbatim records, field notes and documentation are in textual form, before utilising this software.

#### **4.2.3 Adopted Strategy for Theory Development, Sampling, and Scope**

Researcher aspires to acquire insights in the use of collaborative FA, from a governmental HROs perspective. The case study method was chosen for this study for a number of reasons. Firstly, because of the limited research on collaborative FA. Secondly, this research emphasizes on the “how” research questions. In fact, the research questions are organised on a explanatory and explorative orientations. Hence, employing case study as a specific approach is rationalised in this sense.

To demonstrate the study, this research employs a multiple design case studies, in particular a two-case study procedure for comparative synthesis to develop theory. For this reason, the eventual explanation of this study is as follows: (1) making initial and tentative explanatory proposition; (2) comparing data against the proposition; (3) revising the proposition if necessary; and (4) multiple case study to compare the revision between the cases. Hence, as pointed by Yin (2018) explanation building procedures are partly deductive (referring to the earlier proposition), and partly inductive (based on data from case study), which involves narratives.

In terms of the theoretical design component, the study adopts partial steps of ARP and SPS structure following suggestion by authors (Pan and Tan 2011; Klein and Myers 1999). The adoption of ARP and SPS is premised on logic that both designs constantly reflect on the steps in relation to specific research context and due to its flexibility values. Generally, the adoption of these designs may require repetition of some steps, modification of the conceptualisation of a phenomenon or method, or technique of data collection, and even analysis.

*The study adopts strategy of a two-case study procedure and adapts components of ARP and SPS for theory development. The study will exhibit an explanatory and multiple case studies analytical structure. Equally important, purposeful sampling technique will be applied and steps will be taken to bind the case.*

#### **4.2.4 The Case and Rationale**

The selection of case study is based on purposeful sampling technique, a strategy in which particular setting, person, event are deliberately selected for the important information they can provide (Patton 1990; Maxwell 2009). Firstly, as deliberated earlier, flood is the biggest natural disaster, topping world's disaster events and causing approximately two-third of disaster-related casualties. Thus, the preparation and dealing with a flood prone country by its related agencies would represent a reasonable subject for generalisation of the study. The chosen country as shown in Figure 4.4, Malaysia, is a flood-prone and monsoon affected country which records 136 deaths from 740,000 affected victims with total disaster-related damage cost of approximately USD 1.285 billion from the year 2000 to 2015. This put Malaysia amongst the top three ASEAN countries which suffer highest economic losses due to flood. Apart from this Malaysia is also one of Commonwealth countries which adheres to the procurement principle of value for money embedded in its good governance goals.

A speech by the Minister in the Prime Minister's Department during the ASEAN Regional Forum (ARF) Disaster Relief Exercise (DIREX) acknowledged the logistics and averting bottlenecks as disaster relief challenges, and that speed, efficiency, and good coordination as key elements of disaster response (Kassim 2015). Transparency International, a worldwide watchdog group, highlighted issues in relation to transparency, accountability and process in the procurement for emergency responses to natural disasters and other such events (Hui et al. 2011; Wiehen et al. 2006). Taking a Malaysian local context as an example, the country experienced supply shortages during the "2014 big flood" which affected more than 200,000 people across the country. A number of media outlets reported that there were an inadequate flood relief supplies delivered to the affected victims (Koeck 2014). As such, we view that the related disaster agency dealing with flood would be an exemplary case study.



Figure 4. 4: Location of Malaysia in World Map

***Disaster Relief Agencies for Relief Centre and Food Supplies***

In Malaysia, the National Security Council through its circular number 20 (NSC 2015) outlined that policy and the mechanism for disaster management must follow the following disaster phases: Phase 1, the management and operations of a disaster in a particular area could be dealt by the relevant agencies at the district level disaster management without or with minimal support of external party; phase 2, the management and operations of a disaster area of more than one district in the same state which required the coordination of resources at state level with aid from the federal level; and, phase 3, involving the management of a disaster area of more than one state and viewed as complex to handle which requires the coordination of resources at the federal level with aid from foreign countries. The respective phases of disaster management are based on the evaluation of its magnitude and complexity, damages, the ability of resources of finance, manpower and assets, expertise, aid and response time. As flood is the most frequent disaster that occurs in the country with varying degree of intensity and the corresponding disaster management, a snap shot a recent large-scale disaster would be beneficial for the study.

Under the Malaysia's National Security Council (NSC), the department responsible for coordination of all activities related to disaster, specifying Directive No. 20 which says the funding would be provided by the NSC, however, the provision and distribution of relief assistance which includes food, clothing and other essential to the

affected victim will be performed by the Department of Social Welfare (DSW) (Seng 1999; NSC 2015).

### ***The Big Flood in Malaysia (2014)***

Flood occurrences in Malaysia are the most intense natural disaster in the country and are categorised into monsoon flood and flash flood. The former occurs in a large scale during the northeast monsoon season in the months of November and usually lasts until the month of March coupled with heavy rains especially in the east coast of the Peninsular, north region of Sabah and southern part of Sarawak (Hassan and Ghani 2006). The five regions of the country are as shown in Figure 4.5. Although the occurrence of flood in the country is perceived to be annual, nevertheless the occurrence of major floods is unpredictable. For example recorded occurrence several major flood as far back as 1886 (extensive damage in Kelantan), 1926 (regarded as the worst in living memory) and 1967 (disastrous flood in Kelantan, Terengganu and Perak, death toll of 55 lives) (Department of Irrigation and Drainage Malaysia 2011b). Meanwhile, another publication by (Department of Irrigation and Drainage Malaysia 2011a) states that on average an approximately 9% of the total area of the country is hit by flood and affected more than 22% of the country's population as well as causes a staggering estimated damages of MYR 915 million.

In 2014, the regions surrounding Malaysia, especially the immediate neighbouring countries were hit by flood. For example, in Indonesia, it was reported that a total 120,000 evacuates were transferred to the relief centres. Whilst, Thailand had an approximately 10,000 evacuates (Akasah and Doraisamy 2015). Although the numbers are lower, the figure represents significant reporting of such flood occurrence in the region, in which Malaysia experienced one of the worst flood catastrophe.



Figure 4. 5: The Map of Malaysia and its Five Regions

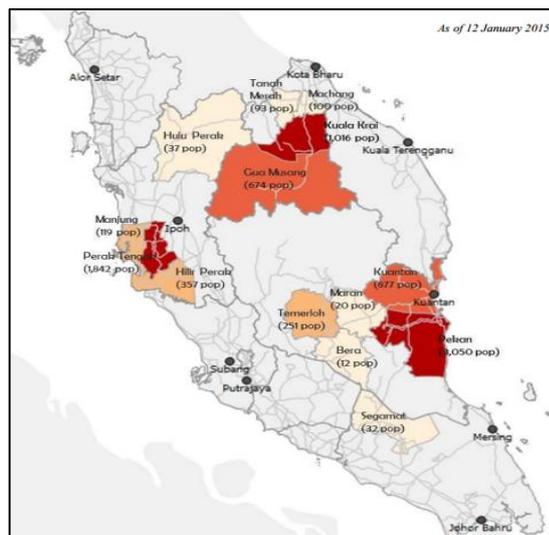


Figure 4. 6: Evacuation Centres for Flood in Peninsular Malaysia (2014-2015)

Source: (AHA Centre 2015)

The 2014 flood in Malaysia or also known as “the big flood 2014” was arguably one of the worst flood incidents in the country. The catastrophe occurred due to heavy rainfall combined with strong winds in December. The flood had displaced more than 200,000 people. The most affected areas was in the East Coast of Malaysia (Kelantan, which account for 158,476 or approximately 70% of total victims displaced, Terengganu and Pahang), followed by four other states of Peninsular Malaysia (Perak,

Johor, Selangor and Perlis) and East Malaysia (Sabah). The incident had caused 21 fatalities and the estimated damages of MYR 1 Billion (Inter Health Worldwide 2015). Victims were evacuated to disaster relief centres as some villages were submerged entirely for example, *Manik Urai* in Kelantan where roads were flooded and connecting bridge was washed away and this not only hampered the rescue and relief operations, but caused major inaccessibility for food and clean water supplies (Inter Health Worldwide 2015; AHA Centre 2015). Figure 4.6 is the map of the evacuation centre or disaster relief centres provided by the Association of Southeast Asian Nations, ASEAN coordinating Centre for Humanitarian Assistance for Disaster Management on 12<sup>th</sup> January 2015, approximately after 5 days that the flood water level peaked and improved thereafter.

***Recorded statements from The Guardian (2014) news:***

*“I admit the situation is challenging to the rescue workers and we are trying our best to make sure that the food arrives to the victims on the flood situation” Deputy Prime Minister of Malaysia, 27 December 2014.*

*“The severity and scale of the floods had taken the authorities completely by surprise as it was worse than anticipated, overwhelming all disaster management plans and preparations” Opposition leader, 27 December 2014.*

*“We just want the government to do what they should do and help us. For breakfast I had was three biscuit and tea. There’s not enough water and no food at all for my baby” Victim with a six-month old baby, 27 December 2014.*

*“Military helicopters and trucks were seen in Kota Bharu area, Kelantan (near the border of southern Thailand) but rescue efforts were being hampered by fast rising waters and strong currents while roads to hard-hit area were impassable” The Guardian, 27 December 2014.*

These recorded statements described the level of intensity of the 2014 flood, which arguably surprised the Government’s machinery in-charge of managing flood incidents and rescue efforts. As explained by the four statements including the Deputy Prime Minister, leaders of the opposition parties, media and the victim of the incident, the theme derived concludes that food and clean water supplies to victims and evacuates were severely affected, despite the pre-planning and readiness of the

agencies responsible to respond for such incident. Moreover, due to high rise of the evacuates as opposed to the initial prediction, which includes budgets, procurement, supply storage and logistics supports from collaboration between agencies in relation to disaster relief activity, it is evident that the preparation was undermined from the actual presentation.

In dealing with such disaster, the Malaysian Government allocated more than RM 60 million for the relief efforts (The Guardian 2014). In addition to this, during the flood incident, Malaysia also received donation and support from several Asian countries as well as from Australia, the United Arab Emirates and the United States of America (USA) (Inter Health Worldwide 2015). Supplies were also provided by the United Nations and a number of Non-Governmental Organisations (NGOs). In short, the flood incident of such magnitude created chaos for food supplies and clean water.

#### **4.2.5 Number of Cases**

Next part of this chapter is to elaborate the argument concerning the number of case studies chosen and its purposeful sampling logic. As deliberated in Section 3.4.4, the comparative case studies is between two civil service disaster relief agencies in Malaysia: the first, comprise the DSW, the HRO which handles food supplies during floods through FA with transactional base suppliers, and the HRO which presents a re-collective from eight flood prone states of the total five regions of the country, as an embedded unit of analysis for case analysis; and second, NADMA-FAMA collaboration, the HRO which collaborates with another civil service agencies with the capability to manufacture and supply flood relief food related items as a modular. All these will provide for a cross-case synthesis analysis. Both studies predominantly seek an explanatory building and replication strategy. As Malaysia is a flood-prone country and the fact that disaster relief activity is a gazetted role of the civil service under the NSC regulation number 20, the two agencies under study represent a credible purposeful sampling, as well as for analytical generalisation that will derive from the overall study. It is important to note that despite two-comparative organizational-based case studies stipulated, the overall cases that will be examined are eight (8) cases in total and this number reflects a sizable sampling to address the gap of the study. Furthermore, the researcher could not make comparison between countries at this stage

due differing structures of HROs (Malaysia is governmental versus neighbouring countries are mostly NPOs) and differing nature of the incentive contract/FA utilised.

### **4.3 Method (Part 2): Scope, Data Collection and Analysis**

This section discusses the scope of the case studies and henceforth the data collection and analysis process for the study in detail.

#### **4.3.1 Scope of the Case Studies**

The scope of the study is equally important to note. A common problem related to case study is the tendency of being too broad on answering the question of the study. Hence, this study adopts the suggestion by authors on binding the case within reasonable scope that is prescribed either based on time and places, time and activity, or, definition and context. This case study scope is based on two civil service HROs in Malaysia, and the time frame is three years, from 2015 to 2017. The activity concerns food supplies for flood cases, although the both agencies also handle other types of natural disaster relief as well as other relief items. However, the logic why FA implementation and consideration will be explored and discussed in the results sections. In addition to this, four constructs or concepts and the combination of theories used in this study may reflect a large scope of the study. It is contended that as this explanatory and multiple case studies are undertaken due to the fact that prior studies have yet to investigate linkages of some the concepts involved in SCM of disaster management, in which the goal is to replicate findings across cases. It fits the definition of the explanatory and multiple case intended to explain presumed causal links in real life intervention as advocated by Yin (2003). Overall, this study arguably will be conducted within a reasonable scope.

#### **4.3.2 Data Collection and Analysis: A Three Phase Approach**

In linking the data to the proposition, the present study is based on mixed method approach as this research is based on pragmatic grounds and that data collection will be either simultaneously or sequentially involving gathering of both numeric and text information. This researcher investigated case studies for a real life observation which leads to theory suggestion as suggested Kovács and Spens (2005). A multiple-case designs structure as suggested by Yin (2014) will be performed using mix sequential



flexibility), and Supplier-buyer relationship	for buyer-supplier relationship based on existing procurement strategy		agile purchasing portfolio			
How FA promotes pricing flexibility, quality, timeliness and flexibility of food supplies in disaster relief? How FA promotes buyer-supplier relationship and what is the impact? What response approach is formed in an FA procurement? How is leagile demonstrated: with or without de-coupling point	To understand the process and connection between Framework Arrangement, Contingency Response and SCM Leagile in disaster relief	Case Study: (In-depth semi-structured Interview) Observation Procurement Document (Secondary Data)	Narrative analysis Content Analysis Comparison analysis	FA: Pre-approved suppliers, price range, quantum, delivery, flexibility, quality Information sharing: Meeting, briefing Disaster Intensity, delivery quantity, delivery flexibility, delivery time Response: Forward location/base, disaster relief centre, dry ration, raw food, cooked food	Researcher Bias Flexibility term unrecorded Disaster information unrecorded Different practices between state agencies could lead to narrowing conclusion on response	Transcribing and coding by second reader, interview transcribe confirmed by interviewee Triangulate through observation, interview between and supplier confirmation Purposeful sampling technique covering the major state affected in which similarity and differences of data is both interpreted as to provide holistic picture and derived conclusions
How are practical issues (regulation & contract management) addressed	To understand the challenges faced and how agencies manage them for current and future use on disaster relief	Interview from practitioners (a subset of case study)	Coding & thematic analysis (Categorizing)	Challenges: Large scale disasters, logistics, supplier commitment, lack of funding, price fluctuation, payment delay Management: Special approval, emergency purchase, supplier category, simulation, pre-purchasing, stocking, improved payment	Non-existence of formal contract limits the responds to experience	Triangulation of data sources to provide not only supplementary source of lack of documents but with interviews and relevant document citing will also provide deeper understanding of the meaning presented by practitioners

Source: Author

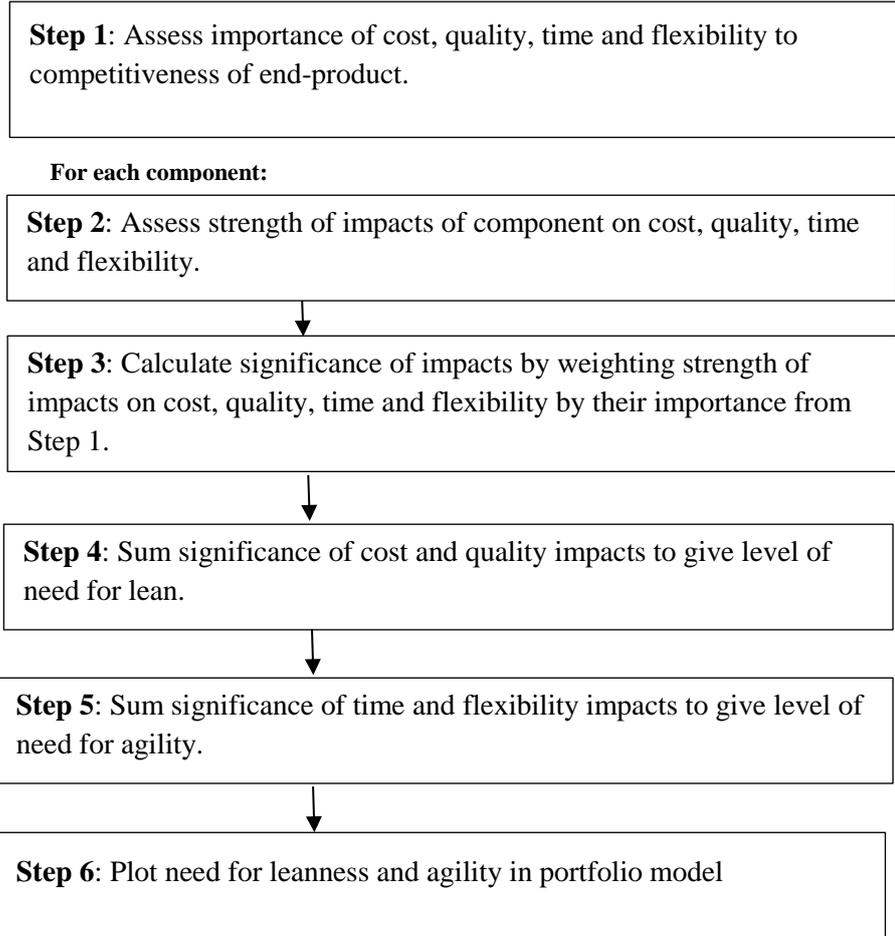
Table 4.5: Summary for Data Collection and Methods of the Study

Phases	Objectives & RQs	Data Required	Methods	Sampling	Subjects	Settings	Analysis
1	Objective 1 (RQ: 1)	Competitive priority factor and impact assessment	AHP moderation	Purposeful sampling	Key Procurement personnel, operations (20 interviewees)	Identified government agencies	Analytical Hierarchy Process (AHP)
2	Objective 2 (RQ: 2)	Qualitative (opinion – interview)  Real life situation  Quantitative (numerical data)	Case Study on two HROs (In-depth semi-structured Interview) Observation  (Secondary Data)	Purposeful sampling	Key Procurement personnel, operations, + Supplier (50 interviewees)  Contract Documents (mode sequentially)	Government premises, suppliers' premise and natural setting in the field	Narrative/content analysis (connecting)
3	Objective 3 (RQ:3)	Qualitative (opinion)	Semi-structured interview		Key Procurement personnel, operations, + Supplier (50 interviewees)	Government premises, Suppliers' premise	

Source: Author

#### 4.3.2.1 RQ1: Phase 1 – Identifying links between relief components to procurement strategy and buyer-supplier relationship tendency

Phase 1 of the present study involves identifying the links between relief components to HROs' strategy for procurement and buyer-supplier relationship. This is made based on the lean and agile purchasing model by Drake, Lee, and Hussain (2013) in which the model explains each relief components fits in lean, agile or leagile quadrant correspondingly by utilising the AHP procedures. The supply option is based on two-dimensional impact factors: lean, being impacted by cost and quality; and agile, being impacted by flexibility and time. Meanwhile, Figure 4.7 represents an overview of the procedure to be used using AHP (Ho, Prasanta and Lockström 2011).



**Note:** Steps 1-3 performed using the Analytic Hierarchy Process (AHP)

Figure 4. 7: Overview Flow Chart of Process for Placing Component in Lean and Agile Procurement Portfolio Model

***Procedure***

To implement AHP, the researcher guided the evaluators based the procedure to be used in positioning a component. In summary, the procedures are as follows:

- Select the criteria and their sub-criteria (measures) according to which the components are to be prioritised;
- Weight the relative importance of the criteria followed by sub-criteria using pair-wise comparison based on value of 1 to 9;
- Multiply weights of criteria and sub-criteria to obtain the global weights;

- Score each component based on importance of the sub-criteria using 5-point scale from very high to very low, and the scale converted a pre-calculated weight from highest of 0.51 to lowest of 0.04; and
- Calculated the mean of all evaluators, the normalised score for lean ( $y_{li}$ ) and agile ( $ya_i$ ) is standardised to a value of 1 and below using the formula:

$$ZL_i = (y_{li} - y_{min}) / (Y_{max} - y_{min})$$

$$ZA_i = (ya_i - y_{min}) / (Y_{max} - y_{min})$$

As rule for the pair-wise comparison, Saaty and Vargas (2001) suggest the geometric mean is used rather than arithmetic mean. For each comparison made, consistency ratio (CR) is calculated and the value of  $CR < 0.1$ , satisfying the consistency test. In addition, AHP model is based on five level hierarchy measuring impact as shown in Figure 4.8. To support this hierarchy, the AHP model measuring impact is based on rate the strength of the impact of the individual component of the sub-criteria using the five-point scale as shown in Table 4.7. The absolute measurement as mentioned in Level 4 and Level 5 of the AHP Model, is distinctive from the pair-wise comparison, where the latter was used in the previous level involving the criteria and the sub-criteria. The pair-wise comparison in table uses “one to nine scale” AHP preference. The absolute measurement<sup>8</sup> classification employing five-point scale: VH = very high; H = High; M = medium; L = low; and, VL = very low.

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<sup>8</sup> This absolute or alternatively referred as direct measurement is applied because there would be an intractable number of pair-wise comparison to perform. For example, assuming there are 5 components to be rated against 12 strategic priorities measures, the pair-wise comparison formula is  $n(n-1)/2$ , where n equals the number of components. Using this formula, which totals 10 is then multiplied to 12 (being the strategic priorities) for a sum of 120 comparisons. In contrast, the absolute measurement reduces this to  $5 \times 12 = 60$ . This absolute measurement method has been utilised in previous studies, for example in supply selection and, functional versus innovative product comparison.

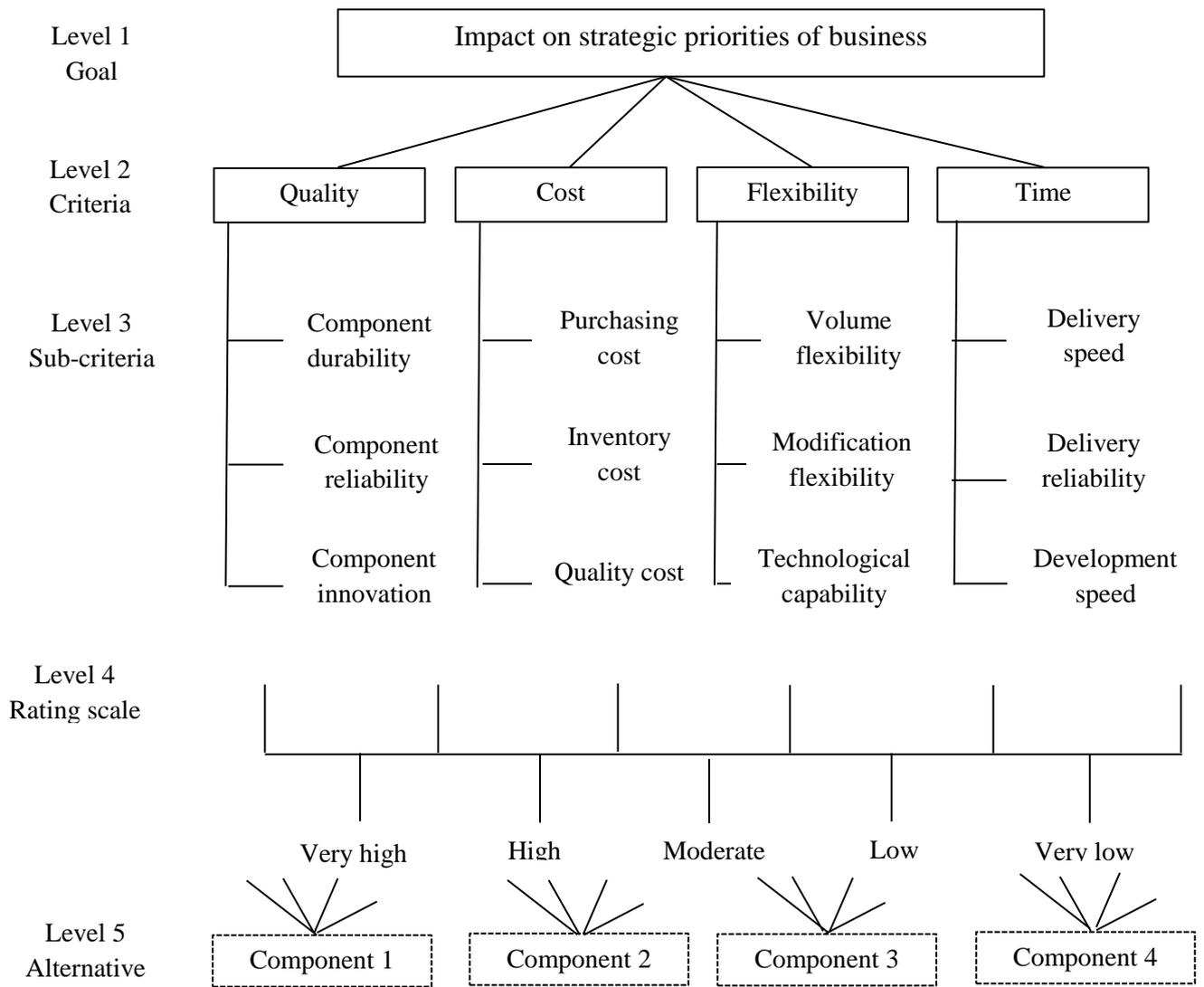


Figure 4. 8: AHP Model for Measuring Impact of the Components on Strategic Priorities

Table 4.6 shows that the importance is divided into intensity, definition and explanation to guide evaluators in the pair-wise comparison. Drake, Lee, and Hussain (2013) provide the calculation of the normalised weight for the five-point scale using AHP procedure as shown in Table 4.7. For example, in comparison between choosing a public transport and own transport as alternatives to work, in assessing cost savings versus environmental impact, the decision maker may prefer or score a 5, meaning, cost saving is more important than environmental impact for the decision maker. However, another evaluator may think that environmental impact is more important than cost saving, hence using the standard AHP form, where column is compared to row, here the row value is bigger, hence a reciprocal value will be used. In this

instance, the value is 1/5. In some instances, the decision maker may prefer a more compromised value, for example between choosing moderate and strong, and decides a value of 4 or its reciprocal, 1/4 instead of choosing between 3 or 5.

Table 4. 6: One to Nine Scale for AHP preference

Intensity of importance	Definition	Explanation
<b>1</b>	Equal Importance	Two activities contribute equally to the objective
<b>3</b>	Moderate importance	Experience and judgement slightly favour one over another
<b>5</b>	Strong importance	Experience and judgement strongly favour one over another
<b>7</b>	Very Strong importance	An activity is strongly favoured and its dominance is demonstrated in practise
<b>9</b>	Absolute importance	Importance of one over another affirmed on the highest possible order
<b>2,4,6,8</b>	Intermedia values	Used to represent compromise between the priorities listed above
<b>Reciprocals of above non-zero numbers</b>	If activity <i>i</i> has one of the above non-zero numbers assigned to it when compared with activity <i>j</i> , then <i>j</i> has the reciprocal value when compared with <i>i</i>	

Table 4. 7: Pair-wise Comparison Judgement Matrix for Five-point Rating Scale

Rating scale	VH	H	M	L	VL	Priority weight
<b>VH</b>	1	3	5	7	9	0.51
<b>H</b>	1/3	1	3	5	7	0.26
<b>M</b>	1/5	1/3	1	3	5	0.13
<b>L</b>	1/7	1/5	1/3	1	3	0.06
<b>VL</b>	1/9	1/7	1/5	1/3	1	0.03

The procedure employed for multiple evaluators from the data collection agencies and aggregation of individual judgment (Saaty and Vargas 2001) is as follows:

- The AHP procedure this are made using the questionnaire where each member of the group has to make judgement doing a pairwise comparison of criteria in the categories and subcategories of the hierarchical structured decision problem;

- The individual evaluator’s assessment will be based on geometric mean (the  $n^{\text{th}}$  root of the product of  $n$  items) rather than the arithmetic mean;
- The outcome would be a consolidated weights or priorities for criteria in a category for the calculation of global priorities in the decision problem;
- In the case of inconsistency<sup>9</sup>, consistency ratio (CR) (Saaty 1977) is adopted for treating inconsistency as it is widely accepted (Saaty 1980; Forman and Selly 2001; Liu et al. 2008; Drake, Lee and Hussain 2013; Siraj, Mihailov and Keane 2015);
- The calculation of CR<sup>10</sup> was based on AHP decision support tool software, *PriEst* (Siraj, Mihailov and Keane 2015) and complemented with *AHP-OS* of Business Performance Management Singapore (Goepel 2017). This study adapts recent study by Siraj, Mihailov, and Keane (2015) which demonstrated how a case study on the selection of the most appropriate telecom infrastructure for rural areas benefitted from using features of *PriEst*.

The “rule of thumb”:  
 $CR = \text{Consistency Index (CI)} / \text{Random index (RI)}$   
 Where the acceptable value is  $CR < 0.1$   
 (Note: CI to measure the “closeness to absolute consistency”)

#### 4.3.2.2 RQ 2: Phase 2 - Developing Conceptual Framework

In phase 2, the study proposed a conceptual framework of the relevant concepts of a multi-disciplinary area of SCM and disaster response, and the linkages comprise two comparative case studies with embedded unit of analysis. This explanatory research (to answer the how question) follows stringent case protocol and incorporated rival claims, a strategy used for a critical case study (Yin 2014). A multiple-case designs structure as suggested by Yin (2014), will be performed using mix sequential methods which include an in-depth interview (semi-structured, open-ended), observation and gathering of secondary data. This multiple method can be used to triangulate findings (Saunders, Lewis and Thornbill 2009). In addition, according to Yin (2014) using a multi-source evidence is regarded as case study’s major strength as it increases

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<sup>9</sup> For example, an evaluator when rating three preferences  $E_i$ ,  $E_j$  and  $E_k$ . If  $E_i$  is preferred to  $E_j$  and  $E_j$  is preferred to  $E_k$ ,  $E_i$  is preferred to  $E_k$  that is, if  $E_i \rightarrow E_j \rightarrow E_k$ , then  $E_i \rightarrow E_k$ . Inconsistency in the preference, for example  $E_j$  and  $E_k$  has a higher value than  $E_i$ , is largely due to physiological reasons, clerical errors, and insufficient model structure (Sugden 1985; Siraj, Mihailov and Keane 2015)

<sup>10</sup> There are other software tools in the market such as Expert Choice and *HIPRE*.

construct validity. The study includes a real life observation for theory development as proposed by Kovács and Spens (2005).

Elements critical for the proposed lean, agile, leagile conceptual framework are represented by the proposition in which measurement constructs such FA elements includes pricing/cost, quality, delivery, flexibility, and buyer-supplier collaboration elements (represented by sharing of disaster information) as well as the response mechanism. The study attempts to explain how these elements, when combined in a contingent response strategy requires a minimum quantity order (usually as storage) and a threshold quantum specified in disaster intensity that will support disaster relief missions through the increase in quantity and speedier delivery of the supplies. More profoundly, the research inspects evidence of price variation or mechanism, quantity flexibility, the speed of the delivery and the decoupling point based on disaster intensity information sharing, which is central to this leagile conceptual framework. This is substantiated with field observation (process observation on supply positioning) and interview, with procurement and operations manager/officers/staff as well as selected supplies that is nominated by the procurement agencies as the key players in the market with large contracts and long-standing experience.

Data is analysed simultaneously with data collection, a protocol usually related to qualitative technique to reflect the emerging conclusion. These case studies is analysed for process tracking, common in an explanatory study (Yin 2014). A descriptive graph will be plotted to compare leagile and response perspective of both types of procurement strategy, FA contracts versus competitive bidding contracts. These are used as comparison to disaster relief procedures used by agencies in dealing with natural disasters or in this study, on flood relief. To gain a deeper understanding of the process and challenges, content analysis which determines connectivity between a statement (interview transcript) and observation to the event as highlighted by Maxwell (2009) is performed. In ensuring the validity of the case study research quality, the study focuses on triangulation of data, in which biasness of one method could be neutralised using another (Creswell 2000).

One of the triangulation applications, the observatory procedures of the present study embarked on one-zero sampling techniques. The technique appears to be most appropriate due to the unpredicted nature of disaster on-set, and as it also requires the

consent given by the relevant authorities. It is important to realise that for an observation study, it may involve issues such as safety, logistics supports and the acceptance of affected victims. Hence, despite this technique is critiqued for being dimensionless, it is adopted based on best suited circumstances and the repetition of such observation following an organised way in other premises offer a thematic conclusion as well as may possibly be the key source to answer the relevant research question.

In ensuring additional care for validity and research quality of the case study, research adopts the three evaluation criteria as suggested by Halldorsson and Aastrup (2003), and Purvis, Gosling, and Naim (2014): firstly, truth-value, as appreciating that there is no single version of reality and that researchers have predefined concepts that they bring into any approach analysis; secondly, transferability and contextualise in which researcher recognises that the research is context specific and that immediate generalisation is not possible; and finally, track ability and explicitly, as researcher relates to the documents of the research process and data sources used. The method relies on triangulation of data logics as mentioned earlier in which biasness of one method could be neutralised using another (Creswell 2000). In addition, based on the dominant qualitative nature with implicit quantitative component, the potential conclusion bears a quasi-statistics evidence (Becker 1970; Maxwell 2009).

#### **4.3.2.3 RQ 3: Phase 3 - Assessing Practicality of the Conceptual Framework**

In phase 3 of this research, this study seeks to understand factors surrounding the conceptual framework. This includes obtaining the perspective of the both HROs in terms of the regulation requirements, contract management and operational issues such as supplier performance capacity, unit price adjustment, performance timeline, quality, performance bond or default clauses and tightening audit systems, as hovered by prior studies (Wang (2012).

The objective of this method is to gain a deeper understanding of a particular opinion, for example, the regulatory change required for FA implementation in public procurement. Data analysis for this phase will be purely qualitative based on opinion

obtained from the respective HROs. The data analysed using an inductive (useful for explorative investigation) based narrative procedures, such as data display and analysis approach as suggested by Miles and Huberman (1994). The authors argue that data analysis and drawing of conclusion are conducted by using matrices, networks or other visual forms. Then, coding and thematic analysis technique are done to organise emerging themes and reach the conclusion.

#### **4.4 Validity: Steps for Data Quality and High-Quality Analysis**

This section enumerates the final component of the research design of this study, ensuring validity and reliability which includes a brief discussion on ethical considerations of the study.

The meaning of high-quality data in a qualitative research refers to data that are able to capture processes and provides understanding of the social context (Neuman 2014). In addition to this, Dubois and Gadde (2014) suggest of number of the data sources to obtain different perspective and complementary aspects. Hence, in this study, several steps were taken to ensure that the data presented were able capture the social context in this study through both an adequate range of data and its volume. Moreover, the data collection and analysis were performed either simultaneously or through a linear process. These process continues until sufficient data and analysis fulfils the thematic description and variation, or in other words, reaching conceptual saturation (Corbin and Strauss 2015)

With regards to field research, this study adopts suggestion by Neuman (2014) to ensure internal consistency to so that data fits together in a coherent picture, while for external consistency, actions were taken by a cross-checking other sources of the multiple data. For example, by verifying field interview results with that of DSW-supplier interviews of the same region especially concerning lean and agile factors. In addition to ensuring consistency, this study strived for reliability compliances by performing member's validation on interview transcriptions and field notes. This way, this study professes of an accurate representation of the social context involving important aspects of processes and perspective from the organisation under study

Data collection for both case studies is guided by the use of case study protocol (Rowley 2002; Yin 2003, 2014, 2018), a complete set is listed in Appendix 1.0 of this thesis. The protocol is supported by other documents, and the lists are as follows: (1) under Appendix 1.1, the overview of the study which includes specific RQs and the proposed conceptual framework; (2) data collection process which includes the logistic reminder; (3) data collection questions, which includes case study questions, while more specific details consisting interview questions for agency and supplier (Appendices 1.6 to 1.7), interviewee lists (Appendices 1.8 to 1.9), the AHP moderation form (Appendix 1.8), and guides for interview and observation (Appendices 1.4 and 1.5); and (5) other related documents in relation to research ethics requirement, which will be deliberated in the next section of this Chapter. The protocol was an important tool for the researcher as a constant reminder of the scope, the necessary field procedures and more importantly concerning the case studies' questions. As the organizations under study comprises of various government agencies and geographically apart, bureaucracy and protocols adherent were essential before any data were able to be collected. Hence, the case study protocol's information of the study was used to seek approval and support from the agencies.

Other steps include adherence to suggestion recommended by Yin (2014) on revisiting the initial proposition that shapes the conceptual framework, safeguards scope of such analysis and provides structures. For this, a pilot study is suggested prior to the larger case study, which will be presented in the next Chapter. Next, in ensuring that this research is not too deductively driven of the conceptual framework and limited to the inductive approach (Baxter and Jack 2008), researcher has taken steps on discussing with other researchers on the conceptual framework approach at length and feedbacks were then used to improve of balancing the approaches.

Furthermore, Yin (2014) suggested that to ensure high quality analysis, steps to be taken for this study should include: first, all the evidence to the best of researcher's knowledge were attended, which include rival interpretation; secondly, attempt were made to analyse the most significant part of the multiple case study, and thirdly, researcher's prior knowledge and actors' of disaster relief expert opinion were sought to demonstrate their awareness and current thinking of the topic, with cautions and in an unbiased manner. Lastly, with regards to generalisation, validity, and reliability, the

following tests as demonstrated in Table 4.8 were adopted and carried out to establish quality of the case study.

Table 4. 8: Checking Case Study Quality

Test	Case study tactic	Phases of research
Construct validity	Used multiple sources of evidence	Data collection
	Established chain of evidence based on case study database	Data collection and during analysis
	Interview transcribed and draft of this chapter were reviewed by key informant	Data collection and end of data analysis
Internal validity	Comparative analysis was performed on design derived versus what was observed on the case study	Analysis
External validity	The study used of replication logic for multiple case study, and on utilisation of the case study protocol	Analysis
Reliability	Developed a case study database	Data collection

Adapted from Rowley (2002)

#### 4.4.1 Ethical Considerations

This study is in accordance with the approved protocol National Statement of Ethical Conduct in research, relevant legislation, policies and procedure of Curtin University, which confirms to Australian Code for the Responsible Conduct of Research, National Health and Medical Research Council (NHMRC). Ethics approval were granted by Human Research Ethics Office, Curtin University under approval number RSDE-71-15 dated 16 November 2015 and with a validity period of 4 years ending 17 November 2019. A copy of the approval is presented in Appendix 1.11 of the case study protocol. The general principles lead to the following ethical considerations which are risk, benefit and consent specifics to Research Method or Fields (Human Research Ethics Office, 2015). Next, the specific sub-sections are explained and read in accordance to the relevant chapters of the NHMRC.

#### **4.4.1.1 Risk and Benefit, and Consent**

This study in essence assures minimal to no potential risk to participants, researcher and the University as it involves scrutinizing secondary documents, risk management strategy emphasizing on adhering to participating organizations' pre-set conditions and regulations including privacy while assessing and taking proper care of the control documents.

In terms participants recruitment process, researcher formally approached relevant organisations through letters from the University with relevant supporting documents including supervisor support letters and the participant information statement as provided in Appendices 1.2 and 1.3 respectively. In some occasions, telephone calls and emails are used to approach the agencies and then this was formalised through the official applications. Once the individual or organization agreed to the recruiting process, a consent form were given and collected during the data collection process. A sample of signed consent form is presented for data evidence (see appendix 1.16).

#### **4.4.1.2 Specifics to Research Method**

Data collection method is detailed out in Chapter 3.1 of the NHMRC. Given the fact that the current study employs a mixed method methodology, the study protocol is detailed out specifically. This specific study, as mentioned, involves case studies conducted from various organizations including the triangulations strategy involving semi-structured in-depth interviews, observations and perusing secondary data from relevant agency including the chosen analysis techniques. In light of this, the participant information statement and the consent form were profoundly used. Next, to ensure proper management and to safe guard data obtained, researcher's data was strictly saved using the data management plan as required by Curtin University.

#### **4.4.1.3 Specifics to Participants**

Notably, the present study is rated minimal risk as the participants are not subject to any human procedural and illegal activities. The study also did not involve children and cultural as well aboriginal population. One specific concern was if participants in the research primarily used language other than the English. In reality, most Malaysian are able to speak the English however, there was a concern on the level of proficiency.

## 4.5 Chapter Summary

This chapter explains the strategy of inquiry for the study, guided by complementary theories comprising CT, TCA, and SET, in an attempt to gain knowledge through a pragmatic approach of combining multiple design strategy of two case study procedures and adapting components of SPS and ARP designs. As a strategy, multiple case design study with mixed method procedures is adapted to provide an explanatory and cross-case synthesis. In essence to the chosen research design, this study aims to propose a conceptual framework using multiple concepts for advancing SCM strategies and existing body of knowledge in the area of public procurement and disaster relief management. The study design, as advocated is further supported by a proposition and aims to reject rival explanation.

The study adopted two case study design procedures to develop theory: Phase 1- define and design, involving selecting cases and design data collection protocol; Phase 2 - prepare, collect and analyse the two case studies of the study; and, Phase 3 - analyse and conclude, which includes drawing cross-case conclusion, modifying theory, developing policy implication, and writing the cross-case report. For Phase 1, a detailed description of the design phase was presented in this Chapter which also includes the case study protocol and results of a pilot testing of a disaster relief agency in East Malaysia. The result derived from the pilot study was used to modify the procedures and the semi-structured in-depth interview questions. By doing so, this research argues that the pilot study findings reinforced the confirmation of concepts comprising FA, SCM performance of lean and agile, and leagile, contingency response approach, and other concepts were purely induced from the study which will be explained later. In addition to this, the pilot study also provided a better understanding of the data source structure, recognising the boundary of the case study and facilitating the field logistics arrangements. It is also noteworthy that all these findings aided the progression of the larger case studies, ruminated as a critical part of this research.

Next, phase two of the study incorporates two civil service relief organizations case studies for flood disaster reliefs: firstly, the Department of Social Welfare of Malaysia (DSW) with de-centralised procurement structure dealing with localised transactional suppliers; and, secondly, the National Disaster Management Agency (NADMA) using centralised procurement structure and collaborated with the Federal Agricultural

Marketing Agency of Malaysia (FAMA), that is categorised as strategic supplier with manufacturing capability. The products of the two-case studies different. DSW deals with dry, wet and cooked (packed) food products, while NADMA procures a standardised modular dry and instant based product. The selection of the two case studies offers distinct examples for comparison purposes, comprehending the two-case study design with goals of incorporating plausible rival explanation.

The overall format follows linear-analytical structures, a standard composing structure, generally adopted for thesis/dissertation work, and, applicable to all three purposes of case study: explanatory, descriptive and exploratory. However, the compositional format for this chapter is based on multiple-case study with question and answers. Hence, the reporting format of this chapter will be in accordance with each single case study following the sequence of the individual RQs. Apart from this, this study intends to increase the reliability of the information gathered in the case study. The next chapter cites relevant sources used to arrive at the specific findings, following principle 3 of data collection to maintain a chain of evidence. Next, a separate section for a cross-case synthesis is performed.

## **CHAPTER 5: DATA COLLECTED, ANALYSIS AND RESULTS**

### **5.1 Introduction**

This chapter discloses the data collected, analysis performed, and the results. In addition, this chapter also addresses the steps taken to increase validity and reliability of the three key RQs of the study: RQ1, on determining the strategic decision of procurement of disaster relief items based on purchasing portfolio analysis; RQ2: to understand the inter-relation between the concepts of strategic decision to procure and supply food items, the use of FA as medium to support buyer-supplier relationships through collaborations, the contingency response of the aid, and how these were linked SCM performance of lean or agile or leagile; and, RQ3: the discussion on challenges and practical solutions of FA implementations. The final part of this chapter, demonstrates the development of complementary theoretical perspective of the study, more specifically, the linkages between TCA, SET and CT theories, which are arguably the backbone of this study.

### **5.2 Data Collected, Analysis and Quality**

#### **5.2.1 Agency Approvals**

The study is guided by a case study protocol as outlined in Appendix 1.0. In the foreground, this research required multiple layers of approval from the agencies, which involves Federal as well as state authorities. For example, to commence the pilot project for the study, the approval was granted by state agency on 23<sup>rd</sup> December 2015 (as shown in Appendix 1.14). The pilot study this Thesis work with preliminary assessment of the methodological section and field logistics, before embarking on the larger case study. Details of the exegesis from the pilot study are shown Appendix 2. Meanwhile, for the overall larger case study involving a total of seven states, the approval was granted on 25<sup>th</sup> October 2016. In addition to this, an additional approval was given on 6<sup>th</sup> April 2017, as this research takes an important suggestion by the respondent of the study to include another state DSW agency, which was initially left out. The approval letters and the relevant translations in presented in Appendices 1.12 to 1.13.

In addition, it is also important to note that the approval granted by DSW headquarters (HQ) allowed various progression in the data collection: Firstly, in obtaining the support of the senior officers at the state and respective district offices, who earlier had some concerns as well as reservations for the interview session and releasing government information/documents to third party as in the case of the researcher; secondly, in providing logistics support to conduct observations of field operations; thirdly, in arranging agency's appointed suppliers dealing in disaster relief supplies for interviews; fourthly, in allowing the approval for an interview with victims of disaster relief, taking into consideration of the state of trauma of these victims; and finally, in providing assistance for a timely and feasible logistics route for the data collection process. This benefitted the study considering that the data collection process involves vast geographical coverage (inter-state mobility), in which it has direct financial implications to the study. More importantly, the approval also allowed the study to be conducted in a manner that it could cover the "in-depth" and "up close" requirement.

### **5.2.2 Data Gathered**

Data for this study were collected from responding agencies that were directly involved in the procurement and supply disaster relief items, and able to exhibit collaborative supplier relationship: (1) Case 1 with a total of seven studies demonstrated DSW working relationship with trading base suppliers; and (2) Case 2 explores NADMA collaboration with FAMA, a government linked agency acting as supplier with manufacturing ability. For case 1, a total of eight DSW agencies participated as the corresponding respondents, providing expert opinion on AHP, the procurement and supplier process, linking and arranging with relevant suppliers, facilitating documents suitable for the study and direct observation of the supply process in disaster area, and equally important, arranging the venue and the appointed interviewees of the agencies for the interview session. In contrast, for case 2, due to the recent establishment (the year 2015) of the instant food kit (IFK) modular, the study is limited to data from interviews and documents. Although this may be the case, this study argues that the data still provided an in-depth coverage of the case.

Data collected for Case 1 from seven states in total reflects a sizeable sample of 50% population comprising 14 states and two Federal Territories of Malaysia. The sample

represents states of highest intensity and frequent occurrence of flood and relief activities and geographical coverage of the country. The seven states cover the total five regions targets planned for the study i.e. northern, central, southern, eastern Coast, of Peninsular Malaysia, and the last region in the Borneo states of Malaysia, East Malaysia. The study is concentrated on criteria: comprising all flood states prone and are directly affected by the monsoon season; frequent occurrence of flood relief activities which directly impacted the state budget; and, deployment of experienced personnel for the exhaustive and pressurized working condition. This in turn means that the key informant selected from these states/regions are regarded as highly experienced, as well as, whom are nominated by the central agency of DSW as respondents for the study.

The study collected multi-source evidence for both case studies. These includes mediating AHP evaluation session, collecting and sighting documentations, interviews of key operational and procurement government officers, suppliers and victims, and, carrying out direct observations. A total of 12 appointed decision makers representing the various agencies participated in the AHP evaluation process, intended for RQ1. Correspondingly, for RQ2, a total 24 secondary documents were collected and three direct observation were performed. Moreover, for converging evidence of all three RQs, a total of 47 interviewees participated for the semi-structured in-depth interview session. A summary of responding profile is presented in table, the list of AHP evaluators, list of interviewees and interview transcribe, list of documents collected, and, list of observation conducted with the field notes are presented in the Appendix 3.0 of this study, and in particular Appendices 3.1 to 3.4, and the relevant sub-appendices.

This study also wishes to highlight that during the course of observation at DRC in the central region of the country, Researcher were given the opportunity by the state DSW to perform an interview with victims. Despite being traumatic, victims were excited about this study and gave consent to conduct a field research interview. Considering the victim's situation and the suitability of the setting of which the interview took place (in DRC), Researcher took extra care by being brief and the questions for the victims were descriptive, unstructured and in-depth (Neuman 2014). More importantly, researcher focused on markers, "a passing reference made by respondent to an

important event of feeling” (Weiss 1994, pg. 77). This in particular over lean and agile factors, for example with regards to food quality and time of delivery. The interview is listed under the database in Appendix 3.1 for easy reference. A point that this study wishes to highlight, although the number of victims that were available was minimal, nevertheless this study opines that the victims’ responses were an additional to the multi-source evidence collected and offers better divergence perspective for this research.

Meanwhile, data collected from Case 2 NADMA involves a single evaluator from the agency to access the pair-wise comparison criteria and sub-criteria. Despite this limitation, this study argues that the evaluator concerned is a credible assessor for the AHP session. As a senior Director in NADMA assigned by the agency as a respondent for the study, the evaluator’s credibility is reflected in the knowledge acquired based on involvement since the inception of NADMA, directly involved in carrying the Cabinet mandate for NADMA’s role in coordinating and collaborating with FAMA for the supplies of the IFK modular. Studies have argued that that causes of inconsistency in judgement includes psychological reasons directly associated with knowledge (Sugden 1985). Under those circumstances, this study reasons that a single evaluator with the direct knowledge of the alternatives and the psychological advantages contributes to greater consistency of the judgements than multiple evaluators without the direct knowledge.

In addition to this, absolute ratings as assigned by the evaluator comprise the IFT kit modular as a single item and not the 15 SKUs, which filled in the IFT box or container. The reason for this is that NADMA is flexible about the SKU item’s replenishment into the RM70 modular, whereas greater emphasis was given to supplies of each modular unit to victims. In light of this emphasis of the modular, it could be ascertained that NADMA’s strategic decision for procurement of relief items is centred on the modular or the IFK. In addition to this, as NADMA is a centralised agency, the regulation and funding are by the Federal Government, and, somewhat different from State authorities. To put it in another way, the G2G arrangement between NADMA and FAMA for the IFK is beyond state level financial procedures, hence requires distinctive strategic consideration on procurement.

In terms of the quality of data collected, researcher facilitated the AHP session alongside the evaluator to ensure all instructions are clear and most importantly, the evaluator understood the overall goals and the specific procedures of pair-wise comparison and absolute rating judgements. This study reasons that both facilitation and nature of settings of the evaluator promotes better psychological and motivation for the evaluator to complete tedious judgement exercise. As a result, this reduces inconsistency of the judgement particularly involving ordinal consistency (OC) (Siraj, Mihailov and Keane 2015).

### **5.2.3 Additional Information Collected**

New imperative findings from the data collection includes: (1) De-centralised procurement process and state authority in procurement decisions; (2) the use FA and emergency purchasing procedure; and, (3) the role of inter-agency and intra-agency (includes NGOs) collaboration. Firstly, with regards to the state DWS functions and the de-centralised procurement process, the role of DSW as specified before, is specifically stated under the NSC Directive No. 20 for the provision and distribution of relief assistance which includes food, clothing and other essential to the affected victim (Seng 1999; NSC 2015). However, an additional provision of Malaysia's constitution described under Article 13 states that it is the respective States duty in ensuring the provision and distribution of relief assistance. These includes supply of food and other essential items to on-set disaster areas. Hence, for the purpose of meeting this duty, separate budget of the State Financial Office is allocated for disaster relief, and as result of this, DSW HQ has de-centralised the procurement function to each States, and further cascaded to its district branches.

In addition to this, through the data collection process, this study was also introduced to a common procurement practise process of the Malaysian civil service i.e. Emergency Purchase with FA. According to the guidelines for emergency expenses <sup>11</sup>(AP 55) and emergency procurement (AP 173.2) published by the Malaysian Treasury (MOF 2015), two sets of approval was allowed for emergency purchases for disaster relief, as described in paragraph 3.1.1: Firstly, the AP 55 for emergency

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<sup>11</sup> AP is defined as Treasury Instructions, which are the financial circulars issued by the Ministry of Finance, Malaysia for the direct use of the intended subjects.

expenses not budgeted for/without fund allocation, the expenses could be made through advances for an approved individual; and, secondly for readily fund allocated, the emergency procurement could be utilised with lax finance regulations, made in the interest of public and government. Using these provisions, DSW had incorporated FA as a tool to secure supplies. This study notes that there is lack of documental evidence for the use emergency purchase with FA, however it is safe to say that this procedure is widely practise across DSW state and branch offices during disaster relief.

#### **5.2.4 Unexpected Challenges to the Study**

##### ***Climate deter data collection***

As in other research, this study too encountered some challenges during the course of data collections. Firstly, the disaster occurrence uncertainty deters the progression of data collections. The planned data collection duration was from the year 2015 until the year 2017, however real data collection could only materialise from December 2016 until the mid of May 2017. This was largely due to the lack of the monsoon rains which drastically impacted flood occurrences in most part of the country for the year 2015. Hence this resulted in unavailability relevant data for the intended period. As will be explained in the coming sections, the reduced flood occurrence in the year 2015 resulted in wastages DSW and NADMA-FAMA's food stocks, which was pre-positioned during the preparedness stage.

##### ***Reservation for allowing documents/observation***

In addition to this, selective respondent of the study was unwilling to provide some relevant documents, intended for the purpose of triangulation. This was due to reservation of some officers with regards to the handling of government documents for research purpose for fear that it could be misused, misinterpreted and in some cases discredited the organisation under study. In essence, some officers worry that their action might had an unintended repercussion to their organisations. Nevertheless, credit must be given to responding organisations as this research still manage to acquire relevant documents that serves as multi objective evidences.

## 5.2.5 Analysis Procedures and Adjustment

### *Pair-wise comparison results*

The input from this evaluation for the lean and agile purchasing portfolio model was collected by facilitation, questioning each representative from the states' DSW, usually represented by either operation or/and procurement key informants. Mostly the data were collected based on single form but jointly discussed and decided by the two-division representative. These were made possible only through face to face encounters at the respective state DSW premise. The usual routine of the data gathering involves the researcher brief explanation of the content of the AHP before handing over the forms on the first meet up to the DSW's representative. These ensures the forms were given some attention by the evaluators either reading and getting acquainted with the terms and mechanism of the evaluation process before the actual meet up, usually will take 3 to 4 days from the delivered date. During the actual interview, the specific terminology of the decision criteria and the components were re-explained and all arising doubts cast off to ensure evaluators were ready for the assessment. In addition, special care was abided to ensure no pitfalls arise due to leading question when asking the evaluators.

Data collected from the seven agencies of DSW were arranged and computed for the geometric mean of the priority weights. As described by Drake (2013), the corresponding criterion and sub-criterion weights are multiplied to produce a global weight of each sub-criterion, so that the importance to its parent criterion weighted by the importance of the parent criterion to the strategy. As highlighted in previous chapter, the possibility of inconsistency of evaluation in the pair-wise comparison is treated using value of Consistency Ratio (CR) (Saaty 1980). The CR is computed using the *PriEst* application on every step of the pair-wise comparison. For example, beginning from the pair-wise comparison matrix of competitive priority Goal of each evaluators, before the geometric mean values were tabulated. Similarly, the same process was conducted for pair-wise comparison matrix of the competitive priority for all factors: cost, quality, flexibility and time.

This section unveils the analytical strategy for the larger case study, involving qualitative data. In the previous section, the analysis of the quantitative data uncovers the behaviour pattern on judgements for items purchasing for the relief activity.

However, the main case study questions' nucleus revolves around RQ2, in which the data collected focuses on "how" case study questions are determinants in identifying the meaningful patterns of the conceptual framework of the study. This is consistent on the fact that conceptual framework development should continue to develop as the study progress and the proposed construct emerges from the data analysis (Baxter and Jack 2008). Apart from this, studies also argues on the convergence of multiple data to contribute to greater understanding of the whole case (Patton 1990; Yin 2003; Baxter and Jack 2008). With this in mind, this section of the study will be elaborated beginning with the discussion regarding the background of the data collected and the analysis strategy, followed by the frequency distribution of perspective on concepts of the study, embedded unit analysis of five regional DSW cases, and, finally, the summary of the larger single case.

### *Use of CAQDAS*

To support the data base organization and analysis, this study utilises CAQDAS function in particular for two phase analysis, the descriptive-level and conceptual-level as it is argued that when carefully conducted, it possibly could increase the validity of the research result especially at the conceptual stage of an analysis (Frieze 2014). Albeit CAQDAS limitations, manual analytic strategy such as cross case synthesis was utilised, which will be elaborated in the next section. In addition to this, this study also adopted the computer assisted NCT analysis (Seidil 1998). For instance, after noticing (N) data such as interview transcribes and secondary documents, the next step of collecting things (C) involves the coding process. The codes used for the study follows a mixed deductive framework and inductive open coding as described by Frieze (2014). For deductive coding, provisional coding was developed based on constructs adapted from theories of contingency, TCA, SET and SCM concepts for performance and FA features. Meanwhile, for inductive open coding were also used for additional new input given by the respondents. The list of codes used for this study is listed in Appendix 4.10, together with its respective properties and dimensions.

Lastly, in determining the properties and dimensions of each concept's coding, insights from Corbin and Strauss (2008, 2015) were applied in particular on the process of making connections between concepts to indicate phenomena, and thereby developing theory. Yin (2014) argues that the guidance by Corbin and Strauss is relevant to all

case studies. By the same token, although the current study is guided by complementary theories, the grounded theory guidelines provided the study with imperative connections between concepts and in reality. For example, in determining the properties for FA' concept, dimension such as flexibility were used and the properties of high, low and moderate were employed. Diagram will be used with arrows to indicate the connection between concepts for theory development. In essence, this final action constitutes the thinking about things (T) of the NCT model, where finding patterns and relations through CAQDAS query tool, and network view could be made possible.

### *Cross-case synthesis*

The analysis section is guided by strategy. In fact, studies also suggest that strategies and techniques employed are not mutual exclusive (Yin 2014, 2018), in other words, individual or a combination of strategies or techniques could be utilised for case studies. In this instance, this study employs two strategies out of four describes by the authors: firstly, by relying on the theoretical proposition of the study, which have moulded the data collection scheme and produced analytical significances; and, secondly, by explaining plausible rival explanations. For the former strategy, this study profess that 'Super Rival' or described by Yin (2014) as a force larger than but including intervention accounts for results. In pursuing for the plausible rival explanation, steps were taken to ensure the study is conducted as rigour as can be to avoid biasness towards the original explanation.

In addition, the cross-case synthesis approach was utilised on within-case analysis. This provides an analogous instance, in which when the relevant conditions appear to be similar, construction of an adequate explanation for each single case is possibly, and the researcher knows of the acceptable level of modification in the original explanation as new cases are encountered. Therefore, the flow of the analysis of this study includes priori embedded unit of analysis of each region's DSW case, and the argumentative conserved for the larger case studies' comparison. Hence, this imparts the justification for choosing the cross-case synthesis between DSW and NADMA, with goals of exploring whether these cases had a replication of contrasting view on the larger case study goals.

### **5.2.6 Demonstrating Chain of Evidence**

As highlighted in Chapter 4 and data base details as highlighted Appendix 3.1, this study acquired multiple data from various sources. This arguably supports the strategy to enhance credibility (Patton 1990; Yin 2003). The multiple data for this case studies includes primary and secondary data: Firstly, primary data comprises 47 primary interviews/joint interviews from eight States DSW as well as its branches encompassing all region of the country. Secondly, the interview also includes NADMA-FAMA. Thirdly, a set of primary data includes three direct observation conducted in three different states/three different region (central, southern and east coast of West Malaysia) each with its own objective and narrated in field note form with photographs included. Finally, secondary data which comprises 19 government documents, and one document from FAMA were obtained to meet the purpose of this study. The data were then organised in this data base for researcher's tracking purposes, and if necessary, to facilitate independent inspection. In this way, the reliability element of the study is arguably improved (Stake 1995; Yin 2018, 2003).

## **5.3 Results of Case study 1: DSW-Local Suppliers Collaborative FA**

### **5.3.1 RQ1: AHP, and, Lean and Agile Purchasing Portfolio**

By employing AHP for this study, a close examination of preferences could be made on six most common disaster relief items as listed in Table 5.1. Medicines and other non-perishable items were excluded as its not in the purview of the agency under study and are usually provided as item of the shelf items by the country's Ministry of Health. The selection of these six items was made earlier during the pilot study phase. Two significant items listed that will be analysed in RQ2 of both case studies are the food for DRC and modular food. Food for DRC comprises of raw food such as vegetables, rice, cooking oil, canned food, instant noodle, salt, sugar, tea, coffee, biscuit, bread, fresh fish and other 'halal' meat (meat as prescribed by Muslim law) /poultry such as chicken and red meat. While, the modular kit prepared by the DWS agency are in the form of dry food items such as rice, sugar, salt, instant noodle, biscuits, canned food, cooking oil and bottled water. These items are stored at the forward operating bases approximately one or two months earlier, before the predicted flood occurrence. The

usage of such dry food is either for the supply of DRC or to be supplied to victims that are unable to move to DRC or trapped in their homes/higher grounds.

Table 5. 1: Summary of the DSW’s Flood Relief Items

Items	Modular (Dry food/ bottled water) – FOB & DRC	Food for DRC – (cooked meal or for cooking fresh/raw food)	Hygiene kit	Clothes		Sleeping aid	Tent/ partition
Product life cycle	6 months	Less than 1 week	1 year	2 years		More than 2 years	More than 2 years
Variety	Low (Standard components)	High (Standard and specific component)		Low (Standard components)			
Demand	Forecasted	Actual		Forecasted			
Average stock out rate (%)	90%	100%	100%	30 - 40%		50%	5%
Order winner	Cost	Time		Time		Cost	
Level of customization	Standardized	Customized		Standardised			
Supply chain	Lean	Agile		Lean			

Source: Author

Other items named for comparison includes hygiene kit, clothes, sleeping aid such as blankets, pillow, comforter, mattress, and, partitions/tent used to provide comfort and privacy for the victims and their families. In contrast to food items, this study does not dwell on the items for RQ2 as it is not within the scope and are not subjects of the use of FA, as will be shown in the results of RQ1. Nevertheless, these items provides a clear comparison of purchasing strategies used by the disaster relief agency, similar to the notion that a manufacturing’s purchasing strategy for the components of products should be aligned to its business strategy to achieve competitive advantage as argued by Cousins (2005).

Each pair-wise comparison in Tables 5.2-5.6 as presented shows that the CR of below 0.1 and meets the consistency test rule. The following results were obtained: firstly, the geometric mean for priority were calculated and tabulated in Table 5.2; secondly, the tabulate the priority weight for each of the competitive priority measures (i.e.

quality, cost, flexibility and time) and the results shown in Tables 5.3 to 5.6; and, thirdly, the priority vector in Tables 5.2 to 5.6 are tabulated for computation of the total or global weights for the sub-criteria in Table 5.7.

Table 5. 2: Geometric Mean of All Pair-Wise Comparison of the Competitive Priority Goal Matrix for All Evaluators from States DSW

<b>GOAL</b>	<b>Quality</b>	<b>Cost</b>	<b>Flexibility</b>	<b>Time</b>	<b>Priority Weight</b>
<b>Quality</b>		0.92	0.94	0.62	0.21
<b>Cost</b>	1.09		0.82	0.71	0.22
<b>Flexibility</b>	1.07	1.22		0.87	0.26
<b>Time</b>	1.61	1.40	1.15		0.31
					CR= 0.003
<b>Note:</b> CR, consistency ratio <span style="display: inline-block; width: 20px; height: 10px; background-color: #cccccc; border: 1px solid black;"></span> Value of 1.00					

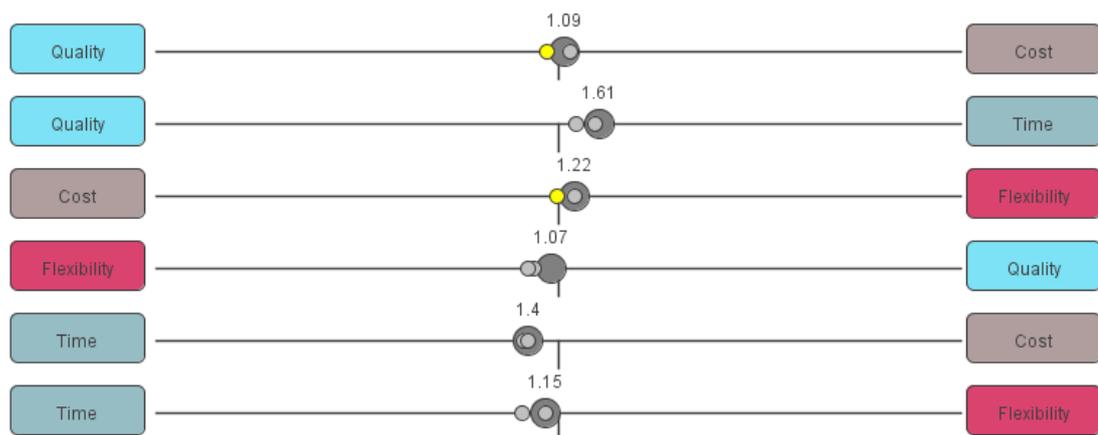


Figure 5. 1: *PriEsT* Equalizer View of Priority Goal Judgements

Source: Author

Equally important to note that, Tables 5.2 to 5.6 also indicates ranking of each competitive priority for criteria and sub-criteria, and these are substantiated by the graphs derived from *PriEst* application output, as shown in Figures 1 and Appendix 4.1. For example, in Table 5.2, based on priority weights, criteria for time is 31% tops flexibility of 26%, followed cost (22%) above quality (21%). Hence, the order of importance of the criteria: time (first ranked), flexibility (second), cost (third) and quality (fourth). However, in terms of pair-wise comparison rating as shown in Figure

22, the difference of importance between the criteria appears to be marginal as all four criteria are almost at equal importance.

Table 5. 3: Geometric Mean of Pair-Wise Comparison Matrix of the Competitive Priority Quality for All Evaluators from State DSW

QUALITY	Component durability	Component reliability	Component innovation	Priority Weight
Component durability		1.21	2.17	0.44
Component reliability	0.83		1.65	0.35
Component innovation	0.46	0.61		0.21
				CR= 0.001
<b>Note:</b> CR, consistency ratio				

Source: Author

Table 5. 4: Geometric Mean of Pair-Wise Comparison Matrix of the Competitive Priority Cost for All Evaluators from State DSW

COST	Purchasing cost	Inventory cost	Quality cost	Priority weight
Purchasing cost		1.00	1.33	0.37
Inventory cost	1.00		1.21	0.35
Quality cost	0.75	0.83		0.28
				CR= 0.001
<b>Note:</b> CR, consistency ratio				

Source: Author

Next, in assessing the sub-criteria of each criteria. Firstly, CR rule were satisfied for the sub-criteria under the test. Secondly, based on Tables 5.3 to 5.6 (as also represented by Figures 1 to 4 of Appendix 4.1), the following were established for the humanitarian aid items: (1) Quality criteria, durability sub-criteria are 2.17 times more preferred than innovation, while durability is only 1.21 times more preferred than reliability; (2) for Cost criteria, that there is no difference of importance between purchasing cost and inventory cost. However, both these factors are preferred over quality cost factor, the former is 1.33 times more important while the latter is 1.21 times more preferred; (3)

for Flexibility criteria, volume flexibility is 5.8 times more preferred than technological capability, and is 3.5 times more preferred to modification flexibility, which suggest that volume flexibility is an importance consideration of the components. By the same token, modification flexibility is seen as more preferred than technological capability by a slim preferential rate of 1.6%; and, (4) for Time criteria, demonstrates the preferential of delivery speed over delivery reliability by a marginal figure of 1.32%. The more significant observation however could be established between delivery speeds to development speed, where the former is 2.28 times more preferred. Whilst, delivery reliability factor is more preferred to development speed by 1.93 times. The ranks of all 12 sub-criteria are shown in next section.

Table 5. 5: Geometric Mean of Pair-Wise Comparison Matrix of the Competitive Priority Flexibility for All Evaluators from State DSW

<b>FLEXIBILITY</b>	<b>Volume flexibility</b>	<b>Modification flexibility</b>	<b>Technological capability</b>	<b>Priority Weight</b>
<b>Volume flexibility</b>		3.49	5.80	0.69
<b>Modification flexibility</b>	0.29		1.60	0.19
<b>Technological capability</b>	0.17	0.63		0.12
				CR= 0.00

Source: Author

Table 5. 6: Geometric Mean of Pair-Wise Comparison Matrix of the Competitive Time for All Evaluators from State DSW

<b>TIME</b>	<b>Delivery speed</b>	<b>Delivery reliability</b>	<b>Development speed</b>	<b>Priority Weight</b>
<b>Delivery speed</b>		1.32	2.28	0.45
<b>Delivery reliability</b>	0.76		1.93	0.36
<b>Development speed</b>	0.44	0.52		0.19
				CR= 0.001
<b>Note:</b> CR, consistency ratio				

CR Satisfied

Source: Author

***Global weights for the competitive priority***

Table 5.7 shows the ranks of the all competitive priorities sub-criteria. Interesting to note that each criterion has sub-criteria that is highly ranked, however top three sub-criteria are attributed to agile strategy (flexibility plus time). The average ranks of the criteria demonstrate that lean and agile strategies appear to be near to equal distribution, hence reflecting the preference of both strategies of humanitarian aid items by the evaluators. However, as will be demonstrated in the next section, the absolute rating on the respective aid components resulted in sensible differentiation of these components.

Table 5. 7: Combined Criteria and Sub-Criteria Weights in States DSW

Competitive priority	Local weight	Competitive priority measures	Local weight	Global weight	Rank
Quality	0.21	Component durability	0.44	0.09	4
		Component reliability	0.35	0.07	7
		Component innovation	0.21	0.04	11
Cost	0.22	Purchasing cost	0.37	0.08	5
		Inventory cost	0.35	0.08	6
		Quality cost	0.28	0.06	8
Flexibility	0.26	Volume flexibility	0.69	0.18	1
		Modification flexibility	0.19	0.05	10
		Technological capability	0.12	0.03	12
Time	0.31	Delivery speed	0.45	0.14	2
		Delivery reliability	0.36	0.11	3
		Development speed	0.19	0.06	9
Total	1.00	Total		1.00	

Top preference for the relief items

Source: Author

***Absolute ratings of components***

The rating described in Table 5.8 is based on the six components of the disaster relief items on competitive priorities of sub-criteria based on judgement value: VH = 0.51; H = 0.26; M = 0.13; L = 0.06; and, VL = 0.03. Based on the absolute ratings, the calculated global weight value is as shown Table 5.9. To illustrate, for food

component in DRC, the impact on durability is evaluated as very high, or the judgement matrix value of 0.51. Hence, the score for food in DRC with regards to durability is  $0.0928 \times 0.51 = 0.0473$ . The total score for each component is normalised by dividing by the sum of the total scores throughout all components, and, accordingly the total sum is 1. The total score across all items was computed as 1.7904. Therefore, the normalised total score for the food in DRC is  $0.3870/1.911 = 0.2161$ . The normalised lean and agile scores for each item by the respective evaluators are merged using the geometric mean to give the results as exhibited in Table 5.10. These values are used for the axes of the purchasing portfolio model.

Table 5.11 shows that the mean score food at DRC are  $y_{li} = 0.0741$ ,  $y_{ai} = 0.1370$ ,  $Y_{\max} = 0.13704$  and  $Y_{\min} = 0.05820$ . So, the standardised lean score for food at DRC item is  $ZL_i = (0.0741 - 0.05820) / (0.13704 - 0.05820) = 0.20$  and the  $ZA_i = (0.13704 - 0.05820) / (0.13704 - 0.05820) = 1.00$ . Based on the result from Table 4, the evaluators of DSW give a slightly more importance on lean characteristic as compared to agile characteristics. This demonstrates consistency of the decision makers of the five regions of Malaysia. However, as indicated earlier the importance of both procurement traits (lean and agile) are almost equal<sup>12</sup>.

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<sup>12</sup> In the evaluation, all evaluators have mentioned that the procurement principle of Best value for money and meeting the demand on supply for the victims are equally important.

Table 5. 8: Example of Absolute Rating Given by Evaluator 1 to the Humanitarian Aid Components

Competitive priority	Competitive priority measures	Evaluator-1 component rating					
		Food in DRC	Hygiene kit	Clothes	Sleeping aid	Tent/Partition	Modular (Dry food & Water Bottle)
Quality	Component durability	VH	M	VH	VH	VH	VH
	Component reliability	H	M	H	H	VH	VH
	Component innovation	M	L	H	H	H	M
Cost	Purchasing cost	H	M	VH	VH	VH	VH
	Inventory cost	H	H	VH	VH	VH	VH
	Quality cost	H	M	M	M	M	H
Flexibility	Volume flexibility	VH	M	M	M	H	H
	Modification flexibility	M	VH	M	M	M	H
	Technological capability	L	L	L	L	L	M
Time	Delivery speed	VH	H	H	H	H	H
	Delivery reliability	VH	H	H	H	H	H
	Development speed	VH	H	H	H	H	M
<b>Notes:</b> VH = very high; H = high; M = Medium; L = low, VL = very low							

Source: Author

Table 5. 9: Calculation of Overall Score for Food Component in DRC by Evaluator 1

Competitive priority measures	Global weight <sup>a</sup>	Rate	Rating weight <sup>b</sup>	Global weight x Rating weight
<i>Quality</i>				
Component durability	0.0928	VH	0.51	0.0473
Component reliability	0.0746	H	0.26	0.0194
Component innovation	0.0440	M	0.13	0.0057
<i>Cost</i>				
Purchasing cost	0.0804	H	0.26	0.0209
Inventory cost	0.0777	H	0.26	0.0202
Quality cost	0.0621	H	0.26	0.0161
<i>Flexibility</i>				
Volume flexibility	0.1751	VH	0.51	0.0893
Modification flexibility	0.0495	M	0.51	0.0064
Technological capability	0.0306	L	0.06	0.0018
<i>Time</i>				
Delivery speed	0.1415	VH	0.51	0.0722
Delivery reliability	0.1115	VH	0.51	0.0568
Development speed	0.0601	VH	0.51	0.0307
Total score				0.3870
Lean (quality and cost) score				0.1297
Agile (flexibility and time) score				0.2572
Normalized total score = Total score/sum of total score across all component				0.2161
Normalized lean score = Lean score/sum of total score across all component				0.0725
Normalized agile score =Agile score/sum of total score across all component				0.1435

Source: Author

Table 5. 10: Sample of Evaluator 1 Absolute Value and Normalised Lean and Agile Calculation

Competitive Priority Measures	Global weight	Food (Disaster Relief Centre)	Hygiene Kit	Clothes	Sleeping	Partition	Modular (Dry food /water bottle)
Durability	0.09	0.05	0.01	0.05	0.05	0.05	0.05
Reliability	0.07	0.02	0.01	0.02	0.02	0.04	0.04
Innovation	0.04	0.01	0.00	0.01	0.01	0.01	0.01
Purchasing Cost	0.08	0.02	0.01	0.04	0.04	0.04	0.04
Inventory Cost	0.08	0.02	0.02	0.04	0.04	0.04	0.04
Quality Cost	0.06	0.02	0.01	0.01	0.01	0.01	0.02
Volume flexibility	0.18	0.09	0.02	0.02	0.02	0.05	0.05
Modification flexibility	0.05	0.01	0.03	0.01	0.01	0.01	0.01
Technological capability	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Delivery Speed	0.14	0.07	0.04	0.04	0.04	0.04	0.04
Delivery Reliability	0.11	0.06	0.03	0.03	0.03	0.03	0.03
Development Speed	0.06	0.03	0.02	0.02	0.02	0.02	0.01

Total score	0.39	0.19	0.28	0.28	0.32	0.33
Lean (quality and cost) score	0.13	0.06	0.17	0.17	0.19	0.19
Agile (flexibility and time) score	0.26	0.13	0.11	0.11	0.14	0.14
Normalized total score	0.22	0.11	0.16	0.16	0.18	0.18
Normalized Lean score	0.07	0.04	0.09	0.09	0.10	0.11
Normalized Agile score	0.14	0.07	0.06	0.06	0.08	0.08

Total score all components  
1.79

Source: Author

Table 5. 11: Summary of Normalised Scores of Lean and Agile for DWS Disaster Relief Items

Disaster Relief Item	Evaluator-1		Evaluator-2		Evaluator-3		Evaluator-4		Evaluator-5		Evaluator-6		Evaluator-7		Evaluator-8		Mean score		Standard Score	
	Lean	Agile	Lean (y <sub>l</sub> )	Agile (v <sub>a</sub> )	Lean (Z <sub>L</sub> )	Agile (Z <sub>A</sub> )														
Food (Disaster Relief Centre)	0.07	0.14	0.07	0.14	0.07	0.14	0.07	0.13	0.07	0.13	0.07	0.14	0.09	0.13	0.08	0.13	0.0741	0.1370	0.20	1.00
Hygiene kit	0.04	0.07	0.07	0.06	0.04	0.07	0.05	0.07	0.10	0.06	0.09	0.06	0.09	0.06	0.10	0.06	0.0716	0.0627	0.17	0.06
Clothes	0.09	0.06	0.10	0.05	0.10	0.06	0.09	0.07	0.10	0.06	0.05	0.06	0.07	0.05	0.10	0.06	0.0870	0.0581	0.37	0.00
Sleeping aid	0.09	0.06	0.10	0.05	0.11	0.06	0.10	0.07	0.10	0.06	0.10	0.07	0.09	0.06	0.10	0.06	0.0980	0.0610	0.51	0.04
Partition/Tent	0.10	0.08	0.11	0.06	0.11	0.06	0.11	0.07	0.11	0.06	0.10	0.08	0.09	0.06	0.10	0.06	0.1034	0.0645	0.57	0.08
Modular (Dry food /water bottle)	0.11	0.08	0.11	0.06	0.11	0.07	0.11	0.07	0.11	0.06	0.10	0.08	0.10	0.10	0.10	0.10	0.1051	0.0773	0.59	0.24
<b>Total</b>	<b>0.51</b>	<b>0.49</b>	<b>0.56</b>	<b>0.44</b>	<b>0.55</b>	<b>0.45</b>	<b>0.52</b>	<b>0.48</b>	<b>0.58</b>	<b>0.42</b>	<b>0.51</b>	<b>0.49</b>	<b>0.54</b>	<b>0.46</b>	<b>0.55</b>	<b>0.45</b>	<b>0.5392</b>	<b>0.4608</b>		

Note:

Ymin	Ymax
0.05820	0.13704

Results exhibits that lean characteristic is marginally more important than agility.

Source: Author

Based on the graph in Figures 5.2 and 5.3, the case study results show that of the six disaster relief items under evaluation, five items namely hygiene kit, clothes, sleeping aid, partition/tent and modular (dry food and water bottle) has more leanness value and the food supplied in the disaster relief centres shows agility factor as its most important factor. It could be established that these five lean items are *ex ante* items and requires a proactive response from the purchasing agency. As the purchases were made in advance prior to disaster, there is a possible outcome of underutilisation of these items in the event disaster occurrence is less or none. In contrast, the sole agile item is the food purchased for the disaster relief centre. Knemeyer et al., (2009) argues that agile items are usually highly utilised, however the cost of procuring can be equally elevated as the purchases were made as a reactive response.

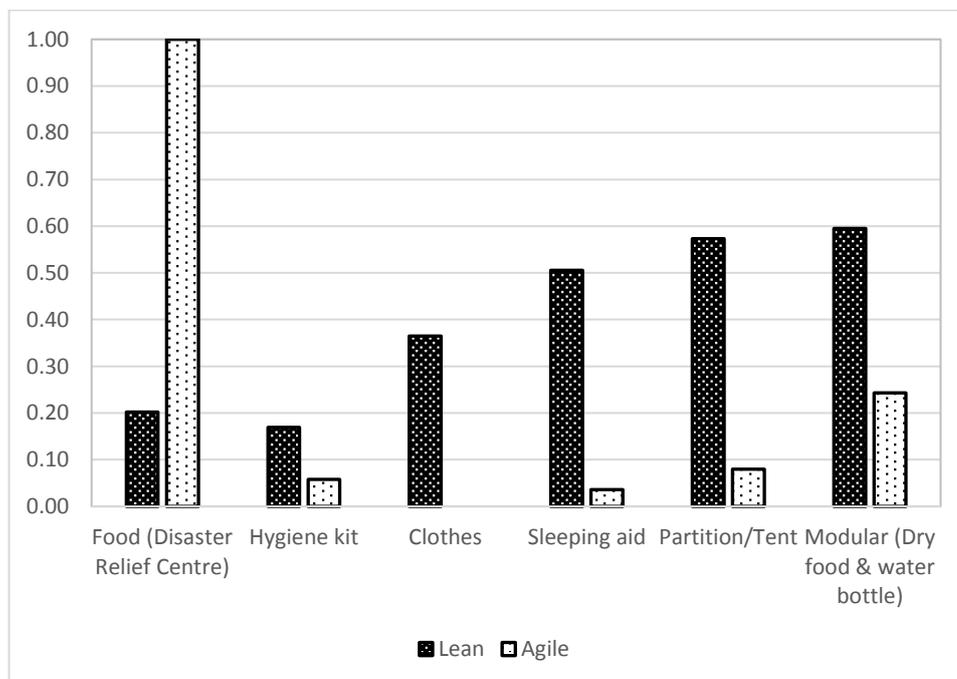


Figure 5. 2: Standard Lean and Agile Scores of Components in States DSW

Source: Author

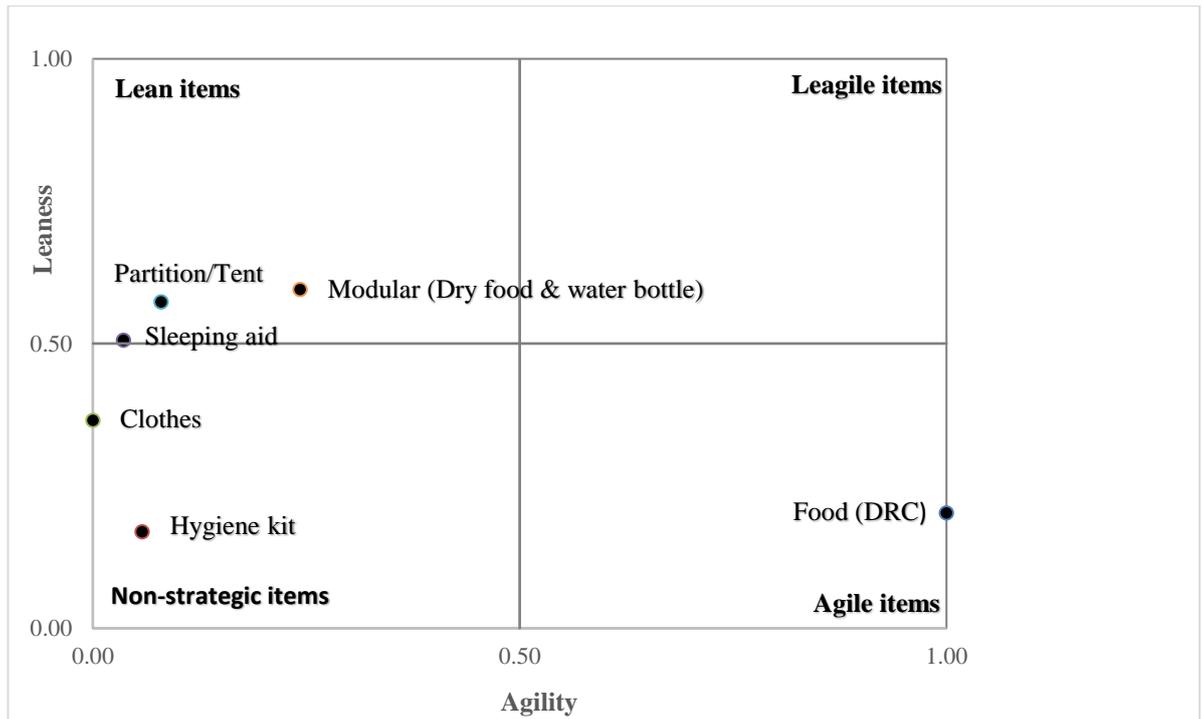


Figure 5.3: Lean and Agile Procurement Portfolio Model

Source: Author

### 5.3.2 RQ 2: Conceptual Framework Development

#### Results 1: Preliminary Conceptual Analysis

The purpose of this section is to identify the patterns of perspective by five regional responding agencies of DSW: four West Malaysia regions namely northern, central, and southern and east coast; and, an East Malaysia region. To re-cap, four important concepts that forms the major constructs of the study consist of the procurement strategy for the adoption of FA, buyer-supplier relationship (in this case government-supplier relationship), contingency response, and, SCM performance (lean and agile). Each construct was represented by codes with its properties and dimension as highlighted in the previous sections. Using CAQDAS functions, this study follows the guide provided by Friese (2014) to generate codes-primary document table based on linked memos. To clarify, the codes-primary document table outputs displays the frequency of perspective of primary interview, observations and secondary documentations of all five region or the embedded unit of analysis. Henceforth, using Microsoft Excel application, graphs were generated for better illustrations of the data. The results are exhibited in Tables 5.2 to 5.18 and Figures 5.3 to 5.9.

For example, Table 5.12 and Figure 5.3 shows of the frequency on the perspective of the organisational situation and the responses taken by DSW agencies. By examining the immersed data from the sub-codes of these two codes (organisational situation and responses), this study enters into the preliminary conceptual-level analysis in identifying pattern, a stage before links or relationship between the codes and concepts were established. For instance, under the organisational situation, environment uncertainty tops the concerns of all agencies, followed by the norm of governmental working culture based on top-down decision making and SOP orientated for disaster relief. On a moderate scale, the output also shows that manpower shortage coupled with large geographical coverage of the relief activity represents a concern for almost all of the regional agencies except for the central region. In addition to this, a small number of respondents from each region also highlighted incidents of lack of coordination within the agencies, and, between the agency and its suppliers.

Correspondingly, Table 5.13 and Figure 5.4 displays the details of flood in the region of the corresponding agency which includes the frequency of its occurrence, the scale and type. The results show that flood occurrence is on annually basis for all region except for the central region, where it is reported as rare. In terms of the scale of flood, all regions agreed that concentrated in a district scale and sometimes correspondingly with two or three more districts and rarely involve more three than districts. Apart from this, all region respondent agrees that during the monsoon seasons, the major cause of flooding is through the overflow of rivers, followed by flash floods most concentrated in the northern region and in most cases, the extended stay in DRC was due to water retention closely related to the soil type of the affected areas.

To respond to the organisational situation and the flood occurrence, the responding agencies prioritise contingency response approach by giving 78% or 124 perspective from a total of 159 total perspective. This is followed by 16% perspective on *Ex-ante* response, and, *Post-ante* response by the central and northern region. Given these points, to support the relief response stated, corresponding agencies focused its organisational responses to early preparation which includes forecasting, and, pre-positioning of relief items. On a moderate response, the agencies also profess of sourcing activities and nurturing buyer-supplier relationship. Noteworthy to mention that there was some perspective given about training as response mechanism especially by the southern region. In the meantime, as mentioned by the respondents with regards

to sourcing, two most common procurement strategy employed by DSW are emergency purchase with FA (51% response) and competitive bid (44% of the response) as shown in Table 5.14 and Figure 5.5 respectively. In contrast, the use of the original form of FA were only reported by one region namely the east coast region. As a result, short term contracts, rare negotiations and preferred supplier collaborations were mostly desired as reflected in Table 5.15 and Figure 5.6 correspondingly.

Next, the perspective on FA features as shown in Table 5.16 and Figure 5.7, which includes reserve capacity, geographical location or coverage, the order quantity, the supplier base, the selection and its term. Examination of each sub-codes revealed the following perspective: First, moderate to high reserve capacity; second, geographical location mostly includes suppliers for district, and remote areas; third, no limits on order quantity; fourth, it mostly features few small suppliers; fifth, the FA are pre-disaster approved, and finally sixth, the term or duration of the FA is mostly short term. In addition to this, the pattern of perspective on buyer-supplier collaboration exhibits high perspective on commitments, reciprocity and trust, while the collaboration nature is dominated by mutual buyer-supplier decision making. In addition, most responses indicate that information was shared during pre-disaster, moderate perspective on during the occurrence, and least perspective via on noticed. Table 5.17 and Figure 5.8, summarises the results of the buyer-supplier collaboration, commitment and trust perspective.

Finally, the performance perspective measured through lean agile lens as reported in Table 5.18 and Figure 5.9 respectively. The results show that high lean features as most perspective reported moderate to high quality perspective coupled with FA price perspective that centred on either a fixed price or price range, which can be described as cost containment. Likewise, similar findings were reported on agile perspective concerning deliver time and flexibility. The response for delivery perspective was highly for 'on-time to fast' delivery time whilst for flexibility, a moderate to high responses were only provided. The results show that the overall perspectives of all responding agencies of DSW were of the opinion that the FA lean and agile features were high and therefore appears to support high SCM performance.

Table 5. 12: Frequency of Organisation Situation and Response Perspective

Region of Malaysia	Organisational response					Organisational situation						Totals
	Buyer-supplier relationship	Early preparation/forecasting	Pre-positioning	Sourcing	Training	Lack of coordination	Large geographical coverage	Limited financial	Manpower shortage	Top down decision & SOP	Environment uncertainty	
Central Malaysia	2	6	9	0	0	1	0	0	0	5	1	24
East Coast Region Malaysia	10	27	29	16	0	1	5	3	8	18	26	143
East Malaysia	12	19	22	11	0	1	8	0	5	9	27	114
Northern Malaysia	3	10	9	5	0	1	0	1	4	9	8	50
Southern Malaysia	12	10	19	9	3	1	3	4	7	12	10	9
TOTALS:	39	72	88	41	3	5	16	8	24	53	72	421

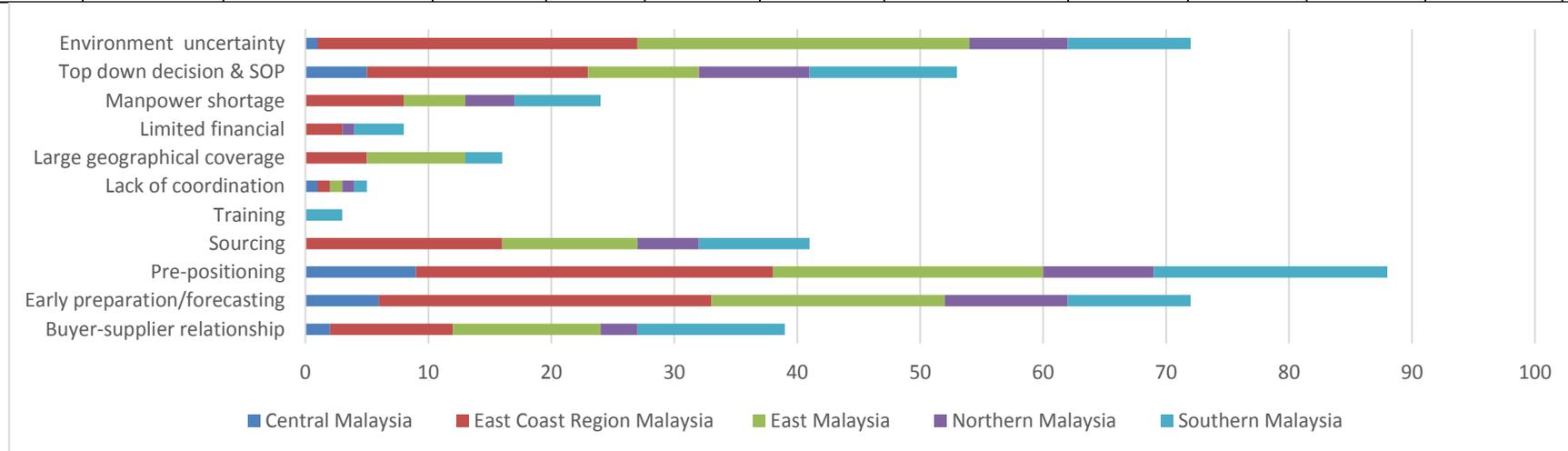


Figure 5. 3: Graph for Frequency of Organisational Situation and Responses Perspective

Source: Author

Table 5. 13: Frequency of Disaster Details and Responses Perspective

Region of Malaysia	Disaster relief response type			Flood frequency			Flood scale			Flood type			TOTALS
	Contingency	Ex-ante	Post-ante	Annually	Occasionally	Rare	One district	2 - 3 districts	More than 3 districts	Flash flood	River overflow	Water retention	
Central Malaysia	16	8	2	0	0	1	2	0	0	1	5	1	36
East Coast Region Malaysia	45	5	0	5	0	0	2	0	0	0	1	1	59
East Malaysia	42	5	0	5	0	0	4	1	0	0	4	0	61
Northern Malaysia	8	5	6	1	1	0	0	2	1	9	1	2	36
Southern Malaysia	13	4	0	3	0	0	2	1	0	1	5	3	32
TOTALS:	124	27	8	14	1	1	10	4	1	11	16	7	224

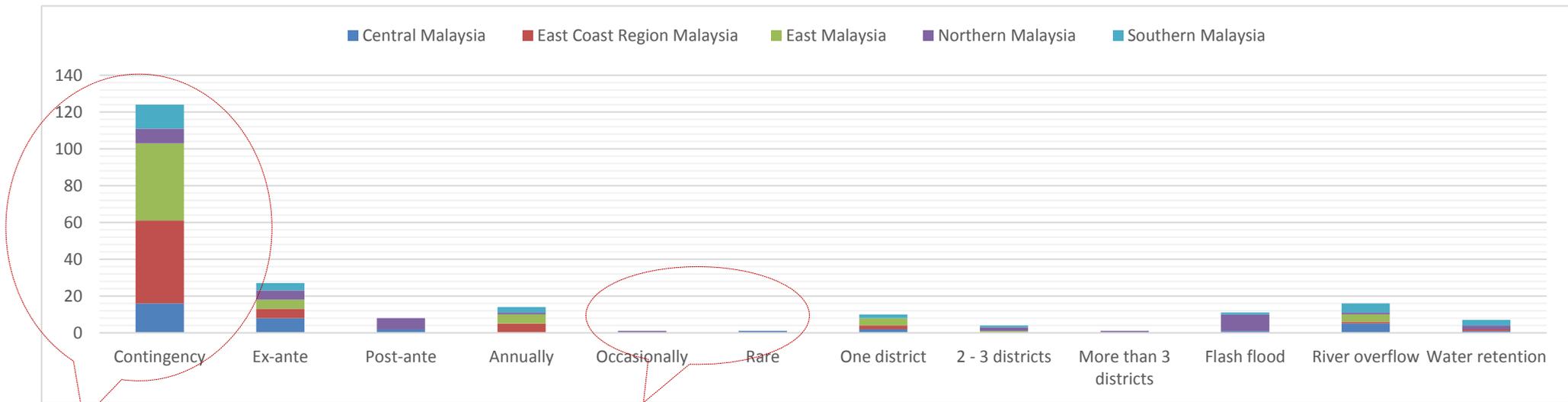


Figure 5. 4: Graph of Frequency for Disaster Details and Responses Perspective

Highest number indicates consensus amongst respondents across regions on the factor

Lowest number implying rareness of the events

Source: Author

Table 5. 14: Frequency of Procurement Strategy Perspective

Region of Malaysia	Procurement strategy			TOTALS
	Competitive bid	Emergency purchase with FA	FA	
Central Malaysia	4	6	0	10
East Coast Region Malaysia	17	12	3	29
East Malaysia	6	11	0	17
Northern Malaysia	1	3	0	4
Southern Malaysia	3	4	0	10
<b>TOTALS:</b>	<b>31</b>	<b>36</b>	<b>3</b>	<b>70</b>

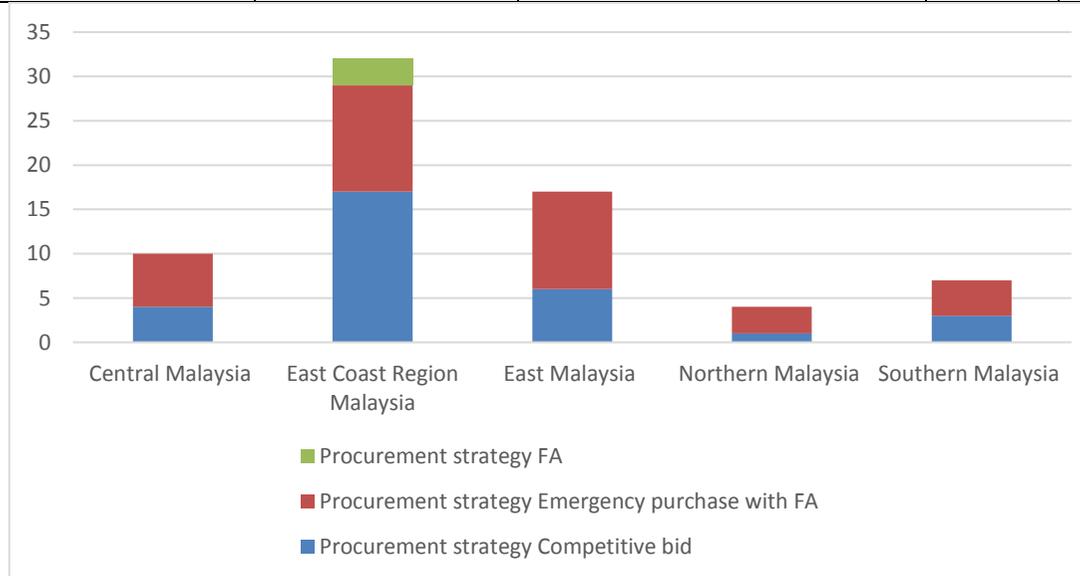


Figure 5. 5: Graph for Frequency of Procurement Strategy Perspective

Source: Author

Table 5. 15: Frequency of Buyer-Supplier Relationship Perspective

Region of Malaysia	Buyer-supplier relationship				TOTALS:
	Preferred supplier and collaboration	Transactional	Highly collaborative & long term contract	Rare negotiation & short-term contract	
Central Malaysia	1	0	0	2	3
East Coast Region Malaysia	9	0	1	4	14
East Malaysia	4	0	0	4	8
Northern Malaysia	1	0	0	1	2
Southern Malaysia	4	0	0	2	6
TOTALS:	19	0	1	13	33

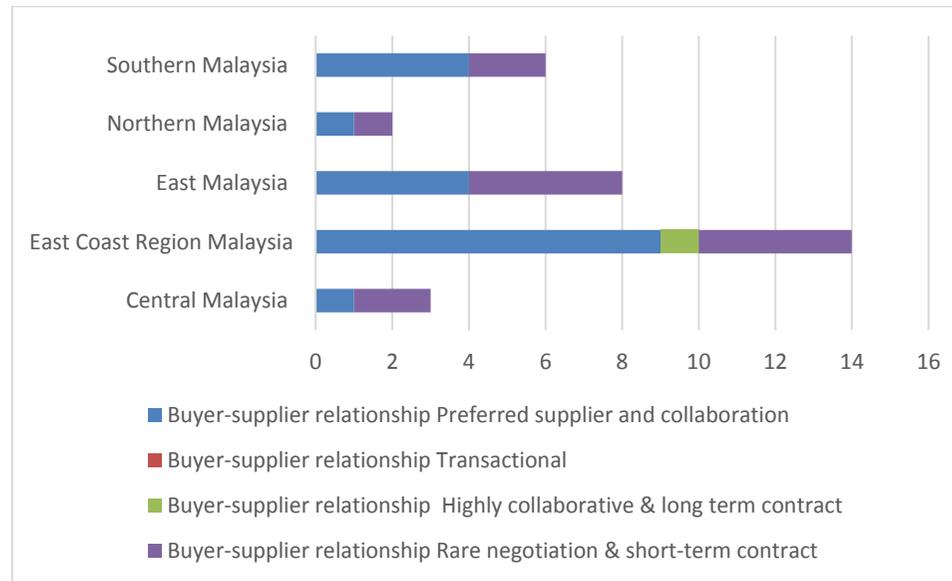


Figure 5. 6: Graph for Frequency of Buyer-Supplier Relationship Perspective

Source: Author

Table 5. 16: Frequency of FA Features Perspective

Region of Malaysia	FA with Reserve Capacity			FA geographical location			FA order quantity			FA supplier base					FA selection		FA term		TOTALS:
	Minimum	Moderate to high	None	Disaster location	District	State	Fixed order	Minimum	No limit	Few large suppliers	Few small supplier	Large single supplier (trading)	Single large with manufacturing capability	Small single supplier	Pre-approved	Spot-approval	Medium to long	Short	
Central Malaysia	2	0	1	1	1	0	1	0	2	0	2	1	0	1	6	0	0	3	21
East Coast Region Malaysia	2	25	0	1	5	4	0	0	7	3	12	4	0	2	17	2	7	4	95
East Malaysia	4	4	0	3	5	0	0	0	7	0	17	2	0	1	11	0	0	6	60
Northern Malaysia	2	0	1	1	1	0	0	0	1	0	3	1	0	1	3	1	0	2	17
Southern Malaysia	0	14	0	0	2	0	0	0	4	0	1	1	0	0	10	0	0	2	34
TOTALS:	10	43	2	6	14	4	1	0	21	3	35	9	0	5	47	3	7	17	227

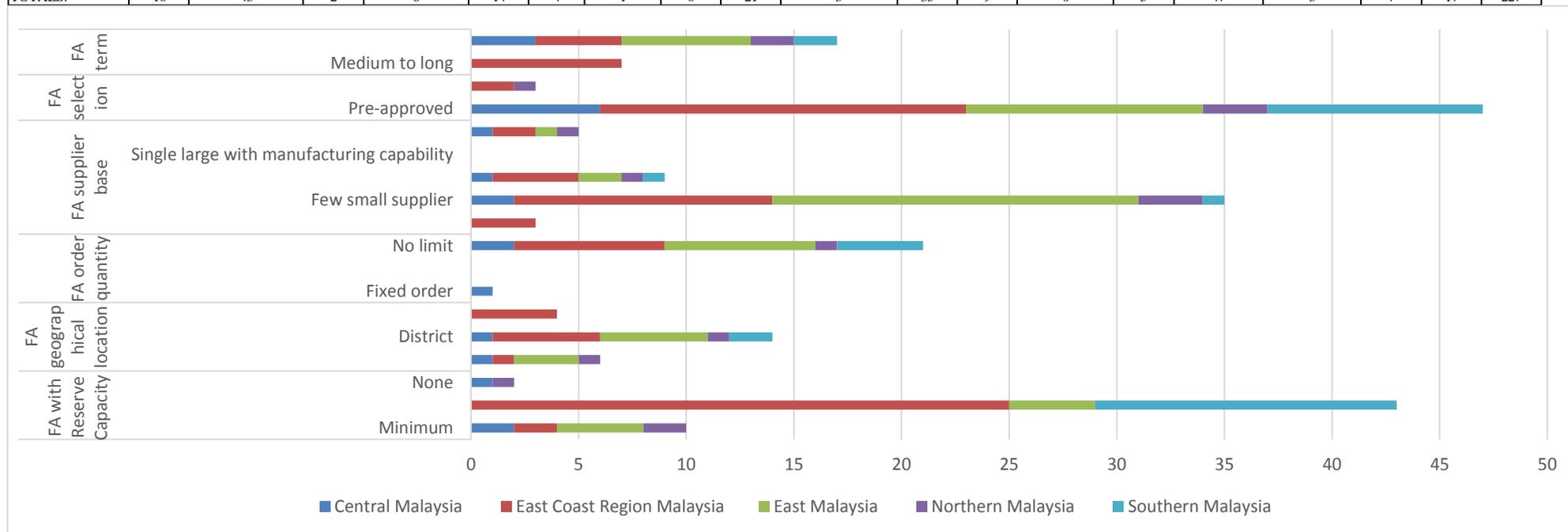


Figure 5. 7: Graph for Frequency of FA Features Perspective

Source: Author

Table 5. 17: Frequency of Buyer-Supplier Collaboration, Commitment and Trust Perspective

Region of Malaysia	Commitment		Collaboration nature			Reciprocity		Reserve capacity			Sharing of information			Trust		TOTALS:
	High	Low	Buyer dominance	Mutual decision making	Supplier dominance	No	Yes	Minimum	Moderate to high	None	During disaster	Early	On notice	High	Low	
Central Malaysia	1	0	1	1	0	0	1	2	0	1	4	4	0	1	0	16
East Coast Region Malays	34	1	2	15	0	0	6	2	25	0	6	14	5	28	1	139
East Malaysia	20	0	0	18	0	0	7	4	4	0	4	7	1	17	0	82
Northern Malaysia	2	1	3	3	0	0	0	2	0	1	2	4	1	7	0	26
Southern Malaysia	3	6	1	10	0	0	6	0	14	0	2	12	0	21	0	75
TOTALS:	60	8	7	47	0	0	20	10	43	2	18	41	7	74	1	338

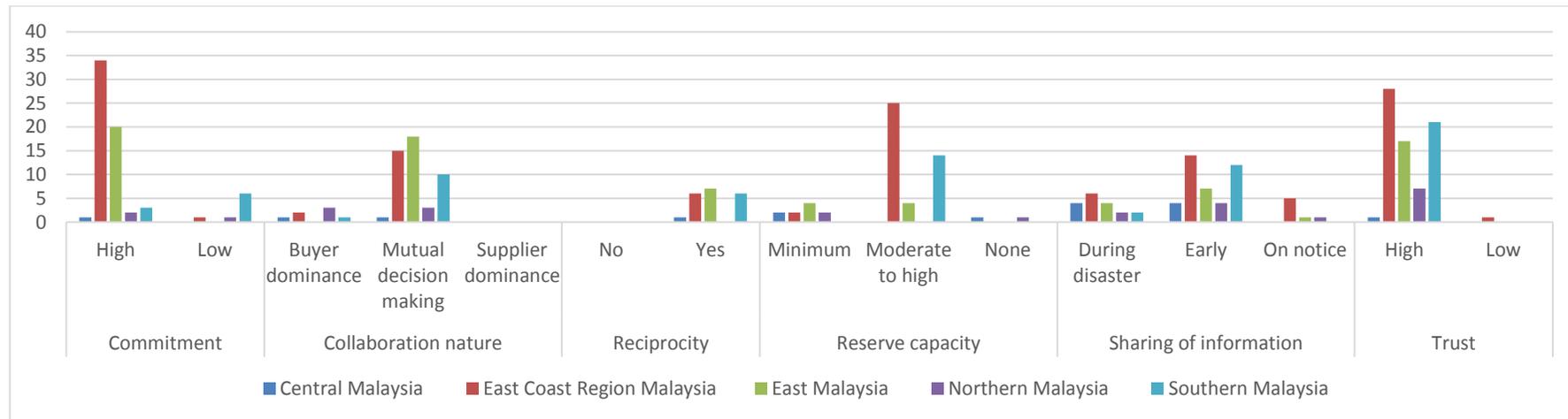


Figure 5. 8: Graph for Frequency of Buyer-Supplier Collaboration, Commitment and Trust Perspective

Source: Author

Table 5. 18: Frequency of FA Performance (Lean and Agile) Perspective

Region of Malaysia	FA delivery perspective		FA flexibility perspective		FA price perspective			FA Quality Perspective		TOTALS:
	On-time to Fast	Slow	Moderate to High	Low	Price range	Fixed price	Market price	Moderate to High	Low	
Central Malaysia	8	4	3	0	0	8	1	9	0	33
East Coast Region Malaysia	13	1	12	0	20	6	2	14	0	68
East Malaysia	10	0	24	0	13	18	3	10	1	79
Northern Malaysia	3	0	5	0	1	3	0	4	0	16
Southern Malaysia	10	0	15	0	3	5	1	12	0	46
TOTALS:	44	5	59	0	37	40	7	49	1	242

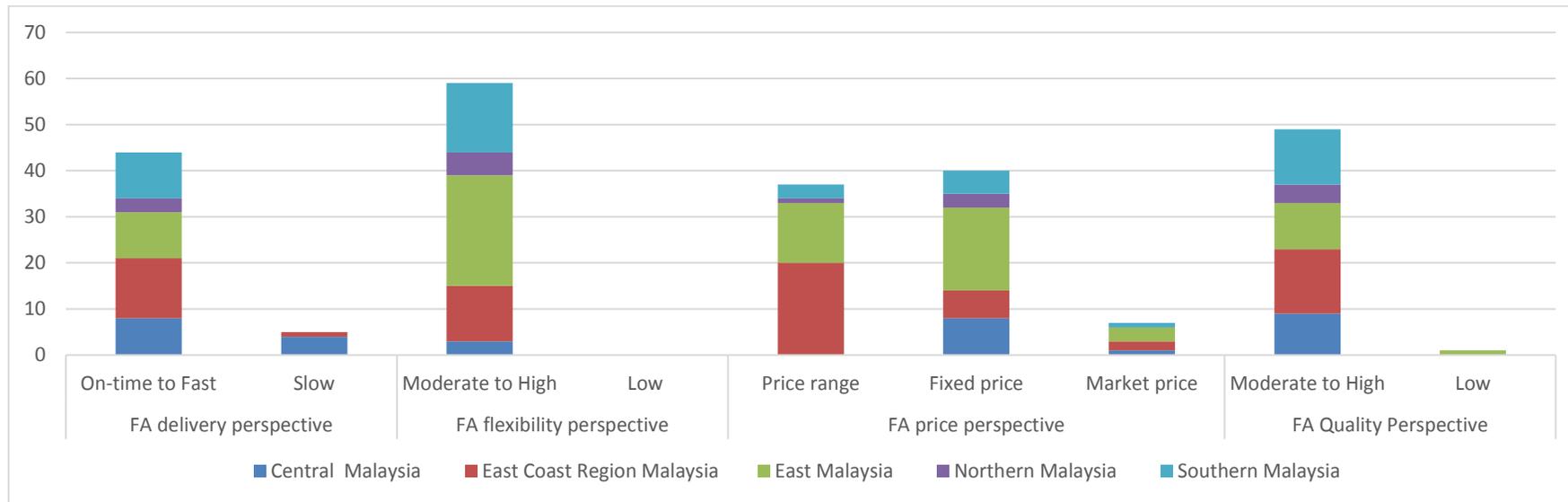


Figure 5. 9: Graph of Frequency of FA Performance (Lean and Agile) Perspective

Source: Author

## **Results 2: Explanatory Building (Within Case Analysis) Based on Themes**

This section, continues the NCT process to conceptual level analysis, to understand links and associations between the concepts or construct (Friese 2014). Previously, this study has described the frequency of perspective, generally providing a preliminary level of understanding between the four concepts of the relief items that require the use of FA, collaboration between buyer and supplier for the supply of the relief items, the contingency response adoption and disaster relief SCM performance perspective adapting lean and agile measurement mechanism. Hence, the next step forward is to develop the relationship between the proposed construct from the emerging theme (Baxter and Jack 2008; Yin 2003, 2014, 2018). This will be demonstrated further as this study continue with a more detailed description of DSWs based on region, focussing on food relief items.

In doing so, this study will present the perspective of the respondents following the case study outline in the order of nature of operations, FA practices and the collaboration action that was pursued and identifying the lean and agile practices. At the end of each embedded unit analysis, this study will explain the ‘how and why’ linkage between the constructs of the conceptual framework, by aggregating finding across a series of individual case and the findings presented in a word tabled uniform categories for the cross-case synthesis purposes. The individual or aggregated states in a region study will be presented beginning from the Northern West Malaysia, followed by Central Region West Malaysia, Southern West Malaysia, East Coast West Malaysia and finally East Malaysia Region. As this particular section captures the important case perspective, the explanatory efforts resulted in lengthy case deliberation. Hence to condense this thesis section, only Northern Western Malaysia results in presented here, whilst the remaining four regions were described in the Appendix 4.9 of this study. Albeit this, Section 4.5 on cross case synthesis will illuminate the summary to assist readers in grasping gist of this section’s content.

### **5.3.2.1 Northern West Malaysia**

Two states DSW participated as the responding agency for this region namely the Kedah and the Perak states, both located at northern part of West Malaysia with Kedah. A total of three interviewee represented these agencies as the key respondents

(Interview 9 to 11, Northern WM, 2017) and one secondary document (Q, Northern WM, 2017) was obtained for the study.

### ***Theme 1: Nature of operations***

Department of Irrigation and Drainage Malaysia's (DID 2017) categorisation of rainfall intensity are based on millimetre (mm) in one hour: Light rainfall, 1-10 mm; Moderate rainfall, 11-30 mm; Heavy rainfall, 30-60 mm; and, Very heavy rainfall, more than 60mm. DID categorised that convective rain of more than 60 mm in 2 to 4 hours duration may cause flash floods. During monsoon rains, the rainfall exceeds several hundred mm in 24 hours. For the period of 2015 to 2017, there were no incidents of big flood as the state of Perak experience big flood in 2014 (Interview 12, DSW Northern, 2017) for the state of Kedah, big flood incident was predicted to occur every five years as it happened in 2005 and 2010, however not in 2015.

The occurrence of flood of the period under study involves mostly flash flood for Kedah state districts such Kulim and Baling and monsoon related flood area in districts of *Kubang Pasu, Terap* and *Kota Setar*. Meanwhile for Perak states, its mostly flash flood in districts such as *Manjong* and *Larut-Matang-Selama (LMS)*. Northern region experiences mostly flash floods with some incidents of monsoon related flood caused by river overflow and slow receding water, both due to geographical nature such as the crater shape terrain near rivers and clay type soil in most of the palm oil plantation area (Interview 12, Northern WM DSW, 2017). Figure 5.10 shows of the flood prone area of the northern region and the coverage area.

In term of organisational situation, DSWs operations in the northern WM is similar to the structure as provided by the DSW HQ SOPs (Secondary B, DSW, 2017), in which decisions are mixed centralised by state DSW HQ and operationally, de-centralised, according districts handled by the district DSW. The main organisational concern for flood relief activities include environment uncertainty as the flood occurrence are mostly flash floods and manpower shortages for vast area of coverage sometimes up to than 3 districts. The shortage of manpower is also aggravated by additional function as the same manpower has to maintain the State's warehouse or depot in addition to performing delivery task of food supplies to DRC especially if the suppliers could not access the road due to flooding (Interview 11, Northern WM DSW, 2017). Due to this, the Northern states DSWs do not hold any food related flood stocks and resorted

to an agile approach for procurement, meaning supplies are mostly procured on post-ante reaction. The pre-positioning are non-food related items for disaster relief such as sleeping aid, partitions/tents and hygiene kits kept in storage of schools, CDF stores and District Office store and DSW temporarily built containers.

In fact, the state of Kedah has a storage depot (in the district of *Bedong*) that are used for storage non-food relief items for state use and to support other neighbouring states such Perlis, Penang and north of Perak. Moreover, the DSW also holds few mini depots in few flood prone districts such as Baling and Kuala Muda, in which the latter has experience high tide phenomena in recent years including affected by the 2004 Tsunami. In addition to this, Interview 12, Northern WM DSW (2017) recalls that some of the stocks were purchased in large quantity due to the large allocation in the year 2015, which were based on the 2014 phenomena. In addition to this since the Northern WM state DSW do not have inaccessible areas in particular islands, hence the reasons for not having food related items pre-positioned (Interview 12, Northern WM DSW, 2017). With this mind, the early preparation in terms of forecasting for relief items is intended only for non-food relief items and the focus for DSWs in terms of food supplies are anchored on fostering buyer supplier relationship for timely supplies once the flood has occurred.

For the operations of DRC, the Northern DSWs are highly dependent on its supplier at the district level to prepare the refreshment kits and meals. The refreshment kit consists of light meal provided upon the arrival of the victims, catered to ensure their well-being during the traumatic stage of flood evacuation. Next, through the respective Cooking Committee of the DRC, the need for the required food related items are determined based on the statistics provided each four hours by the person-in charge of the registrations of the victims which usually takes place once the victims arrived and briefly settles at the DRC. Usually, for the first night of arrival, the victims will be given packed food. For subsequent days of stay at the DRC, the Cooking Committee will request purchasing through the respective district DSW office for purchase and supply of food related items consists items such as uncooked rice, sugar, flour and canned sardines, fresh vegetables and raw meat and fish. The co-operative cooking is handled by the Red Crescent Association, an NGO whom are also members of the committee (Interview 13, Northern WM DSW, 2017).

The supplier selection is made by the respective districts DSW with help of the Village Head, whom usually are familiar with reliable supplier/s of the disaster area. To ensure this, the state DSW HQ instructs the districts DSW for an early engagement of potential suppliers especially for flood prone areas prior to the monsoon seasons approved by the DO as the Chairperson of the District Disaster Management Committee, which are then published in a form of booklet similar to as shown in secondary E, DSW (2017). The geographical coverage of the suppliers is mostly to the affected areas consisting few DRCs (victims are mostly villagers or housing estate residents that are affected).



Figure 5. 10: Flood Prone Area and Coverage of DSW in Northern WM States

Source: DID (2017)

***Theme 2: FA practices and collaboration pursued***

The FA routine practices for the Northern state DSW is aimed at securing supply of food related items required for the operations of DRCs. Suppliers were appointed prior to incidents, however the DSWs operates the FA via emergency purchase procedures

(MOF 2015). Payments to the respective suppliers will be centralised function of states DSW HQ after obtaining full documentation from the suppliers as forwarded and solicited by the district DSWs. To ensure, continuity of supply, the state DSW and the District DSW provides information to the suppliers in terms of the flood forecast based on possible weather condition Metrological Department (MET) and the Department of Irrigation and Drainage (DID) (Interview 11, Northern WM DSW, 2017) for supplier's early preparation for stock reservation. Next, in ensuring suppliers concerns could reserve stocks in accordance with the law (to control manipulating of the market price by selective suppliers), DSWs at state and district level will request the Consumer Affairs Department for a consent on reservation of suppliers for the purpose of supporting disaster relief (Interview 11, Northern WM DSW, 2017; cross referenced Secondary D, DSW, 2017).

Based on this preferred supplier collaboration and short-termed in nature usually for the current year flooding, all three Northern DSWs respondents agrees that supplier's commitment to supply during flood relief and buyer's promise to pay, creates a sense of trust between the parties. In addition to this, the decision made on pricing, quality, quantity and delivery are through mutual discussion.

### ***Theme 3: Lean and agile practices***

Respondents from the Northern region beliefs firmly that lean and agile factors are their priority in the disaster relief SCM management. For instance, when talking about leanness quality factor, whether it concerns the packed food meal or related food items for co-operative cooking purposes at DRC, qualities are checked during receiving and reviewing reports from victims. Additionally, the Department of Health conducts routine checks on the quality of the food prepared as well as the calorie intake required. In fact, based on the adverse report by the victims, the only finding was not in relation to quality but rather preference for a better meal i.e. substituting canned sardines to chicken or beef meat as the main course (Interview 11, Northern DSW, 2017). Next in terms of cost, respondents indicated that their early engagement with suppliers coupled with working with MDTCA for selective items reserve capacity approval had allowed an agreement of an acceptable price range on mutual consent for each party for fresh food items, while most of the shelf items such as uncooked rice, cooking oil and sugar are controlled item in terms of pricing. In addition to this, the DSWs also argued that

the packed followed the 4-8-8 meal rate or RM20 daily per victim (breakfast RM4, lunch RM8 and dinner RM8) (Interview 11 and 12, Northern WM DSW, 2017).

Similarly, for agility factors, respondents profess of the same priority focus. Firstly, with regards to flexibility, the interviewee responded:

*“No, problem at all, they are able to meet this”*

(Interview 11, Northern WM DSW, 2017).

*“Our suppliers are experienced and knows how to adjust to the fluctuation of the victims since we communicate with them frequently and agree on a cut off time for the last order”*

(Interview 13, Northern WM DSW, 2017).

Next concerning meeting delivery time, respondents are in consensus that delivery has improved due to better arrangement with the suppliers and co-ordination with other strategic partnering agencies for disaster relief such as assistance of delivery through vehicles, boats and even airlifted provided by the Malaysian Armed Forces (MAF), the Fire and Rescue Department Malaysia (FRDM), the Works Department and CDF. In some cases, DSW will also deliver the items on their own (Interview 11 and 12, Northern WM DSW), albeit in most cases the delivery is made by the suppliers. Respondents agrees the omission of transport charges by almost of their suppliers in most delivery cases to DRCs is another element of cost saving that could also be taken into consideration for the study “Interview 12, Northern WM DSW, 2017).

Apart from this, its noteworthy to established that the practices of lean and agile by the Northern WM DSWs do not consist of movement from lean to agile process because there was no pre-positioning of food stocks as asserted by the respondents. Hence, the SCM process of the Northern WM DSWs do not encompasses neither postponement nor de-coupling point, rather lean and agile centred on the supply of food items or food related items for DRCs. In addition, the embedded unit of analysis also revealed of association between the four constructs based on the flood situation which are mostly flash floods and the adapted action taken by the DSWs based on this situation for right the procurement procedure, in this case the use of FA with emergency purchasing method or EPFA, and the focus of short-term based collaboration to ensure supply meets the post-ante demands.

### **5.3.3 RQ 3: Practical Perspective of the Conceptual Framework**

The FA or in essence EPFA implementation by the respective regional DSW had numerous challenges as opined by the respondents. Together with these challenges, respondents had also provided suggestions for improvement. These will be discussed in the next sections.

#### **5.3.3.1 Practical Challenges of DSW's FA implementations**

The respondents from the five regions under this study provided valuable perspective of the challenges when implementing the EPFA, in particular. Originally, the challenges enunciated were more than 30, however using content analysis procedures as prescribed by Kumar (2014), in which the descriptive information were emerged as themes and coded. In affect, 11 challenges were listed by the DSW and its suppliers namely funding, lack of assets, large scale flood, late payment, late response, pre-positioning wastages, price hikes, red tapes, anxiety to reserve capacity, supplier withdrawal and supplier lacking tier-supplier's support. The response rate for all challenges provided by the regions is displayed in Table 5.19, and, the graphical representation in Figure 5.11.

Based on this Table and Figure, the distribution of the responds seems fairly across the board with highest recorded challenges orated on red-tapes (17%), large scale flood (15%), pre-positioning wastages (12%) and anxiety to reserve capacity (11%). Meanwhile, responds recorded close to mean value of 8% was late responses and vendor's tier-supplier dilemma, descending to 7% for late payment and supplier withdrawal, further to 6% for lack of assets and price hikes, and final to the least, funding at 3% respond rate, which will be explained under the pre-text of late payment. Hence, it makes sense that the detail explanation for each of the challenges are elaborated in the above descending order as it reflects the strength of opinion, in order to grasp a better understanding of the challenges.

Table 5. 19: Respondents' Perspective on FA Implementation Challenges

Region	FA Challenges:											
	Funding	Lack of assets	Large scale flood	Late payment	Late response	Pre-positioning wastages	Price hikes	Red-tapes	Anxiety to reserve capacity	Supplier withdrawal	Vendor's tier-supplier dilemma	Total
Central West Malaysia	0	0	1	1	3	1	0	1	0	1	0	8
East Coast West Malaysia	2	5	9	4	4	8	7	9	15	2	13	78
East Malaysia	1	6	10	4	2	11	7	16	10	2	5	74
Northern West Malaysia	0	1	7	1	0	4	0	7	0	1	0	21
Southern West Malaysia	3	3	9	7	9	3	0	7	1	10	0	52
Total	6	15	36	17	18	27	14	40	26	16	18	233
<b>Percentage</b>	<b>3%</b>	<b>6%</b>	<b>15%</b>	<b>7%</b>	<b>8%</b>	<b>12%</b>	<b>6%</b>	<b>17%</b>	<b>11%</b>	<b>7%</b>	<b>8%</b>	<b>100%</b>

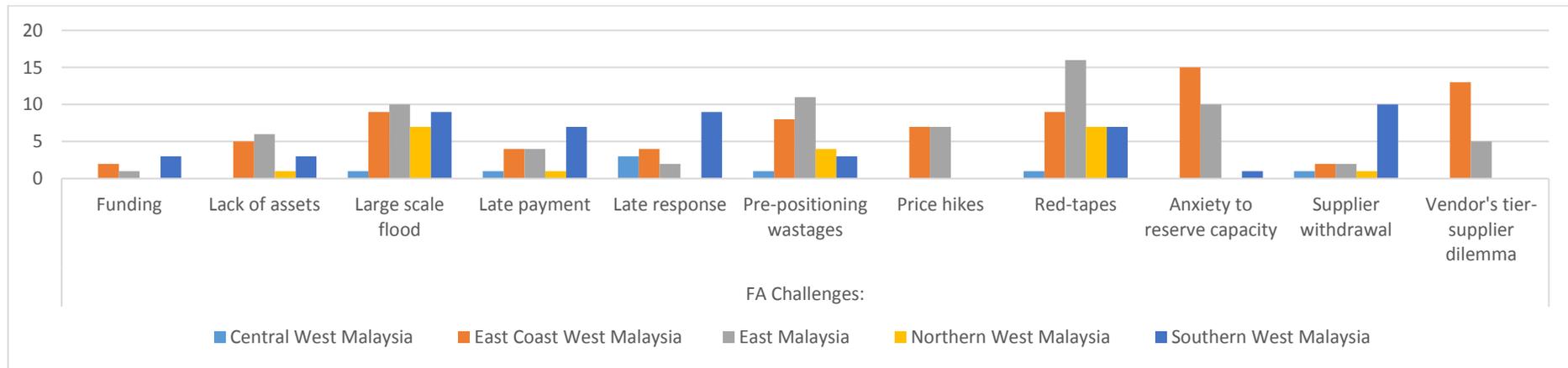


Figure 5. 11: Respondents' Perspectives on FA Implementation Challenges

Source: Author

### ***Red tape***

Red tape is defined as official routine or procedure marked by excessive complexity which results in delay or inaction (Merriam-Webster 2018). Based on this definition, red tapes exist in the form of ad-hoc tender (for a particular case at hand), unclear guidelines, and, SOP or regulation rigidity. Firstly, with regards to ad-hoc tender, which possibly could be classified as form of regulation rigidity, was performed by DSW during flood occurrence which resulted in complexity to the suppliers to procure and supply large items for the relief activities. The consequences of an ad-hoc tender involve unnecessary waiting hours spent at the agency (DSW) during disaster and difficulty for a supplier to engage with their manufacturer or tier-suppliers due to the sudden timing which affect the supplier's ability to secure large cash as collateral for the transactions (Interview 39, East Coast WM Supplier, 2017).

Secondly, as a continuation of the discussion in SOP or regulation rigidity are concerning the need for issuance of LPOs during the intensity of disaster (Interview 4, 8, 10, DSW, 2016-2017), this could be deemed as mismanagement. In addition, financial regulation on the appointment of suppliers resulted in complexity in securing the supplies with possible consequences to premium pricing (Interview 36, East Malaysia Supplier, 2017). This occurs when a registered supplier with the government could not supply during disaster reliefs and seeks an unregistered supplier for assistance which results in trade-offs in pricing, ultimately resulting in higher cost for the Government. Apart from this, as reported there were incidents that the delay in the food supplies inclusive of the IFK modular was due to late conformation of the number of victims by the agency due registration procedures (Interview 2, 18, DSW, 2016-2017).

Finally, red tape involving the unclear guidelines involving the practices within the agency and between the corresponding actors of disaster relief activities. For instance, involving supplier continuity in which the decision is made by relevant disaster management committee (Interview 15, 16, 22, DSW, 2017) as oppose to practices of buyer-supplier relationship between DSW and its supplier at the field. Secondly, as in the case of district borderline alignment, the new alignment hence resulted in cloudy judgement on the guidelines (Interview 6, DSW, 2017) and hence complexed the routine aspect of the procurement and supplies of the relief activity.

### ***Large scale flood***

Large scale disaster management as defined by the NSC circular no. 20 (NSC 2015) would require a phase 2 or phase 3 type of management which involve coordination resources at state level with aid from the federal for the latter and the former, federal level coordination with aid from foreign countries. In summation, the respondent's perspective of the challenges due to occurrence of large flood involves inaccessibility difficulties for the delivery of supplies (Interview 39, East Coast WM Supplier, 2017; Interview 37, Southern WM Supplier, 2017, Interview 3, 6, DSW, 2016), suppliers premise were affected reducing the capability to supply (Interview 39, East Coast WM Supplier, 2017, Interview 9,18, DSW, 2017), power cut affecting the fresh supplies (Interview 39, East Coast WM, 2017), fast depletion of stocks and sudden sourcing activity with possible rejection (Interview 40, East Coast WM, 2017; Interview 10, DSW, 2017; Interview 3, DSW, 2016).

Apart from these, the respondents also highlighted on the large number of victims that could not be backed even with additional suppliers (Interview 30, DSW, 2017), higher than normal consumption of supplies in remote area and dangerous delivery of supplies due to poor visibility and fast streams (Interview 30, DSW, 2017), limited capability of assets to ferry supplies (Interview 30, DSW, 2017), difficulty in assessing the needs and forecasting activity (Interview 30, DSW, 2017); unpreparedness of the district which was never affected before (Interview 10, 30, DSW, 2017), mobilisation to new super large premise such as stadium as gazetted DRCs were unable to accommodate the rising numbers of victims (Interview 9, DSW, 2017), Supplier's manpower shortage either not able to cope with demands or affected by the flood (Interview 37,Southern WM Supplier, 2017), suppliers withdrawal and reluctant to supply (Interview 18, 20, DSW, 2017), price of food supplies increases due to overwhelming demand (Interview 20, DSW, 2017), limited fresh food supplies (Interview 6, DSW, 2016), limitation of agency's manpower (Interview 3, 18, 22, 26, 30, DSW, 2017) and communication's break down (Interview 18, 26, 29 30, DSW, 2017). Hence, large floods cause various difficulties involving the agencies and its supplier's capability and resources, chaotic situation with uncertainty in demands and pricing as well as increasing shortages in supplies, and, late deliveries of supplies to victim in remote and inaccessible places.

### *Pre-positioning wastages*

Wastages of food relief stocks occurs at DSW's FOBs and their supplier's premise mostly due off beam prediction of flood occurrence. For DSW's, the pre-positioning wastages occurs at large food items stored in depot (Interview 27, DSW, 2017), FOB's intended for inaccessible and remote areas including islands (Interview 3 and 6, DSW 2016; 18, 23, 30, DSW, 2017). Some have quoted reported a loss of 10% of the whole items value and other have defined specific value of RM80, 000. As a result, some DSW states have reduced the numbers of FOBs by 75% or even have stopped the storage in FOBs temporarily and focuses only for inaccessible, remote and isolated areas (Interview 2, 3, DSW, 2016; Interview 18, DSW, 2017). Respondents argued that for remote areas and islands, besides the varying expiry date of the dry food items (uncooked rice last for 3 months, sardines last up to 2 years), sometimes the food items could easily be spoilt due to the storage condition aggravated by the weather, pest and improper care. They added that it is not feasible to bring back the relief. Hence, for all near expiry and expired items, disposal procedures were performed with the approval from the respective authorities or DSW HQ. The disposal procedures for the near expire items do not involves re-sale of the items rather were given as aid to DSW monthly aid recipient or to the poor and needy as well as the villagers in remote areas or island.

Meanwhile, concerning the reserve withholding of supplies by suppliers, respondents argued of the loss or possibly loss that could occur if the flooding did not happen. For instance, a supplier revealed reveal of the following:

“Like in the year 2015, I kept some cans of sardines, about 30 boxes, I could not finish selling it. My boss got angry with me. Yes, in 2015. That was the year it did not flood, my bad luck!”

Generally, the problem involves small suppliers as reserve capacity if not used will affect their cash flow, overstretch their credit period with their manufacturer or supplier/wholesaler/retailer and as result possibly affecting their business relationship (Interview 35, East Malaysia Supplier, 2017; Interview 38, East Coast WM Supplier 2017; Interview 40, East Coast WM Supplier, 2017).

### *Anxiety to reserve capacity*

The FA or EPFA performed by DSW do not explicitly state of the need to reserve capacity due to the reason that the agency does not wish to be bonded to stocks held and obligation to pay it especially with uncertainty of flood occurrence (Interview 2, DSW, 2016; Interview 23 and 27 DSW, 2017). However, the DSW hopes for supplier's to hold stocks in preparation for disaster is tacitly laid on its letter of appointment with wordings of "being prepared to be called at any time during disaster" and in the condition imposed by the procurement committee translated through a letter of award to the supplier imposing a condition that they should have premises and not merely brokers (Interview 3, 7, DSW, 2016; I, East Malaysia Document, 2016; Interview 23, DSW, 2017). In addition to this, DSW also believes that their suppliers would have make the necessary arrangement's on reserving the stocks with their own suppliers and maintained a good supply chain management to cater for the sudden need as alternatives for either minimal or not at all reserving their capacity (Interview 2, DSW, 2016; Interview27 and 29, DSW, 2017).

On the other hand, the suppliers too had a varying opinion on reserving capacity. For instance, if they could not supply most of the items, DSW would have a back-up plan to source it from their pool of suppliers (Interview 35, East Malaysia Supplier, 2017), in which in some cases it is a fact (Interview 3,4, & DSW, 2016). Apart from this, other grave concerns include cash tight-up on the stocks, the risk of no payments, storage capacity, high investment on storing assets and on non-compliance of stocking regulation (Interview 35 and 36, East Malaysia Supplier, 2017; Interview 38 and 41, East Coast WM Supplier, 2017). On regulation, under the GST procedures, once the items are stocked it is subject to taxation, and, under the MDTCA prevailing acts to curb stock withholding for price manipulation, license as well as special approval is required for reserving capacity above the approved limits (Interview 38 and 41, East Coast WM Supplier, 2017). In spite of this, suppliers also agree that at times they would also source from their supply chain members for additional stocks (Interview 36, East Malaysia Supplier, 2017) or source outside of their supply chain such as from hypermarkets or other contacts to meet the demand (Interview 39, East Coast WM Supplier, 2017).

### ***Late responses***

This study distinguishes late response to late delivery with the fact that the former affects the latter. The respondents opine that late responses usually occurs due to delay of information compilation and transfer to the purchasing party and thereon to the supplier (Interview 39 and 40, East Coast WM Supplier, 2017; Interview 37, Southern WM, 2017; Interview 18, DSW, 2017). This usually occurs on the first two days of the chaotic situations involving elevated fluctuations in the number of victims. Certain suppliers profess that late information influences their service ability in terms of organising manpower, gathering the items and packing the items. On the contrary, several DSW officers argues that in addition to the delay in the information, some suppliers did not reserve enough stocks and the inadequate amount had to be sourced elsewhere. Late responses could have serious repercussion on the delivery of the items especially for remote and inaccessible areas during large scale flooding.

### ***Vendor's tier-supplier dilemma***

In the case of DSW's supplier know as vendor in this context, their tier-supplier usually manufacturers, wholesalers, retailers and even direct farmers or fisherman plays a critical role of the timely and adequate supplies for disaster relief. DSW vendors claim that they might face supply disruption during disaster occurrence due to lack of trust owing to dishonoured credit commitment, which possibly could be 30 days with wholesalers and seven days with manufacturers. Supply disruption could also occur due to business off days especially during festive seasons, deposit terms imposed during irregular transactions, as well as inaccessibility to flood areas(Interview , 38, 39 and 40, 41, East Coast WM Supplier, 2017; Interview 35 and 36, East Malaysia Supplier, 2017; Interview 37, Southern WM, 2017) Apart from this, another dilemma in the vendor's tier-supplier relationship is on price manipulation mainly due to market conditions by the tier-supplier which lead to tension between DSW and its vendors especially in the period of disaster (Interview 39. East Coast WM Supplier, 2017, Interview 35 and 36, East Malaysia Supplier, 2017).

### ***Late payment***

Respondents' perspective on late payment for delivered supplies was noted to be mixed reactions. Some suppliers view that a little delay as non-issue, while others views that the delay could have consequences with their supply chain members particularly its own suppliers (Interview 38 and 39, East Coast WM Supplier, 2017; Interview 35 and 36, East Malaysia supplier, 2017; Interview 37, Southern WM Supplier, 2017). Nevertheless, the concern raised with regards to late payment corollary involves financial risk of incurring interest of more than 1.5% with compounded effect on the revolving term. Equally important is on reputational risk as well as causing unnecessary stress in the business relationships with their suppliers. Other aspect highlighted with regards to payment is lack of funding for EPFA or ad hoc tenders, which are usually unbudgeted for. In like manner, some DSW officers opine that this matter would be raised by the suppliers for this study as well as acknowledgement that late payment affects especially the small supplier's cash flow (Interview 4, DSW, 2016; Interview 18, DSW, 2017). However, other perspective reflects that a lot of improvement has been made in terms of curbing late payments by enforcing the instructions of payments within 14 days via the e-commerce transactions medium (Interview 9 and 18, DSW, 2017).

### ***Supplier withdrawal***

DSW relates supplier withdrawal to supply food items in relief activity mainly due to large scale flood, unforeseen occurrence during festive seasons, short time frame, shortage of manpower, suppliers themselves affected by the flooding and late payments (Interview 2, DSW, 2016; Interview 9, 17, 18, 22, DSW, 2017). Some supplier has agreed that large scale flood that would be the possible reason for them to withdraw (Interview 35, East Malaysia Supplier, 2017). However, of interest is the impact of supplier's withdrawal during the intense period. DSW argues that this has created problems such as delays in the deliveries of the food items due short time frame to source alternative supplier's whom are willing (Interview 16, 18, 22, DSW, 2017). Interview 18, Southern WM DSW (2017) that the suppliers whom are gazetted by the respective disaster management committee, should not withdrawal as they are technically violated such agreement. However, this can be enforced as it is also viewed as voluntarily. Other similar views on this suggest that even with MoU, suppliers are

only willing verbally as they do not want to be bonded in providing the service as it will involve high number of manpower and longer working hours (Interview 2, DSW, 2016; Interview 18, DSW, 2017).

### ***Lack of Assets***

This study views that lack of assets, either in fixed, inventories or manpower could pose challenges for the FA. For instance, DSW entails cases in remote areas where the even the case of supplies have been prepared, delivery is hindered by the lack of assets that could access these places as to ensure delivery, the right asset such as boat as compared to heavy trucks must be used (Interview 9, 18 DSW, 2017). Next, in terms of storage, DRCs which are temporary shelters are not equipped with refrigerator and this could pose a problem to the fresh and raw food items kept to the remaining days (Interview 18, DSW, 2017). In fact, DSW claims that their premise could not hold stocks such dry food and FAMA's IFK modular (Interview 2 and 6, DSW, 2016). On manpower, as highlighted before at times the opening of large number of DRCs are not compensated by the right number of staffing due to this constraint, and, this affects the operational aspect of the FA or EPFA.

### ***Price hikes***

The price hikes challenges for the case of DSW and its suppliers were mostly related to fresh vegetables and raw food such as meat, chicken and fish, and reflected in the EPFA. Respondents especially suppliers revealed that the price range incremental was in the range of between 10% to 50%, especially for the green vegetables (Interview 40, East Coast WM Supplier, 2017; Interview 35 and 36, East Malaysia Supplier, 2017). Whilst for raw food in some cases there were no incremental (Interview 35, East Malaysia Supplier, 2017), and, some the price hikes are estimated to be up to 20% (Interview 42, East Coast Malaysia Supplier, 2017; Interview 36, East Malaysia Supplier, 2017). For instance, a supplier relates an experience that the price of chicken increased from RM7 per kg to RM8 per kg during flood.

The respondents revealed that this was due inaccessibility for the supplies to be brought in to disaster areas as most of the items were not sourced locally and brought from elsewhere (Interview 40 and 41, East Coast WM Supplier, 2017) the reduction of supplies as fisherman and farmers are both affected by the flood (Interview 35 and

36, East Malaysia Suppliers, 2017). In discussing this, DSW argues that there is no threshold set in the regulations hence the Department officers sets range of up to 20% price incremental, price comparison or by logical thinking (Interview 23, DSW, 2017; Interview 3, 4, DSW, 2016). Hence, it would appear that the EFPA have price control on the dry food, however for fresh and raw food items, it depends on market price and adjustment are made based on which items cost less such as substituting green vegetables to easily sourced and longer lasting freshness items such as cabbages.

#### **5.3.3.2 Results of suggestion for improvements**

This study breaks down the perspective of the respondent for improvement in three spheres namely external, management and policy/regulation that could be directed to influence the performance of the SCM. To better understand these spheres, definition is provided as followings: External, meaning in relation to or connected with outside of outer part; management, defined as the act of activity of looking after and making decisions about something; and, policy/regulation, demarcated as a statement spelling out the proper procedures or conduct for an activity. Each of these suggestions will be explained next. Perspective on improvement is summarised in, Table 5.20 and Figure 5.12.

Table 5. 20: Respondents' Perspective on FA Improvement Suggestions

Region	FA Improvement Suggestion on:			Total
	External	Management	Policy/Regulation	
Central West Malaysia	0	3	1	4
East Coast West Malaysia	11	11	24	46
East Malaysia	3	16	14	33
Northern West Malaysia	5	11	1	17
Southern West Malaysia	4	2	6	12
Total	23	43	46	112
Percentage	21%	38%	41%	100%

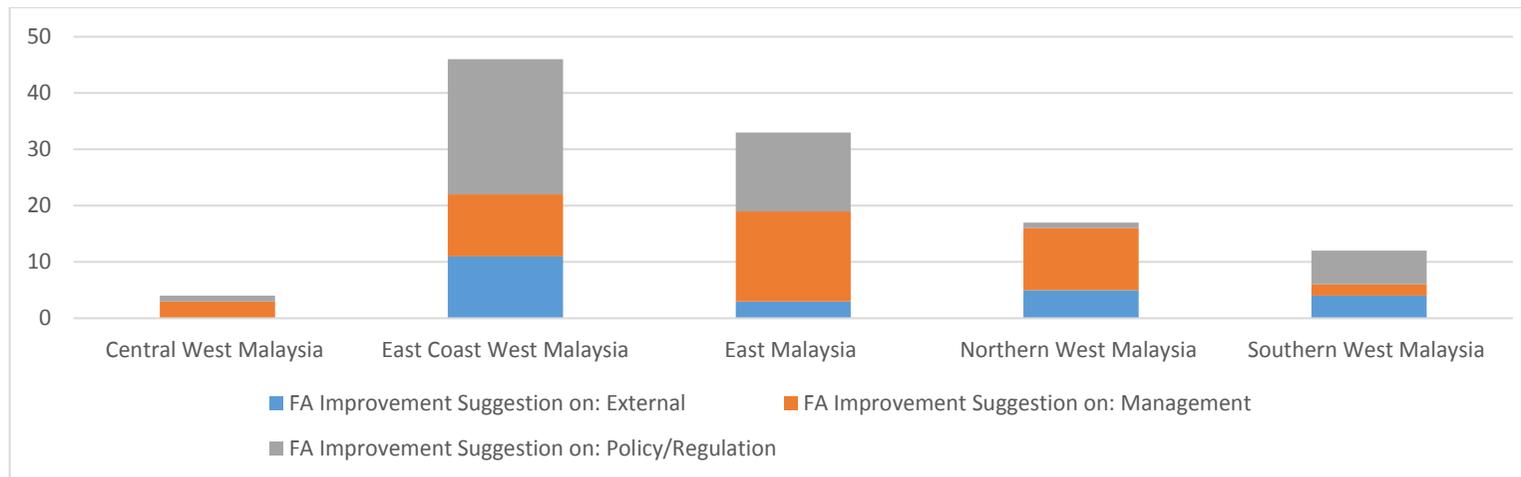


Figure 5. 12: Respondents' Perspective on FA Improvement Suggestions

Source: Author

## *External*

The respondents perspective for external dynamic that could possible improvement the relief activity SCM could be summarised into three factors. Firstly, with regards to FAMA's IFK modular distribution, DSW opines that since they are understrength to handle the growing DRCs, an improvement suggested was for FAMA to either distribute the modular to the victim based on the list of families provided by DSW or with this is to be done with the support of the DSW's strategic partners such as CDF, FRDM, MAF, the district's office. Hence, beside lifting the burden of DSW in handling this extra task, but it also would helps during FAMA's reconciliation of the numbers of IFK modulars to be claim.

Secondly, in getting more support from MDTCA, especially for price control instructions to suppliers as well as the whole supply chain, and, approval for keeping food stocks for the use of relief activity (Interview 46, DSW, 2017; Interview 37, Southern WM Supplier, 2017; Interview 41, East Coast WM, 2017). A sample with its selective translation is provided in Figure 5.13 and Table 5.21. Respondent believes that this ensure a form of control over the price as well as securing extra food stocks. However, the price is not widespread although the beneficial could provide DSW 'a rule tumb' when performing EPFA during procurement of the relief items, instead of logical thinking. Nevertheless, admitably, in the event of large scale flood, price control will be challenging as it affects the total supply chain.

**SENARAI ANALISA HARGA UNTUK BARANGAN MUSIM BANJIR**

BIL	PERIHAL BARANGAN	UNIT	HARGA MINIMUM (RM)	HARGA MAKSIMUM (RM)
1	Bawang Putih Import (China)	1kg	10.00	14.99
2	Beras Super (Tempatan) (ST15%)	10kg	0.00	0
3	Beras Cap Faiza Emas (SST5%)	10kg	0.00	26
4	Beras Cap Rambutan (SST5%)	10kg	24.88	30.9
5	Beras Cap Jasmine (SST5%)	10kg	23.99	26
6	Beras Cap Jati (SST5%)	10kg	25.49	26
7	Beras Super Cap Rambutan 5% (Import)	10kg	27.99	33.9
8	Beras Super Cap Jati TWR 5% (Import)	10kg	0.00	37.5
9	Beras Basmathi - Faiza (Kashmir)	5kg	28.99	34.8
10	Bihun Kering (Cap Eka )	±400g	1.60	2.1
11	Bihun Kering (Cap Bintang)	±400g	0.00	3.45
12	Roti Sandwich Gardenia	400g	2.40	2.4

Figure 5. 13: Sample of MDTCA Price Range for Items during Flood

Translation:

Table 5. 21: List of Price Analysis for Flood Season's Product

No.	Product Description	Unit	Min Price (RM)	Max Price (RM)
1.	Imported Garlic (China)	1kg	10.00	14.99
4.	Rice, Rambutan brand (SST5%)	10kg	24.88	30.9
10.	Glass Noodles (Eka brand)	±400g	1.60	2.1
12.	Sandwich Bread Gardenia	400g	2.40	2.40

Source: MDTCA (2017)

Thirdly, based on the perspective of ensuring continuity of supplies and the difficulty during large scale flood, disaster management committee of respective states have proposed for DSW to have earlier engagement with large suppliers, hypermarkets alike (Interview 18, 22, DSW, 2017; Interview 2, DSW, 2016). Similar activity carried by medium scale suppliers for flood relief activities has bear fruits in which tier-suppliers were able to provide continuous support the vendors of DSW (Interview 41, East Coast WM, 2017; Interview 37, Southern WM, 2017).

### ***Management***

Respondents especially the suppliers suggested early information sharing to improve the management aspect of disaster relief (Interview 39 and 41, East Coast WM Supplier, 2017; Interview 35, East Malaysia Supplier, 2017; Interview 16, DSW, 2017). Early information sharing as some suggested at least 5 to 7 days earlier would assist the supplier in preparing for reserve capacity at their premise as well as with their tier-suppliers. Infact, suppliers are appreciative of the existing communication through WhatsApp performed during relief activity, which has aided them in preparing the supplies of the relief activity. Moreover, suppliers also encourages closer relationship between the agency and supplier especially in information sharing to improve the overall SCM.

Next, suppliers also suggested for prompt payments of their claims due to their credit terms with their supplier. As late payment could result in possible diminishing of the vendor-tier supplier relationship, supplier believes that building trust is key for their business success. In relief activity, this translates time support from their tier-supplier, flexibility in the credit and deposits and reserve capacity could be made by the

manufacturer or supplier, which could be re-directed to their many other customers if the flood did not occur. Finally, respondents also suggested more simulation exercise involving DSW and its strategic partners is to be made more frequently. As pointed by one respondents, situation in reality differs from the simulation, as the latter do not involve suppliers, which arguably are an important component of the relief activity scenario. Apart from this more simulation also means that more districts that are less prone to floods could participate to ensure their exposure, which was actually a lesson that was learnt during large scale floods (Interview 9 and 12, DSW, 2017).

### ***Policy/regulation***

Respondents from the various DSW and suppliers have suggested some review and policy changes and summarised below in Table 5.22 are the relevant perspective confined to the scope of this study:

Table 5. 22: Perspective on Policy Recommendations from the Case Studies

<b>Policy/Regulation</b>	<b>Perspective</b>	<b>Rationale</b>	<b>Respondents</b>
Policy on Suppliers	Strengthening MoU with Suppliers	To increase commitment, reduced supplier withdrawal, no bond placement required	Interview 2, DSW (2016); Interview 18, 26, DSW (2017).
	Sharing of information	Early sharing of information in various modes and to include information of flood forecast, possible area affected, SOP, delivery details.	Interview 35 and 36, East Malaysia Supplier, 2017; Interview 37, Southern WM Supplier, 2017; Interview 38, 39, 40, 41, 42, East Coast WM Supplier (2017).
	Formation of joint suppliers based on zoning (District)	To increase supply ability and reduce supplier withdrawal	Interview 3, DSW, (2016); Interview 36, East Malaysia Supplier (2017)
Policy on financial regulation and relevant act (e.g. anti-competitive act)	Contract of supplies for minimum a year	Ensure supply continuity for all items and placing district suppliers only as back-ups	Interview 30, DSW (2017).
	MDTCA price range list and stock-keeping regulation	Provides guideline for DSW and Suppliers, and, increase reserve capability	Interview 23, 25, DSW (2017), Interview 2, DSW, 2016; Interview 41, East Coast WM Supplier, (2017); Interview 37, Southern WM Supplier (2017).

	Special exemption for year-end payments	Expedite payments to suppliers and reduces tensions with tier-supplier	Interview 38, East Coast WM Supplier, (2017); Interview 37, Southern WM Supplier (2017); Interview 35, East Malaysia Supplier, (2017)
	Special exemption from government sales and service tax	Reduced government expenses on relief items and maintains acceptable price ranges	Interview 41, East Coast WM Supplier, (2017); Interview 37, Southern WM Supplier (2017)
	Federal Central contract/panel of contractors for states for food item supplies	Reduce procurement time, reduced administration cost, reduce price hikes and increase supply reliability	Interview 27, DSW, (2017).
	Loose regulations for compulsory documentations for food suppliers during crises	Increase relief supplies capability, and reduces dependability on monopoly and price manipulation	Interview 36, East Malaysia Supplier (2017).
	Setting price range or percentage of incremental in price under EPFA purchasing	As check and balance, and, reduce cost overrun	Interview 3 and 4, DSW (2016); Interview 23, DSW, (2017).
Policy on resource sharing	Manpower resource sharing	Reduce workloads during incremental of DRCs	Interview 18, 22, 26. 30, DSW (2017).

Source: Author

## 5.4 Results of Case Study 2: NADMA-FAMA Collaboration FA

### *Case Description*

National Disaster Management Agency or NADMA was established via the Malaysian Cabinet approval on 5<sup>th</sup> February in 2015, an immediate action as a result of the severity of the 2014 “big flood” phenomenon in Malaysia. A finding of the Cabinet level task force for the post flood management, reveal that during such flooding, the supply of food was in a confused situation and that there is uncertainty amongst actors involving government agency and NGOs for the coordination and supply for food to the affected areas (Interview 34, Senior Director NADMA, 2016). More importantly, the task force also found that the supply of food was disrupted when major scale flood occurs. Hence, as an immediate response, Malaysian Government was tasked the duty

to identify potential supplier/s that are able to ensure continuous supply of instant food as a first response mechanism to alleviate the suffering of the victims.

Arising from this need for continuation of first response supplies, the Federal Agricultural Marketing Agency or FAMA was tasked as a supplier for the Initial Food Kit (IFK) for the victims (Interview 34, Senior Director NADMA, 2016). FAMA was chosen based on its capability through its affiliated manufacturers (local based) to produce food instant items such biscuits, porridge, noodles, anchovy paste, mixed coffee, mixed oats, jam, canned sardines, bottled mineral water, plastic spoon and fork. The manufacturing-based companies are located mostly at the Western Malaysia as shown in Figure 5.14. These items were stored into a plastic container (imported from China) and the total weight of each container is approximately 5.8 kg, including a total of 15 items or stock kit unit (SKU).

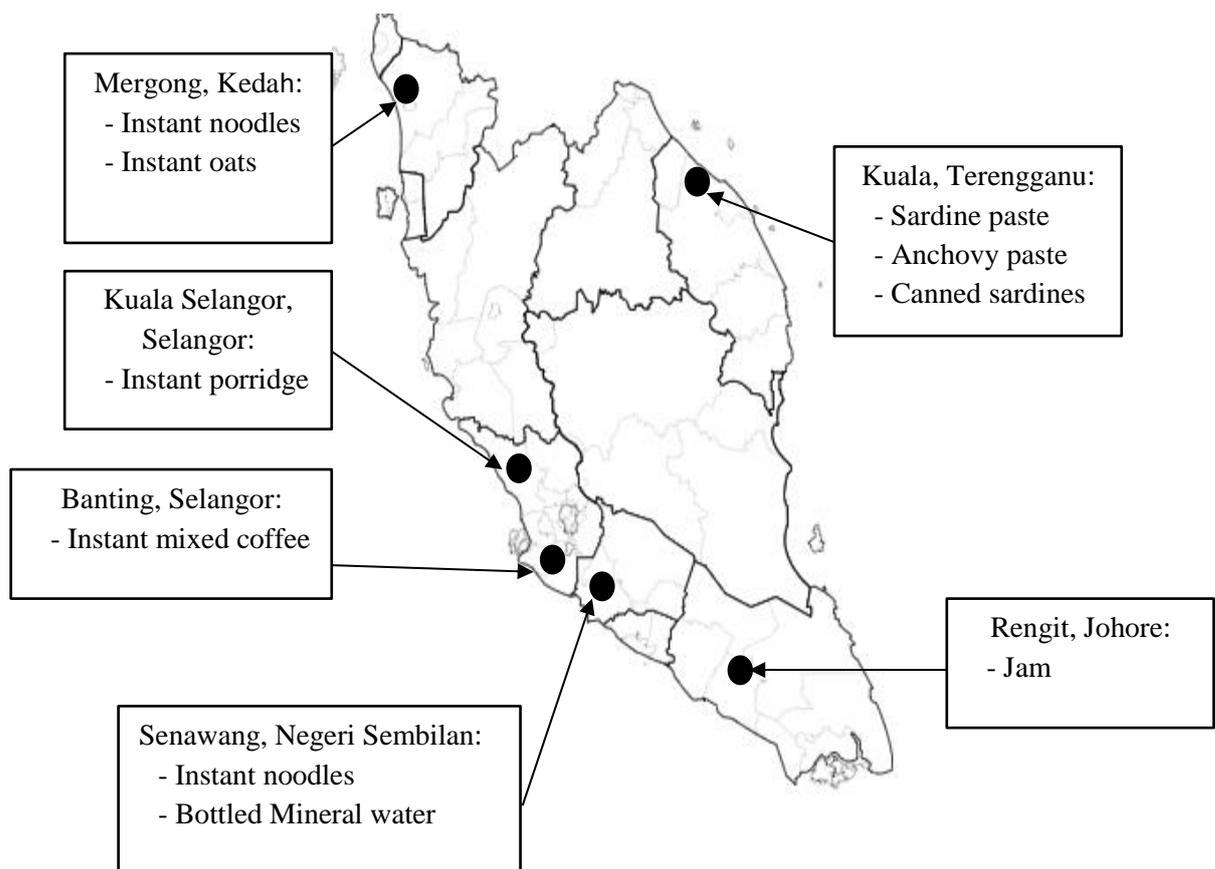


Figure 5. 14: Location of FAMA's Manufacturing Companies

Source: FAMA (2017)

### ***FA between NADMA and FAMA***

The arrangement for the supply and distribution IFKs was based on the Cabinet decision involving two government agencies namely NADMA, as the buyer and FAMA, the seller or supplier. As this is a government to government (G2G) venture based on Cabinet decision, there collaboration was based on the Cabinet decision paper, respective Ministerial involving the Prime Minister's Department and the Agricultural Minister, minutes of joint meeting between the agencies including the distributing agencies and simulation exercises between agencies. Hence, there is no formal agreement and the nature of collaboration is based on arrangement. The FA is a negotiation of pricing, quantity (includes reserve capacity and pre-positioning), quality, distribution, storages and payments.

The agreed pricing for the IFK kit is Malaysian Ringgit (RM) 70 per container, which is a fixed price for all distribution area and not subjected by the location. The funding for the payment of supplies by NADMA is through a special allocation for disaster relief of the Prime Minister's Department. (Interview 34, NADMA). With the implementation of the Government Service Tax (GST) in April 2015 (Muhammad 2017) , there were further discussion on increasing the IFK price as the cost of production was affected. However, a decision was achieved to sustain the price at RM70. In addition this is line with the policy of "1Malaysia, 1price" (KPDNKK 2017) practised, which was intended the reduce burden of cost of living of the public. Apart from this, the cost of shipment to East Malaysia is absorbed by the government.

### ***2015- 2017 Operations***

Between 2015 and 2017, FAMA's supplies had been made for flood related disasters and recently extended to cover other disasters such as fires incidents and landslides. However, it could be ascertained that 90% of the IFK kit was used for flood reliefs (Interview 43 and 45, FAMA, 2017). The estimation IFK kit required is based on monsoon seasons of the country, where the highest rain drop and high tides is expected in three phases on a year basis: first, 24-29 November; second, 11-18 December; and, third, 24-30 December. In addition, the normal rain drop of an area is approximately 500 mm and flood occurrence are expected if the rain drops exceed 500 mm. For example, the average rain drops in the area affected by flood in the year of 2014 was a staggering 1000 mm, double the average of rain received in a normal monsoon. The

situation is worsen with prolonged rain until the month of January or February coincides with higher than normal tides, which effectively inhibited flood waters from draining to the sea (IFRC 2015b).

In addition to the forecast, the early stage preparation was filled with a series of multiparty meetings/programs held in the year 2015, subsequent to Cabinet approval. For example, a simulation in the district of Kemaman, in the state of Terengganu (East coast state of Malaysia). The simulation was regarded as success and the feedback was provided to the National Security Council Chairperson, the Deputy Prime Minister of Malaysia (Interview 34, NADMA, 2016). A series of inter-agency meeting was conducted aggressively between NADMA, FAMA and Ministry of Agriculture. The meeting also decided that FAMA to also do the distribution to the relief centres co-operating closely with DSW.

To support timely distribution, FAMA had reserve capacity of the IFK for almost all states in Malaysia. Table 5.23 shows the list of the storage and distribution operations centres by states. As can be seen, at any time FAMA's storage capacity is for 220,000 IFKs involving 46 operations centres in 13 states or five regions of the country. In terms the overall process, begins with IFK kit preparation process and followed by the kit delivery to FAMA's operations centre for storage. Next, the IFK kits are sent to DWS's storage depot or directly to the DRC. The last process prior to distribution to victims, involves coordination between FAMA and DWS, before and during flood occurrence in the monsoon seasons. Finally, for the distribution to victims, the IFKs will be supplied to the victims by DWS staff. The basis of distribution of each IFK distribution is to a family (calculated for five individuals) for two days consumptions.

Based on FAMA's operation for three years (2015–2017), the agency has managed two cycles of monsoon related flood relief namely for 2015 to 2016 cycle and 2016 to 2017 cycles. The IFKs overall distribution to victims based on these two cycles: for the year 2015-2016, 25,000 IFKs were distributed; and, for the year 2016-2017, 28,000 kits were distributed. Estimation for the year 2017-2018 cycle was 25,000 IFKs distribution. Hence, the average estimation of per year distribution is approximately 26,000 IFKs. The financial implications for the G2G arrangements for cycle year 2015-2016 was an estimated RM1.75 million or approximately USD 440,000 (1 USD

to 3.98 MYR<sup>13</sup> (BNM 2018). Meanwhile, for the cycle of 2016 to 2017, the estimated payments to FAMA was MYR 1.96 million or USD 492,000. For the cycle of year 2017-2018, only an estimation was available at the time of data collection and based on this, the financial implications are estimated to be USD440, 000 subject to exchange rate fluctuations.

Table 5. 23: List of Storage and Distribution Operations Centres by States for IFKs

No.	Region	State	Number of Operations Centres	Combined Storage Capacity (per IFKs)
1.	Northern	Perlis	1	10,000
2.		Kedah	4	29,000
3.		Penang	2	20,000
4.		Perak	4	19,000
5.	Central	Selangor	4	17,000
6.		Negeri Sembilan	3	12,000
7.	Southern	Melaka	2	8,000
8.		Johore	4	19,000
9.	East Coast	Pahang	4	17,000
10.		Kelantan	3	25,000
11.		Terengganu	3	12,000
12.	East Malaysia	Sabah	6	11,000
13.		Sarawak	6	21,000
<b>Total Kit at any given time</b>				<b>220,000</b>

Source: FAMA (2017)

In the next section following this brief of NADMA-FAMA IFKs displays the results of RQ1, RQ2 and RQ3 of the study.

#### 5.4.1 RQ 1: AHP, and, Lean and Agile Purchasing Portfolio

This section of the study reports a fairly straightforward discussion of the results obtained as a sizeable amount of the AHP procedural deliberation (Siraj, Mihailov and Keane 2015; Drake, Lee and Hussain 2013). In addition, the study also highlights of

<sup>13</sup> Fluctuation of exchange rate from 2016 (1 USD = RM 4.3) to 2018 (1 USD = 3.98), average exchange rate from January to June 2018.

limitation which will be deliberated and concerns respectively addressed. Next, the final graphs plotted exhibits the positioning of the modular or IFT kit in the purchasing portfolio model.

***Pair-wise comparison results***

The data analysis for this section neither uses geometric mean as suggested by Saaty and Vargas (2001) nor the arithmetic means due to the fact that it is a single input data. Based on pair wise comparison presented in Tables 5.24 to 5.28, reported CR value of criteria: Goals, CR = 0.00; Quality criteria, CR = 0.00; Cost criteria = 0.00; Flexibility criteria, CR = 0.00; and, Time criteria = 0.00. Hence, all the CR value is reported to be at a value of 0.00, which meets the consistency test rule, CR of below 0.1, and, coherent with previous studies accentuation (Saaty and Vargas 2001; Forman and Selly 2001; Liu et al. 2008; Ting and Choo 2008). The results also satisfy the ordinal consistency for all the matrix, goal criteria and sub-criteria respectively.

Table 5.24: Pair-Wise Comparison Matrix of the Competitive Priority Goal for NADMA Evaluator

<b>GOAL</b>	<b>Quality</b>	<b>Cost</b>	<b>Flexibility</b>	<b>Time</b>	<b>Priority Weight</b>
<b>Quality</b>		1.00	1.00	1.00	0.25
<b>Cost</b>	1.00		1.00	1.00	0.25
<b>Flexibility</b>	1.00	1.00		1.00	0.25
<b>Time</b>	1.00	1.00	1.00		0.25
					CR= 0.00
<b>Note:</b> CR, consistency ratio; <span style="background-color: #cccccc; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Value of 1.00					

Source: Author

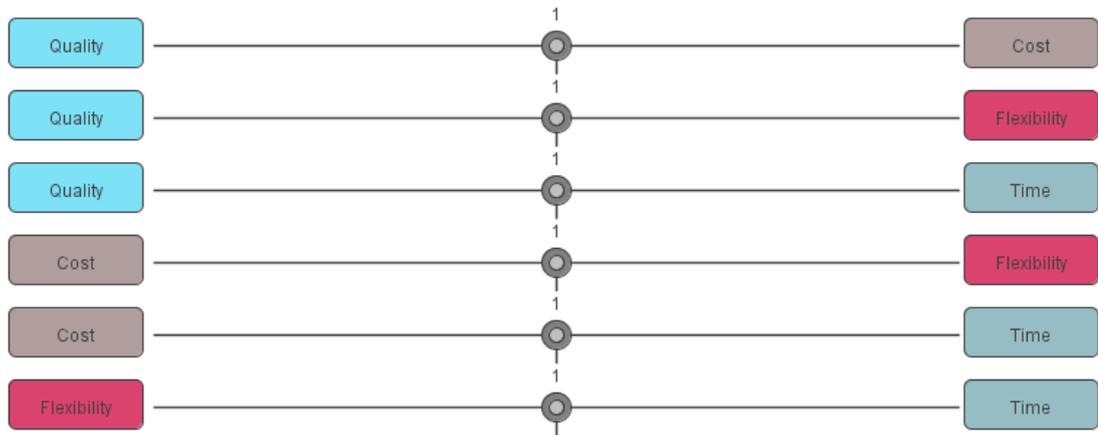


Figure 5. 15: *PriEsT* Equalizer View of Priority Goal Judgements

Source: Author

In addition to consistency of judgements, Tables 5.24 to 5.28 reports the ranking of each competitive priority for criteria and sub-criterion. For example, in Table 5.24, the Goal priority weights is equal at 25% for all the four criteria, to be precise quality, cost, flexibility and time. Accordingly, this is reflected in the equaliser graph view produced from utilising *PriEsT* tool as shown in Figure 5.15. The ranks of 1 for all the criteria in the equaliser view, adds clarity to the pair-wise matrix priority weight results.

Next, concerning the sub-criterion for lean related criteria, quality and cost. Firstly, on Quality factor, three ranking of the sub-criteria: component durability and component reliability (reflects equal priority weight 43%, ranked first); and, component innovation (14%, ranked third). As illustrated by Appendix 4.2, Figure 1, durability and reliability sub-criterion is 3 times more preferred than innovation for the IFK modular. In contrast, for competitive priority pair-wise comparison for Cost sub-criterion, the priority weight for criterion purchasing cost, inventory cost and quality cost are equal at 33.33% or in other words, ranked first equally. Appendix 4.2, Figure 2, graphical view of competitive priority for Cost reveals of that the judgement for preference between the three criteria is equal at 1.

Table 5. 25: Pair-Wise Comparison Matrix of the Competitive Priority Quality for NADMA Evaluator

<b>QUALITY</b>	<b>Component durability</b>	<b>Component reliability</b>	<b>Component innovation</b>	<b>Priority Weight</b>
<b>Component durability</b>		1.00	3.00	0.43
<b>Component reliability</b>	1.00		3.00	0.43
<b>Component innovation</b>	0.33	0.33		0.14
				CR= 0.00
<b>Note:</b> CR, consistency ratio				

Source: Author

Table 5. 26: Pair-Wise Comparison Matrix of the Competitive Priority Cost for NADMA Evaluator

<b>COST</b>	<b>Purchasing cost</b>	<b>Inventory cost</b>	<b>Quality cost</b>	<b>Priority weight</b>
<b>Purchasing cost</b>		1.00	1.00	0.33
<b>Inventory cost</b>	1.00		1.00	0.33
<b>Quality cost</b>	1.00	1.00		0.33
				CR= 0.00
<b>Note:</b> CR, consistency ratio				

Source: Author

Next, concerning the sub-criterion for agile related criteria, flexibility and time. A similar theme was observed with lean related criteria, in terms of the judgement scoring of the pair-wise comparison. For instance, for Flexibility factor, three ranking of the sub-criteria: For volume flexibility and modification flexibility, the results in Table 5.14 shows equal priority weight 43% and both are ranked first; and, for technological capability, the reported priority weight was 14% and this put the criterion at third ranking. As exhibited in Appendix 4.2, Figure 3, for the equally preferred volume flexibility and modification flexibility durability, both are three times more preferred than technological capability sub-criterion. Identical with Cost

factor results, Table 5.15 competitive priority Time sub-criterion, the priority weight for criterion delivery speed delivery reliability and development speed are equal at 33.33% or in other words, ranked first equally. Appendix 4.2, Figure 4, graphical view of competitive priority Time reveals of that the judgement for preference between the three criteria are equal at 1.

Table 5. 27: Pair-wise Comparison Matrix of the Competitive Priority Flexibility for NADMA Evaluator

<b>FLEXIBILITY</b>	<b>Volume flexibility</b>	<b>Modification flexibility</b>	<b>Technological capability</b>	<b>Priority Weight</b>
<b>Volume flexibility</b>		1.00	3.00	0.43
<b>Modification flexibility</b>	1.00		3.00	0.43
<b>Technological capability</b>	0.33	0.33		0.14
				CR= 0.00
<b>Note:</b> CR, consistency ratio				

Source: Author

Table 5. 28: Pair-Wise Comparison Matrix for Competitive Priority Time for NADMA Evaluator

<b>TIME</b>	<b>Delivery speed</b>	<b>Delivery reliability</b>	<b>Development speed</b>	<b>Priority Weight</b>
<b>Delivery speed</b>		1.00	1.00	0.33
<b>Delivery reliability</b>	1.00		1.00	0.33
<b>Development speed</b>	1.00	1.00		0.33
				CR= 0.00
<b>Note:</b> CR, consistency ratio				

Source: Author

***Results of computing global weights for the competitive priority***

As discussed before, the computation of global weights is performed by multiplying the competitive priority local weight judgement results to the sub-criterion local weight results, as illustrated in Table 5.29. Based on computation as shown in Table 5.29, the results shows that of the 12 criterion, ranks (computed using the rank function in Excel), the distribution of ranks was trimmed to 3: Ranked first involving four sub-criterion for component durability, component reliability, volume flexibility and modification flexibility; ranked second consist of six sub-criterion for instance purchasing cost, inventory cost, quality cost, delivery speed, delivery reliability and development speed; and, ranked third involving two sub-criterion namely component innovation and technological capability. In essence, the lean and agile factors are evenly matched in term of importance.

Table 5. 29: Combined Criteria and Sub-Criteria Weights for NADMA

<b>Competitive priority</b>	<b>Local weight</b>	<b>Competitive priority measures</b>	<b>Local weight</b>	<b>Global weight</b>	<b>Rank</b>
Quality	0.25	Component durability	0.43	0.11	1
		Component reliability	0.43	0.11	1
		Component innovation	0.14	0.04	3
Cost	0.25	Purchasing cost	0.33	0.08	2
		Inventory cost	0.33	0.08	2
		Quality cost	0.33	0.08	2
Flexibility	0.25	Volume flexibility	0.43	0.11	1
		Modification flexibility	0.43	0.11	1
		Technological capability	0.14	0.04	3
Time	0.25	Delivery speed	0.33	0.08	2
		Delivery reliability	0.33	0.08	2
		Development speed	0.33	0.08	2
Total	1.00	Total	4.00	4.00	

Source: Author

### ***Results for absolute ratings of IFK Modular***

Similar procedures as DSW were conducted following Five-point rating scale (Tam and Tumala 2001) by NADMA, however unique to only one disaster relief item. As advocated earlier, the objective of the absolute rating on the IFK modular was to gauge its positioning in the lean and agile portfolio model. The absolute rating results is displayed in Appendix 4.3, Table 1. Next, the lean and agile score value were calculated using the judgement matrix value multiplied by the global weights. Appendix 4.3, Table 2 shows lean score of 0.2462 and agile score of 0.2415 respectively. As geometric mean could not be performed due to single evaluation factor, for this reason score for lean and agile were not normalised as normalization of ratings are often performed prior to averaging (Dodge 2003). The final value for standardization of lean score of 0.96 and agile score of 0.94 was used to position the IFK modular component in the lean and agile purchasing portfolio models as shown in Figures 5.16 and 5.17.

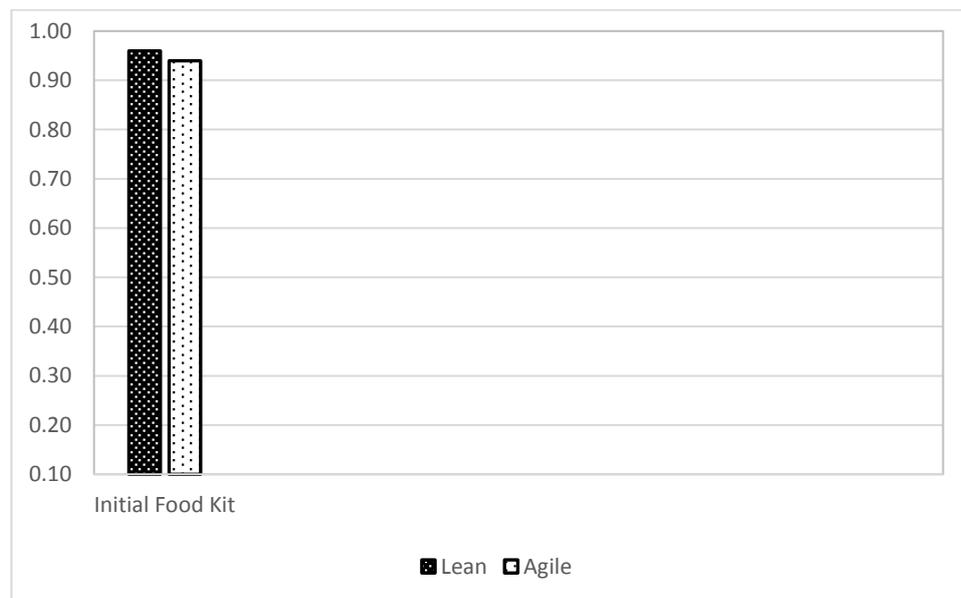


Figure 5. 16: Standard Lean and Agile Scores for IFK modular

Source: Author

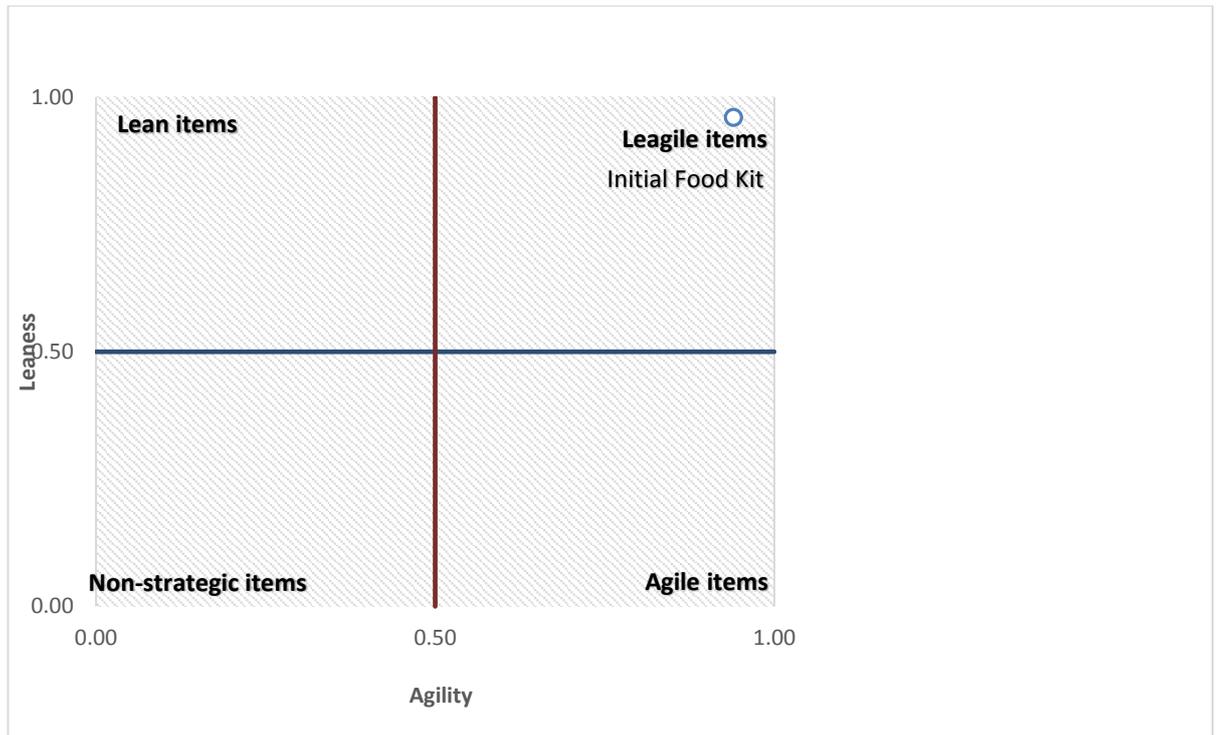


Figure 5. 17: Lean and Agile Purchasing Portfolio Model

Source: Author

#### 5.4.2 RQ 2: Conceptual Framework Development

By the same token as in section 5.3.2 of case study 1, this section is setting the continuity of the previous analysis of the quantitative data disclosing the behaviour pattern on judgements for IFK modular purchasing for the relief activity. For this reason, the analytical strategy is focused on resolving the “how” case study question in identifying the meaningful patterns of the conceptual framework of the larger case study. The qualitative data used for this section involves the convergence of multiple data which includes interviews and secondary documentation to contribute to greater understanding of the whole case (Patton 1990; Yin 2003; Baxter and Jack 2008). In contrast to case study 1, there are no embedded unit of analysis and merely a single case study of NADMA-FAMA collaboration. However, the finding of this single case study professes as a feasible subject of comparison for the cross-case synthesis which will be conducted at the end of this chapter.

#### 5.4.2.1 Results of preliminary conceptual analysis

This section similar to case study intent to ascertain the pattern provided by two collaborating government agencies, NADMA, as the buyer organisation and FAMA, as the supplier of IFK modular with manufacturing ability. The perspective was based on the interview conducted on four interviewees from the collaborating agency (Interview 34, NADMA, 2016; Interview 43, 44 and 45, FAMA, 2017) and secondary documentation (C, FAMA, 2017). CAQDAS analysis were performed based on the constructs of the prevailing theories namely CT, TCA, SET, and, SCM performance measurement of lean and agile which forms the category and codes represented by its properties and dimension. The results derived following procedures on CAQDAS as prescribed by Friese (2014) are shown in Tables 5.30 to 5.36 and Figures 5.18 to 5.24 correspondingly.

For example, Table 5.30 and Figure 5.18 which shows that the frequency of the organisation and response perspective illustrates the consensus between the NADMA and FAMA that environment uncertainty and large geographical coverage forms the two most important reflection of its organisation situations. To understand further of the environment uncertainty, based on Table 5.31 and Figure 5.19, the respondents in particular FAMA highlighted that the occurrence of annual flooding coupled with large geographical coverage of more than 3 districts per state shapes both agencies adoption for contingency response. There were also concerns on lack of coordination between the agencies as well as the strategic partners raised by NADMA, however the aforementioned is of greater concern. Arising from this organisational situation, the response taken by NADMA with FAMA includes early preparations, sourcing and pre-positioning. At the same time, FAMA acting as the supplier for NADMA emphasize buyer-supplier relationship as catalyst for the collaboration.

Hence, as reflected in the procurement strategy perspective in Table 5.32 and Figure 5.20, FA is promoted to accomplish the collaboration rationale. Accordingly, the frequency for buyer-supplier perspective manifest for a highly collaborative and long-term relationship. As can be seen in Table 5.33 and Figure 5.21, the total response is centred on this perspective, in which almost 80% of the response is from FAMA and the rest provided by NADMA. To point out this, Table 5.34 and Figure 5.22 displays the perspective of the buyer-supplier collaboration, commitment and trust perspective.

As can be seen, the collaboration nature is based on mutual decision making in which the both agencies agreed on reserve capacity of the IFK and sharing of vital disaster information. Moreover, the respondents' perspective also reflects that as a result of the collaboration, commitment and trust is acquired coupled with reciprocity expectation by the supplier.

With this in mind, as can be seen in Table 5.35 and Figure 5.23 respectively, the FA characteristics includes large geographical capacity which includes states and districts prone to flood. The FA is also pre-approved and based on medium to long termed agreement. In effect, the FA performance perspective in Table 5.36 and Figure 5.24 exhibits the lean and agile practices. For example, leanness perspective for quality shows a focused perspective on moderate to high whilst for cost, the FA is based on fixed price perspective. Next, in terms of agility perspective for flexibility, the finding reflects a concentration on moderate to high dimension. As for delivery perspective of agility, the dimension shown is centred on "on-time to Fast" opinion. Hence, it would appear that based on this perspective, the NADMA-FAMA collaboration leveraging on its FA features supports the attainment of high leanness and agility of the IFK modular supplies, or in other words high performing SCM. This will be demonstrated further in the next section by the exploring the 'how' and 'why' aspect of the case study.

Table 5.30: Frequency of Organisation Situation and Response Perspective

Agency	Organisational response					Organisational situation						Total
	Buyer-supplier relationship	Early preparation/forecasting	Pre-positioning	Sourcing	Training	Lack of coordination	Large geographical coverage	Limited financial	Manpower shortage	Top-down decision and SOP adherent	Environment uncertainty	
FAMA	7	11	9	1	0	0	3	0	1	1	5	38
NADMA	0	3	1	2	0	2	2	0	0	0	5	15
Total	7	14	10	3	0	2	5	0	1	1	10	53

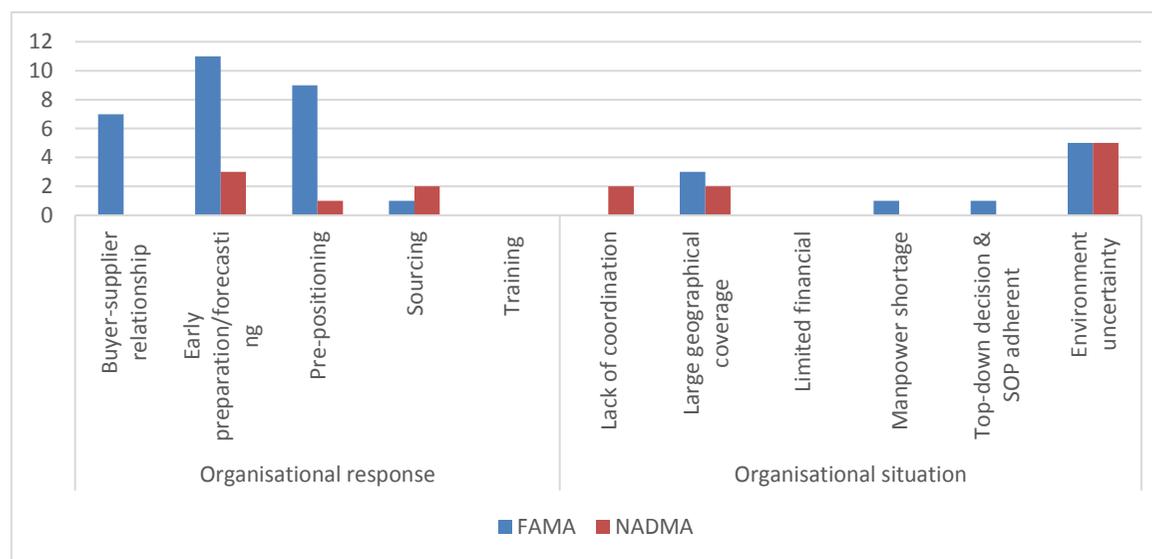


Figure 5.18: Graph for Frequency of Organisational Situation and Responses Perspective

Source: Author

Table 5. 31: Frequency of Disaster Detail and Responses Perspective

Agency	Response type			Flood frequency			Flood scale			Flood type			Total
	Contingency	Ex-ante	Post-ante	Annually	Occasionally	Rare	2 - 3 Districts	More than 3 districts	One district	Flash flood	River overflow	Water retention	
FAMA	10	0	0	2	0	0	0	1	0	0	0	0	13
NADMA	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	12	0	0	2	0	0	0	1	0	0	0	0	15

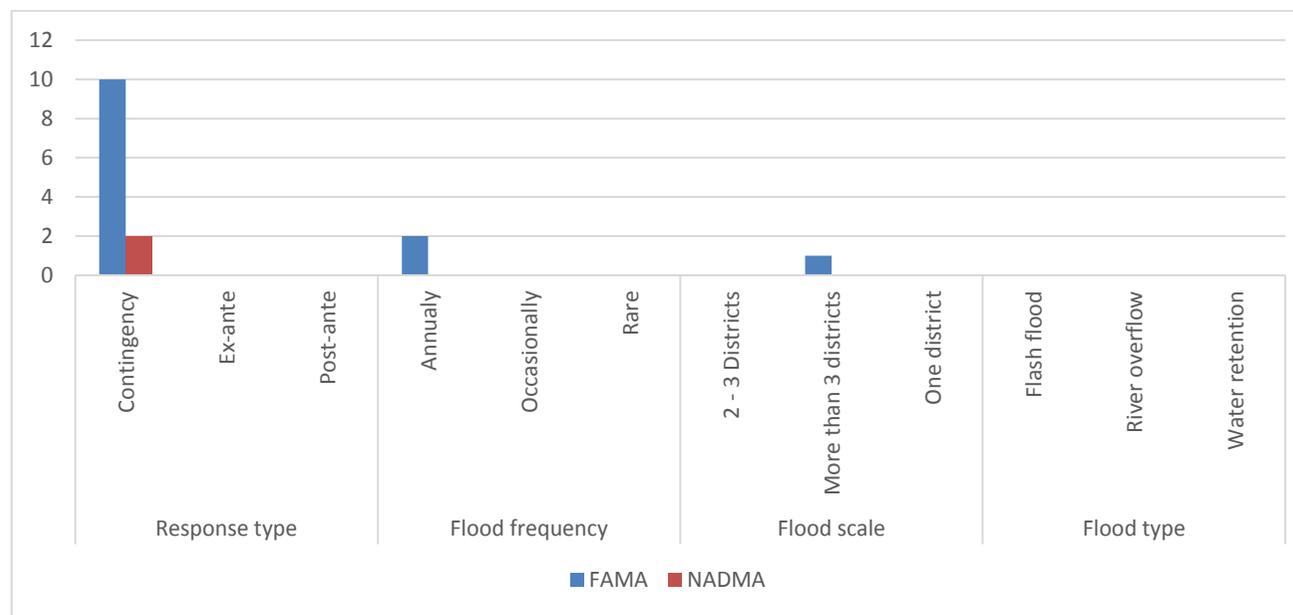


Figure 5. 19: Graph of Frequency for Disaster Details and Responses Perspective

Source: Author

Table 5. 32: Frequency of Procurement Strategy Perspective

Agency	Purchasing Strategy			Total
	Competitive Bid	EPFA	FA	
FAMA	0	0	1	1
NADMA	0	0	0	0
Total	0	0	1	1

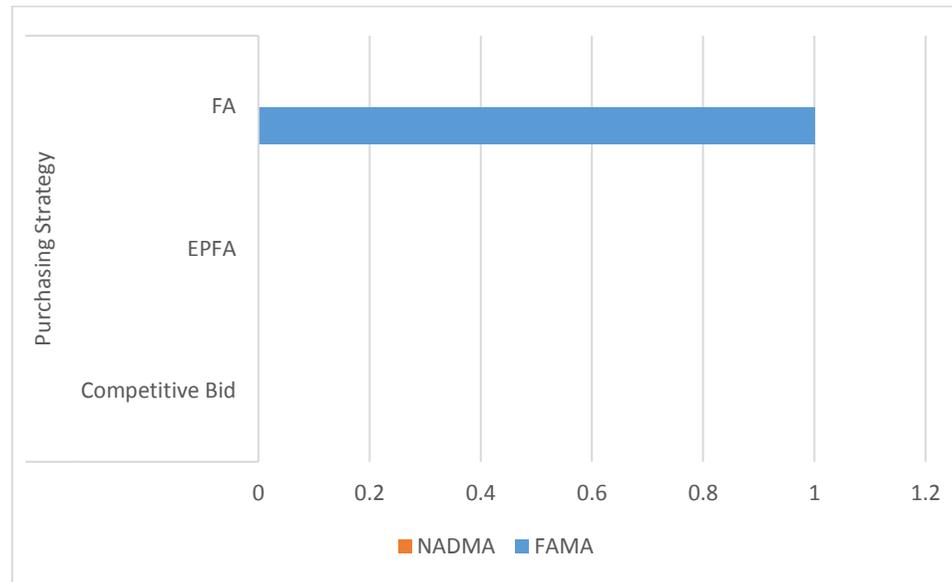


Figure 5. 20: Graph for Frequency of Procurement Strategy Perspective

Source: Author

Table 5. 33: Frequency of Buyer-Supplier Perspective

Agency	Buyer-supplier relationship				Total
	Preferred Supplier and Collaboration	Transactional	Highly collaborative & long-term contract	Rare negotiation and short-term contract	
FAMA	0	0	8	0	8
NADMA	0	0	3	0	3
Total	0	0	11	0	11

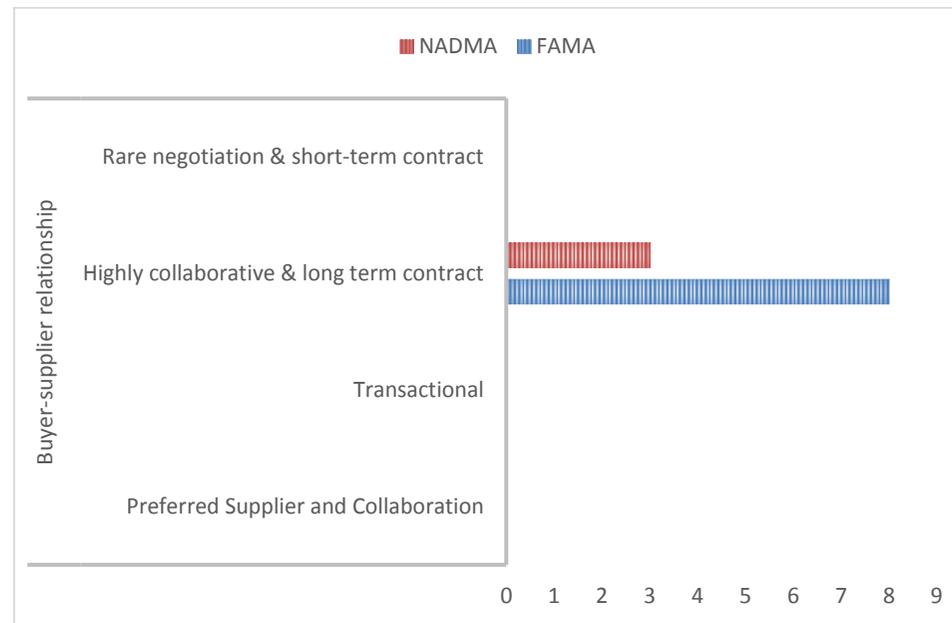


Figure 5. 21: Graph for Frequency of Buyer-Supplier Relationship Perspective

Source: Author

Table 5. 34: Frequency of FA Features Perspective

Agency	FA with Reserve Capacity			FA geographical location			FA order quantity			FA supplier base					FA Selection		FA Term		Total
	Minimum	Moderate to High	None	Disaster Location	District	State	Fixed Order	Minimum	No Limit	Few Large Suppliers	Few Small Supplier	Large Single Supplier (Trading)	*	Small Single Supplier	Pre-approved	Spot-Approval	Medium to Long	Short	
FAMA	0	19	0	0	0	4	0	0	7	0	0	0	9	0	1	0	3	0	43
NADMA	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	4
Total	0	20	0	0	1	4	0	0	8	0	0	0	10	0	1	0	3	0	47

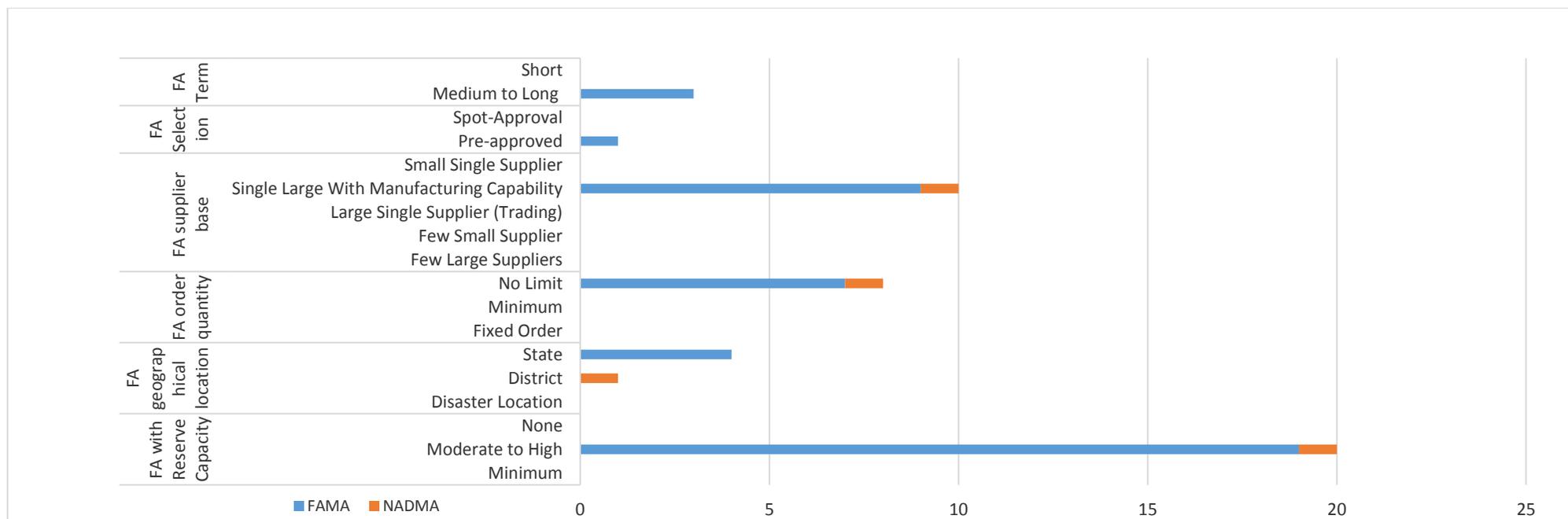


Figure 5. 22: Graph for Frequency of FA Features Perspective

Source: Author

Table 5. 35: Frequency of Buyer-Supplier Collaboration, Commitment and Trust Perspective

Agency	Commitment		Collaboration nature			Reciprocity		Reserve Capacity			Sharing of Information			Trust		Total
	High	Low	Buyer Dominance	Mutual Decision Making	Supplier Dominance	No	Yes	Minimum	Moderate to high	None	During Disaster	Pre-Disaster	On Notice	High	Low	
FAMA	8	0	0	13	0	0	1	0	19	0	0	9	0	6	0	56
NADMA	1	0	0	3	0	0	0	0	1	0	0	2	0	2	0	9
Total	9	0	0	16	0	0	1	0	20	0	0	11	0	8	0	65

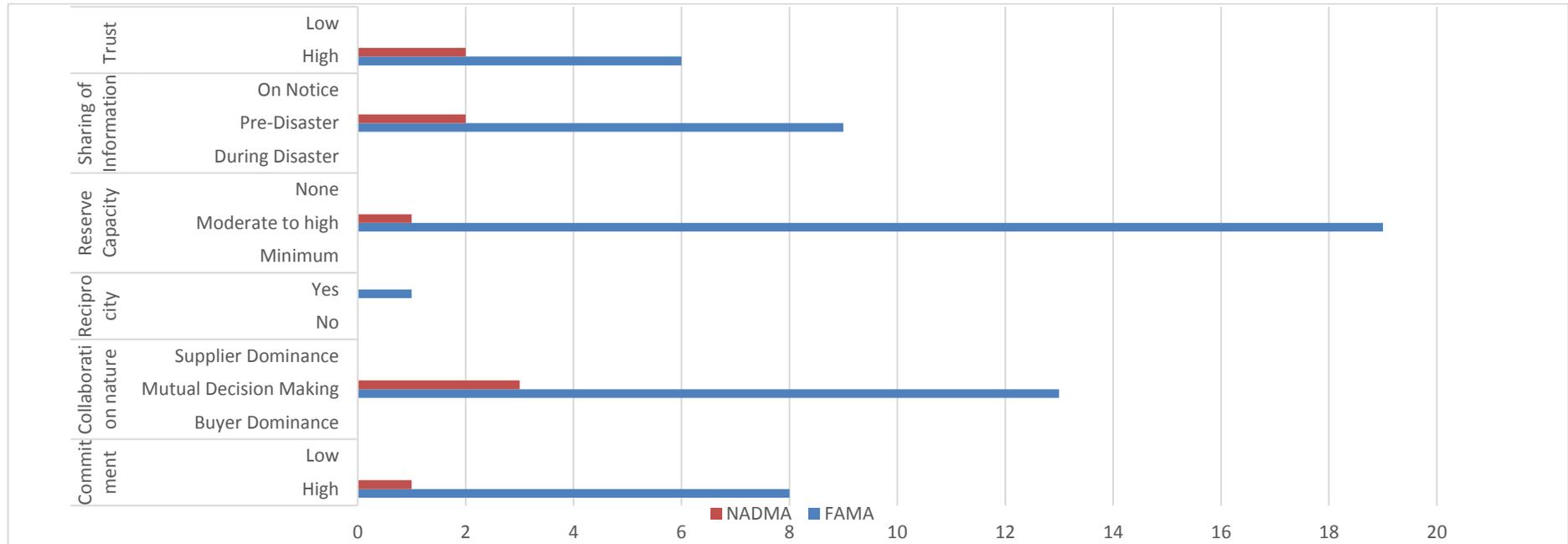


Figure 5. 23: Graph for Frequency of Buyer-Supplier Collaboration, Commitment and Trust Perspective

Source: Author

Table 5. 36: Frequency of FA Performance (Lean and Agile) Perspective

Agency	FA delivery perspective		FA flexibility perspective		FA price perspective			FA Quality Perspective		Total
	On-time to Fast	Slow	Moderate to High	Low	Price Range	Fixed Price	Market Price	Moderate to High	Low	
FAMA	4	0	9	0	0	5	0	2	0	20
NADMA	1	0	1	0	0	2	0	2	0	6
Total	5	0	10	0	0	7	0	4	0	26

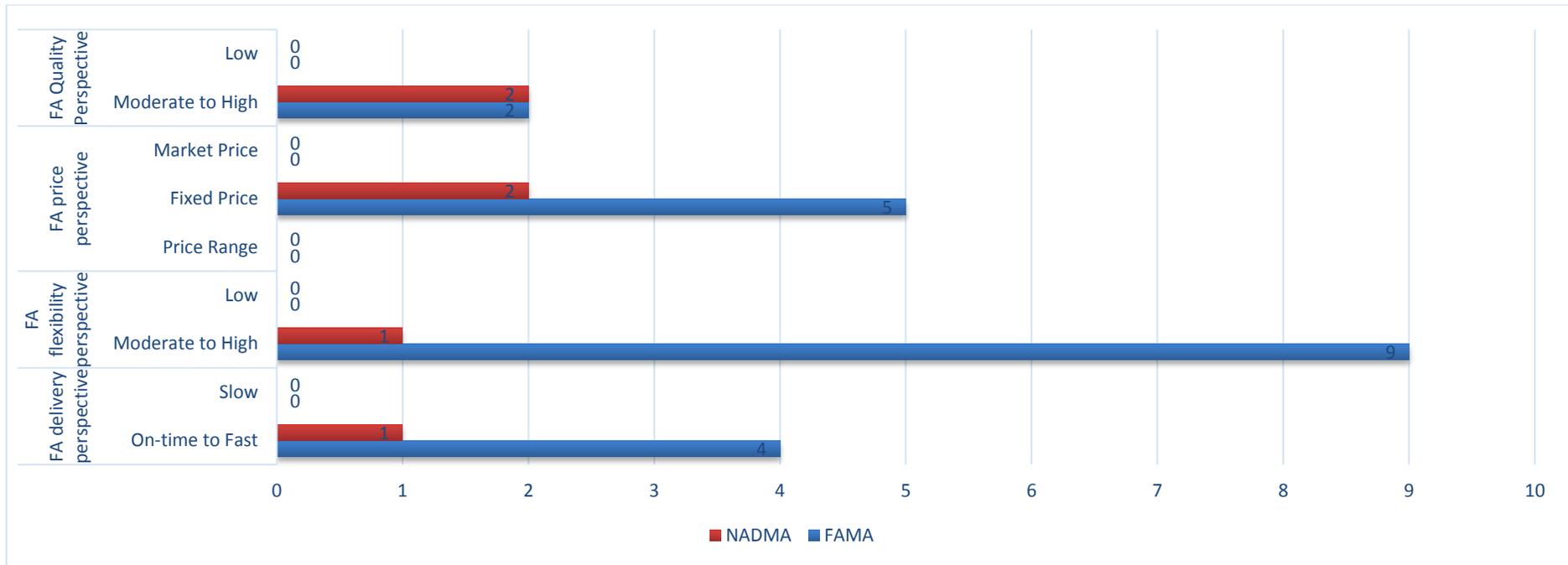


Figure 5. 24: Graph for Frequency of FA Performance (Lean and Agile) Perspective

Source: Author

#### **5.4.2.2 Results of Single Case Study Based on Themes**

NADMA-FAMA collaboration as a reflection can be described as two governmental agencies as strategic partners to supply IFK modular to the most part of the country which is flood prone. Hence, it differs uniquely from the DSW's supply base and food items in numerous predicaments: Firstly, FAMA's position as a supplier with manufacturing ability and the same time as government agency; secondly, the IFK modular consisting 15 SKUs items which are predominantly instantly prepared items, which is entirely at the disposal of the victims'; thirdly, the items are distributed only for the DRC's registered victims; fourthly, pre-positioning as will be explained later involves a clear understanding between the two agencies (NADMA-FAMA) as well the distributing agencies (DSW, CDF); fourthly, the 15 SKUs items could be returnable and replaced by the same new item or other item as agreed between the agency; and, fifthly, the IFK modular is uniquely labelled and distributed to a large geographical area involving all flood prone states of the country. Hence, as will be discussed in the next sections, the IFK modular supplies which is quite similar in many NGOs modular supplies in the rest of the world (Jahre and Fabbe-Costes 2015a), however differs in term of its operations.

##### ***Theme 1: Nature of operations***

The operational aspects of the NADMA-FAMA have deliberated at length in section 5.2, in advance. However, the section intends to reveal the motivation behind such consideration for the operations. As revealed previously, NADMA-FAMA consensually of the opinion that the environment uncertainty and large geographical coverage are two most critical considerations in its organisations' situational reflection. For example, Interview 34, NADMA (2016) argues that because of the environment uncertainty as big flood occurred in 2013 (District of Kemaman, Pahang) and 2014 (nationwide) with possible prospects of occurrence in the future, and, lesson learnt from co-ordination fiascos of food items supplies from various agencies, NGOs and foreign contributors, and, most importantly on the food item to could cater for newly arrived victims in various DRCs in all flood prone states, hence the motivation to work with FAMA for the supply of instant based product as early aid of these victims.

Moreover, FAMA has the capability to produce, supply, storage and delivery these instant food items in large quantity and could cover vast areas which includes East Malaysia states of Sabah and Sarawak (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017). In addition to this, as the central agency for disaster management of the country, it could be reasoned that NADMA possess the leverage to justify the utilisation of the National Disaster Relief Fund. By the same token, as early preparations, sourcing and pre-positioning are the response embraced by NADMA (Interview 34, NADMA, 2016), special approval was acquired through the Cabinet and the relevant agencies for procurement via FA on G2G echelon. In support, FAMA acting as the supplier concurs of its ability to supply as follow:

“Because, even in terms of production, logistics, warehouses, we have them in all the states. We also use our own transport for all. Even the warehouses could possible store more than 2,000 kits. In the event, some of the states had lower storage like Malacca for instance say about 500 kits only, so if there is a big flood, we obtain the additional kits from the nearest state say Johor and some even from Kelantan and Terengganu. That is the reason I like to emphasize that in terms of depot, logistics and distribution, we are ok”

(Interview 45, FAMA, 2017)

As highlighted in section 5.4, NADMA’s capacity for storage is 220,000 in 46 operational centres acting as the FOB for 13 flood prone states of the country (referring to Table 30). Hence, this means that FAMA could support the supplies for the number of victims on a ratio of 5:1 for a big scale flood, taking 2014 phenomena involving 200,000 victims, divided by 5 victims as each IFK modular is given to the family head to support a family of five members (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017). Hence, it could be ascertained that for a big scale flood the IFK modular usages may arise to 40,000 kits and for regular flood, the utilisation mean is 26,000 kits (Interview 45, FAMA, 2017), considering that this as registered victims which may register more than one time depending on the flood phases. As explained by Interview 34, NADMA (2016), the family of victims may get more than one kit which corresponds to the number of registrations they performed at DRCs.

In addition to this, as highlighted by Interview 45, FAMA (2017) that at inception of the IFK modular, the initial phase which was immediately after the 2014 big flood phenomena, the prediction made by NADMA and DSW was for 100,000 kits. However, the flood which occurred the particular year merely small scale hence the some of the stocks were carried forward to 2016:

“For 2015, the forecast was done much earlier by the states. But for 2016, the states were quite concern of over quoting because of reduced flood occurrence in the year before. So, we still prepared for the critical states like Kelantan, Terengganu but in a lower quantity like 1500 to 2,000 kits but less critical states, we give lesser quantity for standby, around 500 kits”

(Interview 45, FAMA, 2017)

Interview 43, FAMA, (2017) added that the expiry of the items varies. For instance, coffee is 2 years, canned sardines are 3 years whilst porridge or biscuit usually expires in one year. As the IFK modular are stored in the operational centres of each states, the near expiry items are monitored and replaced with new items, for example either new SKU of fish porridge or chicken porridge (Interview 45, FAMA, 2017). Meanwhile for the new expiry items (within 3 or 6 months), the respective SKUs are sold at a cheaper price by FAMA through their sale outlet or promotion carnivals (Interview 43, FAMA, 2017). Hence, FAMA is of the opinion that minimal wastages ensue in the supplies (Interview 43, 44, FAMA 2017). Moreover, since 2015, a state FAMA will reserve capacity of 1,000 to 3,000 kits and as the demand is known, the distribution centre (DC) will produce through its *Agromas* or FAMACO vendors (tier-suppliers) the IFK modular for distribution as cited:

“Actually, in DC whenever the order is in, we will make sure our product is in. So, whenever they ran out of coffee for example...like coffee is our own factory. We have few factories like for coffee and for flour in Kuala Selangor. Coffee factory is in Banting. We have person in charge in DC”.

(Interview 43, FAMA, 2017)

“Well, we do not have any problem because our supplier is *Agromas*, a company under FAMA itself. So, we will contact them. *Agromas* has a depot centre in Port Klang and have FAMACO in mostly all states, so, it’s easy. Like last time, there were not enough mineral water in Kelantan, so we requested from Negeri Sembilan, Port Klang and from states that have the stocks”

(Interview 45, FAMA, 2017)

In terms of distribution, NADMA (Interview 34, FAMA, 2016) has granted flexibility of discussion between FAMA and DSW as well as CDF, in some cases. DSW operations officers (Interview 2, 9, 10, 13, 18, 22, 26, 30, DSW, 2017) viewed that there the agencies had storage concern of the IFK modular at its premise, hence would require FAMA to hold the stocks at its respective FOBs. Hence, as stated by Interview 45, FAMA, (2017) that the stocks are kept at respective state FOBs, either state or districts. In some case, there are minimal stocks kept by DSW (Interview 44, FAMA, 2017) at state facilities or districts. Once order is confirmed by the respective state DSW, the state FAMA will coordinate with its HQ (Interview 45, FAMA, 2017) as the purchasing process is centralised, before delivering to either DSW depots or mostly (approximately 60%) to the DRCs. Delivery is also made to several inaccessible places as FAMA owns elevated trucks as well as acquiring the assistance of the relief strategic partnering agencies such as MAF, FRDM and CDF for challenging routes. Lastly, in term of payments, Interview 45, FAMA (2017) informed that delivery order from all states DSW will be consolidated before forwarding the claims to NADMA for payments.

### ***Theme 2: FA practices and collaboration pursued***

The FA characteristics of the NADMA-FAMA collaboration are based on vivid form, pre-approved and for the period of study is stretching to a moderate termed stage (2015 to 2017). As the FA is approved on G2G based, hence there is no specific timeline ascribed, which could possibly extend to a long-term basis. As a G2G strategic partner, FAMA's sourcing fits the description of a single large supplier with manufacturing ability. Although FAMA relies on its tier-supplier, *Agromas* and *FAMACO*, it is regarded as the overall supplier with the manufacturing ability for NADMA (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017). Next, the FA involves a large geographical coverage involving all flood prone states (C, FAMA, 2017) including districts.

More importantly, the FA features a fixed price for the IFK modular. For example, the price of a single IFK modular is RM70 and as revealed, the price has been salient withstanding recent Government Sales Tax (GST) whilst benefitting from the "1Malaysia, 1price", in which transportation cost is discounted from the actual price throughout the country (Interview 43, FAMA, 2017). Next, the order quantity is

unlimited as discussed previously, as the capacity for FAMA to supply the IFK modular could reach up to 220,000, which could be translated to 220, 000 families or .1 million victims (C, FAMA, 2017), which is fivefold then previous big flood 2014 number of victims. Next, in terms of reserve capacity, although not specified in the FA, the collaborating agencies and its strategic partner, DSW and CDF, were able to discuss on the required numbers of IFK modular and hence FAMA could make the arrangements for stocking at its FOBs and DC:

“In terms of quantity... like before we prepared so much and nothing happened, so we improved by producing minimum and maximum. For example, Kelantan, we prepare first for 2,000 kits, and when I’s not enough we will first source out from the nearest state store. In 2016, for example in Pahang, CWD predicted approximately 5,000 family head will be evacuating to relief centre, so we at the headquarters will collect the data, for example the total for all states we require 20,000 kit, so we will prepare the purchasing including the storage box and will distribute to all states DSW”

(Interview 45, FAMA, 2017)

Accordingly, the collaboration pursued by NADMA-FAMA partnership entails a mutual decision making either centralised between the two agencies or often streamed to state DSWs meeting, in which FAMA’s representative will be in attendance. For example, both agencies enlighten that mutual decision making was made on matters on storage involving FAMA and DSW as followings:

“DSW stores are small, their things are already full, this is not possible, and FAMA has a bigger store. So, they discuss within them and we have to just observe. So, once we get the decision, we see how FAMA Kelantan and DSW Kelantan handles this... say for the district of Gua Musang, the food is stored in FAMA store, for Pasir Mas in DSW store, or for the entire state of Kelantan, all is stored in DSW store because FAMA do not have store. Where as in Pahang, all are stored in FAMA because DSW do not have stores. Ok, it’s up to them”

(Interview 45, FAMA, 2017)

Next, on pricing discussion, NADMA-FAMA reached mutual decision making to maintain the price at RM70 per kit compared to the proposed price by FAMA of between RM80-90 due to the introduction of the GST in April 2015 (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017). In addition, mutual decision making was also performed on matters pertaining to delivery, either to DRCs or DSW depots

(Interview 44, 45, FAMA, 2017; Interview 34, NADMA, 2016; Interview 2, 10, 13, 18, 22, 26, DSW, 2017).

Progressing from this, the collaboration aspect pursued by both agencies could be deduced as high in sharing of information and the need for reserving capacity. Firstly, relating to sharing of information, FAMA position as an agency of the government permit fluid sharing of information between the two collaborating agencies as well as in the disaster meeting at respective state levels, in which DSW is a member. For example, Interview 45, FAMA, 2017 divulge of the followings:

“We have frequent meetings with NADMA, but for urgent ones, we will use the group WhatsApp with NADMA and DSW. As NADMA updates us on the situation of the rising flood, we will prepare the kits”.

“For weather forecast and so on, it’s not only during the meeting but it’s ongoing even in the group WhatsApp, for example...this place is forecasted to have flood, they also give statistics for the place and relief centres”. You see DSW also share with us their apps called 'flood. We also rely on this apps as sometimes the relief centres are open but the information is yet to be sent to us”

The weather forecast information shared together with DSW forecast supports FAMA in determining the quantity of reserve capacity (Interview 43, 45, FAMA. 2017; Interview 34, NADMA, 2016; Interview 13 and 30, DSW, 2017). However, there has been cases of inaccurate projection as in the 2015 (Interview 44, 45, FAMA, 2017) and consequently led to adjustment by the supplier to minimal stock levels from 1,000 to 3,000 IFK modular kit stowed at the FAMA state’s FOB.

As a result, commitment and trust shapes these continual collaborations. For instance, Interview 45, FAMA, 2017 argues that the agency is exceptional as a supplier as it has a strong support from its tier-supplier, FAMACO. Hence in term of commitment, FAMA advances its fund to the tier-supplier to supply timely and adequate supplies of the IFK modular. Hence this increased the confidence of NADMA towards FAMA’s ability to supply. Moreover, the collaboration also allowed NADMA to participate in the design of the IFK modular storage box as well convening with the supplier on the need for the FA adjustment merely on MoU concerning replacement of the expired SKU (Interview 34, NADMA, 2016). Moreover, the trust and commitment through

the collaboration between the agencies allowed reciprocal intentions on a ‘win-win’ platform with NADMA placing high optimism on FAMA’s ability to meet the IFK supplies requirement during regular or big scale floods (Interview 34, NADMA, 2017). In return, FAMA faiths of prompt payments and prolonged business relationship with NADMA, despite the fact that this is a G2G FA understanding approved by the Malaysian Cabinet (Interview 43 and 45, FAMA, 2017).

### ***Theme 3: Lean and agile practices***

Lean and agile practices of NADMA-FAMA collaboration predictably slightly differs from DSW as the partnership solely observes FA. To recap, FA of this collaboration includes fixed pricing on ex-ante as well as post-ante phase of the supplies, which arguably differs from most regional DSW practices with EPFA. Hence, when leanness is measured on cost containment due to the fixed price of the IFK modular, both agencies supplement each other on prudent government spending (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017). Next, in term of wastages, minimal depletion was observed as the respective of SKUs of the IFK modular is replaceable, although this could possibly incur some cost to NADMA in the event of stockpiling (Interview 43, FAMA, 2017). However, as stated by FAMA, adjustment of minimal stocks kept is constantly improved by year with inputs from NADMA, DSW and states disaster meetings (Interview 45, FAMA, 2017). Moreover, going back to the removed SKUs from the IFK modular, FAMA possibly could gain further with the sales at their outlet (Interview 43, FAMA, 2017).

Next, in terms of quality factor for lean supply, the collaborating agencies argues that since this is an instant product and that there is a standard measure to handle near expiry product, hence the eminence of the IFK modular products befitting the needs of the victims (Interview 34, NADMA, 2016; Interview 43 and 45, FAMA, 2017). In addition, FAMA also asserts that their products have the necessary recognitions in the country as well as its status as an export item. The following perspective grasps this lean perspective:

“No, there are no issues. FAMA will ensures this and in fact, it’s not just under FAMA purview alone, these entrepreneurs are well trained from institutes like MARDI, Agricultural Department. FAMA takes its product in the name of *Agromas*. There also

some product taken by Agricultural Department under different name, but it is actually the same product”.

(Interview 34, NADMA, 2016)

“We ensure thorough checks of the expiry of the items before delivery, so there has been no complains”

(Interview 45, FAMA, 2017)

Progressing forward, agility based on flexibility breadth, is demonstrated based on FAMA’s capability to meet the volume demand and in substituting the SKUs of the IFK modular. Chiefly, as disclose earlier (Interview 45, FAMA, 2017; C, FAMA, 2017), FAMA is confident in meeting volume due to their support from their large base tier-suppliers, production support at their DC and their numerous operation centres cum FOBs. Next, for the supply of substitute or replacement SKUs, the following was reasoned:

“That’s the reason we have substitute product for such a case. If our product is not enough, we will take product from "usahawan" (entrepreneur). Meaning different brand but same item and from a different source”

(Interview 43, FAMA, 2017)

Moreover, NADMA (Interview 34, NADMA, 2017) has indicated that to this point, FAMA was able to meet the required demand. Justification were given based on the number of entrepreneurs (tier-suppliers) of FAMA:

“You see FAMA does not only produce the items only for flood, the products are supplied to mini market and hypermarket. FAMA product from *Agromas* can be easily obtained in hypermarkets like Tesco and all, so the production is on-going and even if we did not take, the process will continue. But when we take, we would like to have in big volume and in short span. So, we need to inform them early so that FAMA could prepare with its suppliers. Like last year, we made an immediate order in big volume, in some cases of its suppliers, even the production machine broke down because it has to be run continuously”.

Next, agility based on delivery timeliness is regarded by the collaborating agencies as exceptional. Interview 34, NADMA (2016) asserts that FAMA’s mobilisation of the IFK modular as fast and quick:

“If there were emergencies and required by the states, we will call them and they will prepare for us even till late midnight, no problem”

“Yes, land road similar to the one as DSW wants it. If they want it to be sent to Depot, we will be sent it there... if they want it at the disaster relief centre, so we will be sent it. But mostly, about 60 percent, we will directly be sent it to the disaster relief centre. Our Lorries are big and tall, and can go through most flood situations, so they ask us to send directly”.

Moreover, with the assistance of various agencies which includes MAF, FRDM and CDF, the IFK modular was able to be shuttled to inaccessible areas, in which the entrance roads or route has been flooded with water.

Given these points, it could be ascertained that NADMA-FAMA collaboration results in lean to agile or leagile SCM for the supply of IFK modular to the DRCs, in particular. This is argued based on the premise that postponement and de-coupling point occurs when information of flood intensity is shared between NADMA- FAMA-DSW which allowed the following key observations on the SCM: Firstly, the IFK modular was produced for all flood prone states in minimal quantity of between 1,000 to 3,000 kits, in which the estimation was based on DSW forecast and information on flood occurrence's prediction; secondly, the first batch of the kits from FAMA's FOBs were sent DSW or CDF depot or newly opened DRCs as first response, thirdly, as the intensity of flood heightens, the information on DRCs' commencement (includes the number of victims, delivery requirement details) and flood intensity were shared to FAMA; fourthly, FAMA instructs its DC and tier-suppliers to either pack the existing SKUs stocks into the IFK modular container according to the numbers required for distribution to DRCs; and, fifthly: the additional batch of kits required are distributed to the respective DRCs for utilisation or DSW's depots for re-distribution.

In essence, given these settings, the supply process fulfils contingency response process with minimal stocks held at ex-ante stage, postponement of stocks was held at FAMA's DC and de-coupling point for agility during post-ante stage occurs when the agency is informed of the flood intensity information. Hence, it could be argued that the contingency response process is similar to leagility SCM for the supplies of IFK modular of this case study.

### **5.4.3 RQ 3: Practical perspective of the Conceptual Framework**

The respondents for the NADMA-FAMA collaboration enumerated challenges in the FA implementation and provided suggestions for improvement. The next section of this study will encompass the details, which will be beneficial for comparison purpose during the advance stage of analysis.

#### **5.4.3.1 Results for practical challenges of FA implementations**

The case of NADMA-FAMA entails similar responds pattern as DSW for the generating of themes and coding purpose. However, conclusively there were only five challenges listed. As shown in Table 5.37 and Figure 5.25, the descending order of the challenges are as follows: Red tapes (59%), pre-positioning wastages (18%), large scale flood (12%), and, late payment and price hikes, each at 6%. Despite the high variation in percentage, the response in numbers or the highest challenge (red tapes) was only 10 responses out of 17 responses representing the five challenges. It is also noted that, NADMA's perspective was listed and common with FAMA on three challenges namely red tapes, pre-positioning wastages and large-scale flood. Meanwhile, in addition to these three challenges, FAMA put across some noteworthy perspective on price hikes and late payment, which will be discussed next.

#### ***Red tapes***

NADMA-FAMA collaboration which was based on G2G arrangements although arguably yielded many advantages to alliances, has its set back. Due to the fact that the collaboration of such magnitudes in the supplies and being new, the suppliers draws some setbacks or bureaucracy in the form of chain of communication and documentation procedures. For instance, Interview 43, FAMA, (2017) revealed that although the FA was between NADMA and FAMA, the role of third party such as DSW and CDF is equally important. As revealed by NADMA (Interview 34, NADMA, 2016), the agency allowed flexibility between FAMA and DSW for storage and distribution. However, as DSW is not a party of the arrangement, an issue of streamlining the directives to the different states DSW was a primary concern.

Table 5. 37: Perspective on FA Challenges in NADMA-FAMA Collaboration

Agency	FA Challenges:											Total
	Funding	Lack of assets	Large scale flood	Late payment	Late responses	Pre-positioning wastages	Price Hikes	Red-tapes	Supplier lack initiative to reserve capacity	Supplier withdrawal	Supplier lacking tier-supplier support	
FAMA	0	0	1	1	0	2	1	9	0	0	0	14
NADMA	0	0	1	0	0	1	0	1	0	0	0	3
Total	0	0	2	1	0	3	1	10	0	0	0	17
<b>Percentage</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>6%</b>	<b>0%</b>	<b>18%</b>	<b>6%</b>	<b>59%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>

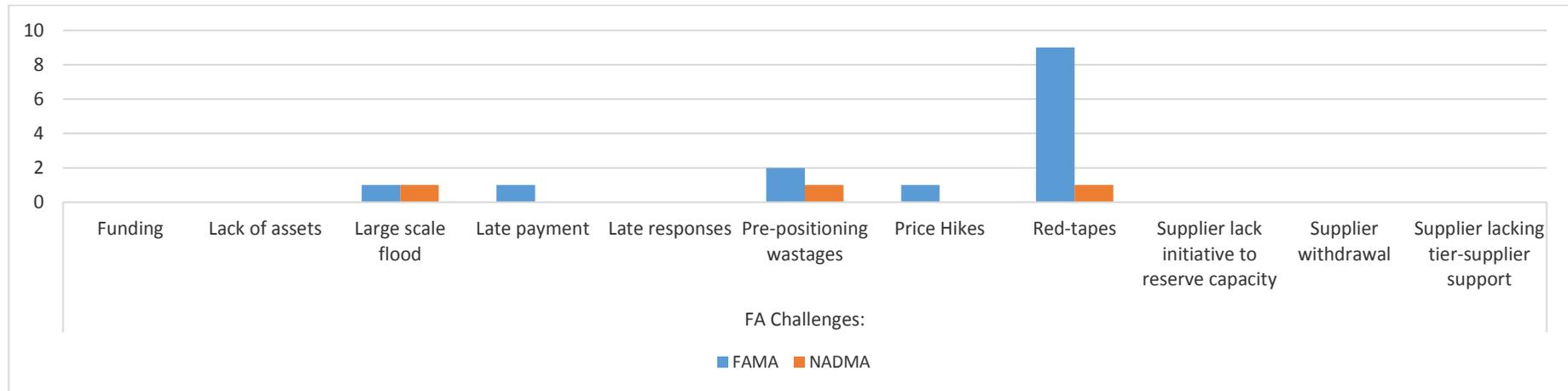


Figure 5. 25: Perspective on FA Challenges in NADMA-FAMA Collaboration

Source: Author

In fact, as revealed by FAMA (Interview 43, NADMA, 2017), there were incidents of shortfall in the claims to NADMA as the suppliers were delayed in acquiring the names of the recipients of the IFK modular kits which was due lack of directives. This led to further changes of process before claiming, based on the number of delivered items. However, this led to another setback that the receiving party did not agree to hold the IFK modular due to storage issues (Interview 43, FAMA, 2017).

### ***Pre-positioning wastages***

Pre-positioning wastages in the case of NADMA-FAMA collaboration are closely linked to either minimal or not at all occurrence of flood in the forecasted states. For instance, Interview 34, NADMA (2016) reported that one particular occasion of underutilisation, which was the case of Kelantan as the worst hit state in 2014 flooding, only used 40 IFK modular for the year due to low scale flood. Due to this, FAMA had minimised its IFK pre-positioning despite higher order as underutilisation would jeopardise the payment to their tier-suppliers who could be small producers in villages. Meanwhile, FAMA added that in the case of East Malaysia, when the stocks of IFK modular were shipped to the states, the agency encounters problem with their SKUs that would expire in one year if flooding did not occur as replacement will involve logistics challenges and manpower problems. This is because FOBs are holding the stocks within the vast area especially in Sarawak (Interview 45, FAMA, 2017). However, in some instances like in the year 2016, the agency was ‘lucky’ as the flood did occur at the eleventh month after being redundant for 10 months (Interview 43, FAMA, 2017).

### ***Large scale flood***

As prescribed earlier, a large-scale flood which requires phase 2 or phase 3 disaster management would possibly cause some challenges to the NADMA-FAMA collaboration’s supplies. For instance, Interview 34, NADMA (2016) argued that the last large-scale flood was in 2014 and it happened before the introduction of the IFK modular kits. The 2016-2017 flood occurrence in Sarawak (East Malaysia) is considered large as it happened in phases and involved large number of returning victims to DRCs. This particular incident revealed that the stocks of IFK modular were not sufficient for the victims. Hence, it would appear that the underestimation of the intensity and subsequent pre-positioning impacted the responses to some of the victims

at the DRCs. Meanwhile, FAMA (Interview 43 and 45, FAMA, 2017) opined that the agency would encounter accessibility issues for areas of large-scale flooding. These involves possessing the right assets such as heavy vehicles and boats, as well as the expertise and the approval from the relevant authorities in mobilising their supplies through such areas, which are generally declared as dangerous areas.

### ***Price hikes***

Price hikes discussion in the case of NADMA-FAMA collaboration occurred minimally as the agreed price of RM70 per IFK modular as FAMA offered EX factory price was supported by free transportation cost to the East Malaysia under the “1Malaysia, 1Price” scheme. FAMA subjected the discussion of price hikes to RM80 or RM90 in 2016 due to transportation cost (mainly land transport) and increase of material prices according to the market (Interview 43, FAMA, 2017). However, it was later mutually that the pricing of RM70 per IFK modular was to be maintained (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017).

### ***Late payment***

FAMA described that they have had good relationship with NADMA and therefore contended that although there were some late payments records, trust on the supply and honouring payment has been high since this was a G2G arrangement. Moreover, they also argued that delays were inevitably unavoidable during the early stages as processes were not yet perfected between the agencies. For instance, FAMA listed that early challenges included coordination with DSW and NADMA on the quantities and delivery destinations and delay of reconciling orders and preparing full documents for claims (Interview 43 and 45, FAMA, 2017). In summary, both NADMA and FAMA opined that the late payments are within their purview and was not an issue per say (Interview 34, NADMA, 2016; Interview 45, FAMA, 2017).

#### **5.4.3.2 Results of suggestion for improvements**

This study has learnt of some of the practical challenges in the implementation of NADMA-FAMA collaboration FA. Hence, the respondents also have also given some optimistic perspectives on improvisation of implementation of the FA for better SCM performance in the flood relief activities. The perspectives follow the same sphere of

the suggestions format as described earlier in section 5.3.3 as shown in Table 5.38 and Figure 5.26 respectively.

### ***External***

The essence of the perspective articulated by respondents in the NADMA-FAMA collaboration surrounds on the need for communicating with third party involved the collaboration, more specifically with DSW, CDF and the disaster management committee, whether at state or district level. For instance, NADMA (Interview 34, NADMA, 2016) reasoned that as DSW knows the area of disaster better than NADMA and FAMA, hence it is believed that this could translate to more accurate forecasting of the minimum and maximum IFK modular needs. Apart from this, NADMA professed that better communication with DSW and other agencies also means that mobilisation involving inaccessible areas must be well understood and enhanced in future delivery and distributions of the IFK modular. By the same token, FAMA also agreed that there is a strong need for the agency to get support from DSW and its strategic partners to ensure that delivery issues previously encountered could be improved (Interview 43 and 45, FAMA, 2017). This study views that this would ensure overall success of the FA lean and and agility, in particular concerning cost (inaccurate forecasting would possibly end up in more wastages) and delivery (inaccessible areas stands to be the most challenging and would result in delay in the delivery of the items to the victims).

Table 5. 38: Perspectives on FA Improvement Suggestion for NADMA-FAMA Collaboration

Agency	FA improvement suggestion on:			Total
	External	Management	Policy/Regulation	
FAMA	3	1	1	5
NADMA	1	0	0	1
Total	4	1	1	6
Percentage	67%	17%	17%	100%

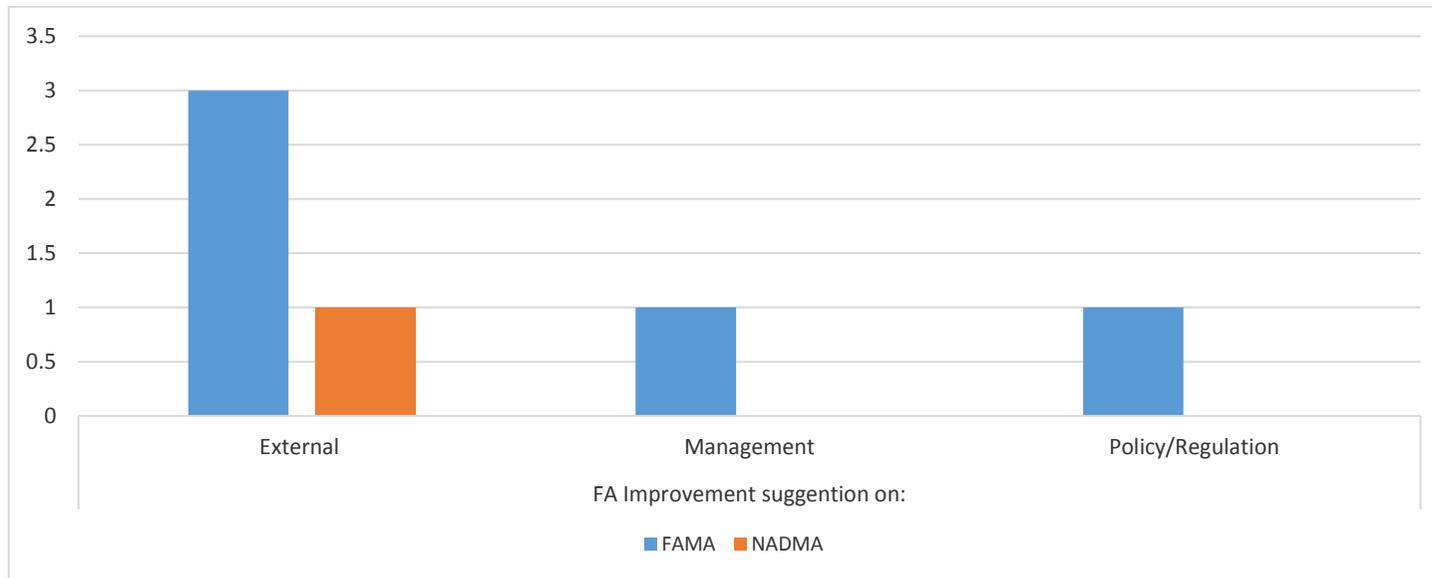


Figure 5. 26: Perspectives on FA Improvement Suggestion for NADMA-FAMA Collaboration

Source: Author

### ***Management***

Respondents had an overall good assessment in terms of management for the collaboration between NADMA and FAMA. For instance, Interview 45, FAMA's (2017) reflection over the two years supplies was that there were no negative comments from any party and at the same time NADMA had also regarded FAMA as a reliable supplier (Interview 34, NADMA, 2016). Moreover, since inception, FAMA through its engagement with NADMA and DSW, has progressively improved its management in forecasting, adjusting its minimum reserve capacity, managing direct delivery to DRCs, replacing of near expiry SKUs, enhancing mobile communications, billings and claims. Therefore, it is believed that FAMA achieved these dynamics with constant collaboration with its strategic partner as well as related agencies in the relief activity. Future improvement on the management aspect includes planning for more workshops to improve work process especially the mobilisation or re-deployment for the IFK modular from less affected states to ensure the highest optimisation. Additionally, through the flexibility provided by NADMA, FAMA also wants to improve its coordination with other agencies to improve delivery to inaccessible and remote places (Interview 45, NADMA, 2017). Overall, these efforts on management are concentrated to improve cost implications and timely delivery involving hotspot areas.

### ***Policy/regulation***

In terms of policy/regulation suggestion, there is only one suggestion advanced by FAMA concerning the expiry dates of the SKUs (Interview 43, FAMA, 2017) and was previously addressed by NADMA (Interview 34, NADMA, 2016). In practise, FAMA will check for SKU items that would expire 3 to 6 months before the distribution. These items as mentioned earlier will be sold off by FAMA and replacement will be made to the IFK modular. However, in terms of policy, it is still not clearly stated in the MoU between the collaborating parties in terms of the additional cost incurred for the replacement and other administration cost. Hence, this would be an avenue for the policy changes that derived from this case study.

## **5.5 Results of Cross-Case Synthesis: Concept Associations**

In a cross-case synthesis, the tactics force the researcher to go beyond the initial frame with a structured data which improves possibility of capturing reliable theory and novel findings (Eishehardt 1989). In this section, the cross-case synthesis results will be displayed in tabled and uniformed categories, in which the array enables the investigation to decide if different cases appear to share similar profiles for consideration of replication. The replication between cases is the predicted similarity of the original expectation based on the proposed conceptual framework. However, this study acknowledges a caveat that a contrasting case outcome may be produced as plausible rival interpretation. In other words, the strategy selects categories or dimension and inspect for within-group similarity as well as intergroup differences. Hence, the deliberation of this section trails the RQs results in section 5.3 and 5.4 respectively.

### **5.5.1 Comparison of AHP**

Table 5.17 presents the lean and agile weights for the two agencies. The results show that for the “agile” DSW, the agile characteristics (flexibility and time) are weighted more heavily than the lean characteristics (cost and quality) in ratio of 57 to 43 percent. In comparison, however the “leagile” NADMA-FAMA has weighed more equally (50 percent). However, in the case of DSW, the exhibited result also shows that lean and agile characteristic differs marginally, hence this supports the fact both lean and agile factors are important considerations for the component procurements. As such, the results also presents a supporting view to Drake’s (2013) work that suggests a contrast of Fisher’s (1997) notion that business primary focus is on agility.

Resuming “agile” DSW arguments, the results as displayed in Figure 5.27, shows that all the relief items or components namely hygiene kit, clothes, sleeping aid, partition/tent, and even modular (dry food and water) are high on lean understandably as these are items stored to be stocked or for pre-positioning purposes. Hence, the items need to be procured in pre-disaster period, and the goals of procurement is to ensure best deal for the one-off purchase. This corresponds to the positioning of these items are mostly in lean items except for hygiene kits and clothes, which are non-strategic items (low in lean and agility) and this, debatably may require a tweak in its procurement method. Although this may be true, this study’s focus is on food item. As

such, for the dry food/bottled water modular, apart from obtaining the best deal in price and costing, the competitive bid or tender process is also performed to ensure specification of quality is adhered was emphasised owing to the fact that it will be stored and must be durable with an acceptable expiry date. This is reflected in the very marginal difference of cost and quality ratios of 22 to 21 percent shown in Table 5.39.

However, it has been noted that from the case study most DSW agencies focus on agility for food items in DRC due to reason of reducing wastages of pre-positioning in the face of uncertainty of the flooding occurrences. In fact, time is prioritising over flexibility as reflected in Table 5.39 as reasonable volume is usually ascertained once the victims have moved in to DRCs and the moving is communicated to the suppliers and the fluctuations thereupon is communicated every four hours. Yet, time or delivery of the food items is highly expected to ensure reduced bottleneck issues, proper and timely meal served to the stakeholder's of DSW, in other words the already traumatised victims. Congruently, this is exhibited in Figure 5.27 and in Figure 5.28 reflecting the positioning of this food item in the agile quadrant. Hence, to meet the objective of supply continuity and agility, DSW adopts EPFA procurement strategy their preferred suppliers.

In contrast, the NADMA-FAMA collaboration consists standard IFK modular items as components, in which a forecasted amount of a full set modular is pre-positioned at the supplier's premise as first response. Whilst, once the intensity of flood and the volume is ascertained, using the make-to-order strategy, the 15 SKU's are packed into the modular box to meet the need of the DRCs, to be supplied to all family heads. Consequently, lean and agile factors are both similarly important to the collaboration and this is reflected in leagile quadrant positioning of the items in Figure 5.28, and the choice of performing FA as procurement strategy. Despite this, similar to DSW, NADMA-FAMA collaboration too placed innovation in quality, and technological capability in meeting flexibility as less priority compared to the rest of the components. This is presumably due to the fact that the SKUs are standard product and do not require customisation through innovation and technology. Moreover, the production is made by FAMA's subsidiary company and trained tier-suppliers, and that FAMA's packaging work could meet demand volatility.

### *Comparison of Results (Derived Versus Observed)*

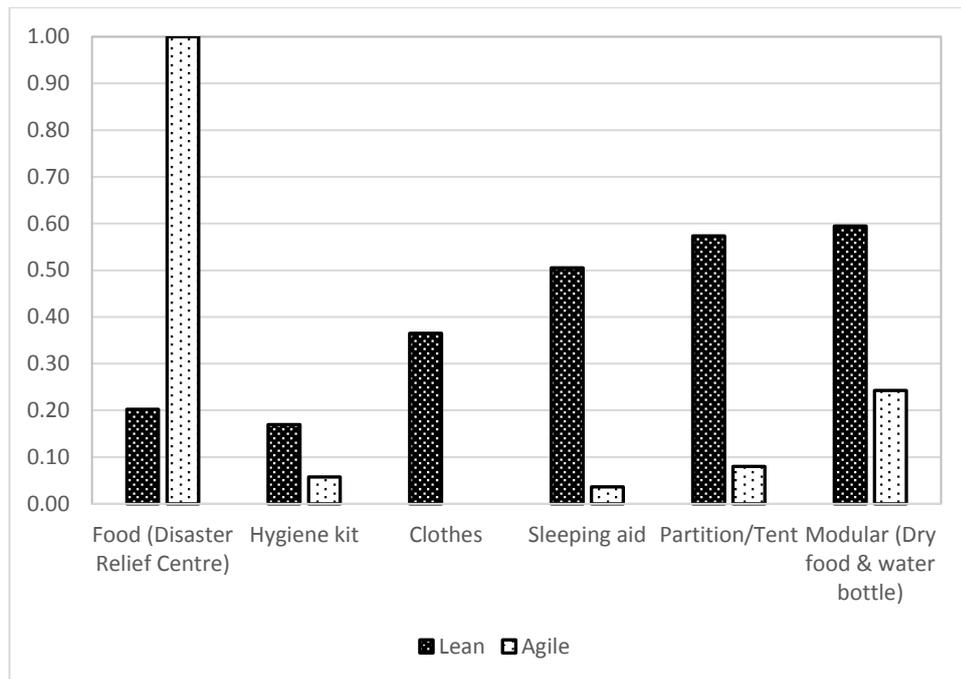
The result as observed shows similarity in previous work (Kraljic 1983; Drake, Lee and Hussain 2013; Tate 2014), which appears as replication instance that the segmentation of the items or components into matrix enables the purchasing team to understand better the importance of these items to business better (in this case, a humanitarian perspective) and therefore propose an appropriate strategy for governing the commodity and the accompanying supplier relationship. In this case comparison, it is professed that the classification of the following food items leads to underlying procurement strategy and supplier relationship: firstly, modular of dry food/bottled water for FOB placed as lean quadrant or as leverage commodities, requires a competitive bid/tender process and the choices of suppliers are preferred suppliers; secondly, for food items supply at DRCs is placed under agile items and are categorised as bottleneck items, therefore requires a short-term transactional suppliers to ensure supply continuity; and thirdly, the IFK modular is place of leagile quadrant and categorised as strategic item, which requires a long-term contracts and relationship, which is represented by the FA.

Table 5.39: Weights of Lean and Agile Characteristics for the Agencies

Strategic Priority	DWS Local weight	NADMA-FAMA Local weight
<b>Lean characteristics</b>	<b>0.43</b>	<b>0.50</b>
Quality factors	0.21	0.25
Cost factors	0.22	0.25
<b>Agile characteristics</b>	<b>0.57</b>	<b>0.50</b>
Flexible factors	0.26	0.25
Time factors	0.31	0.25

Source: Author

### DSW



Source: Author

### NADMA-FAMA

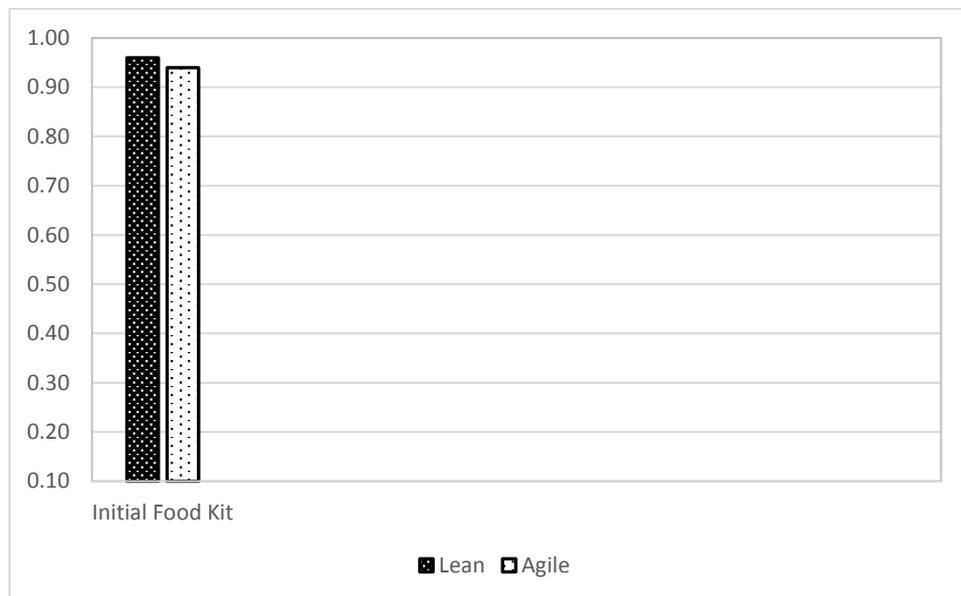
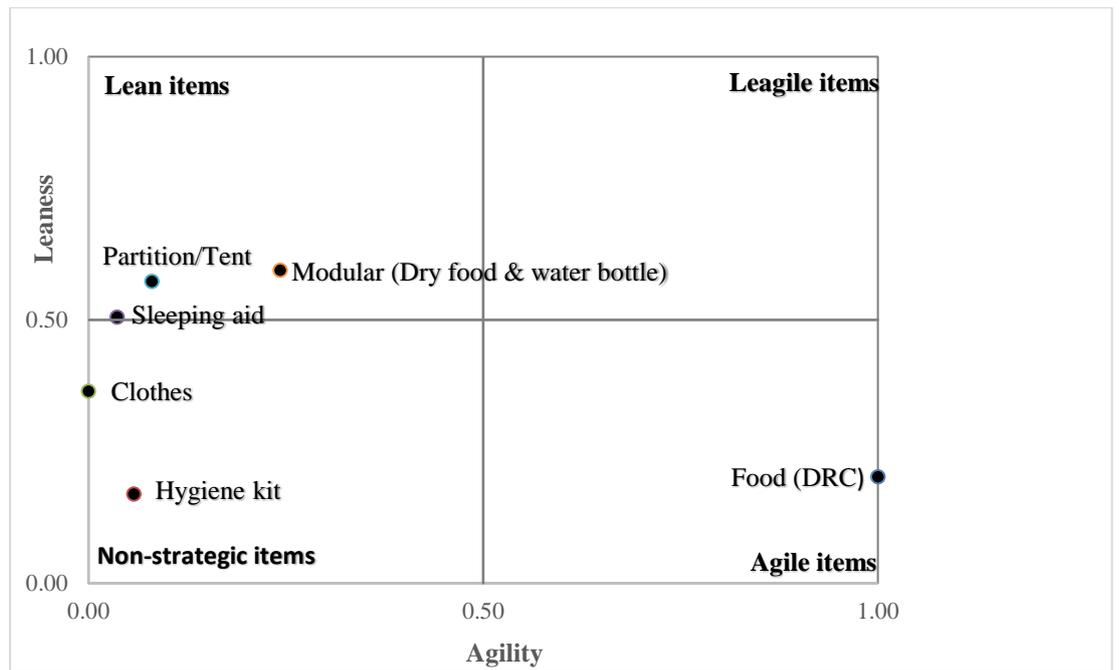


Figure 5. 27: Comparison of Standard Lean and Score between the Two Agencies

Source: Author

### DSW



Source: Author

### NADMA- FAMA

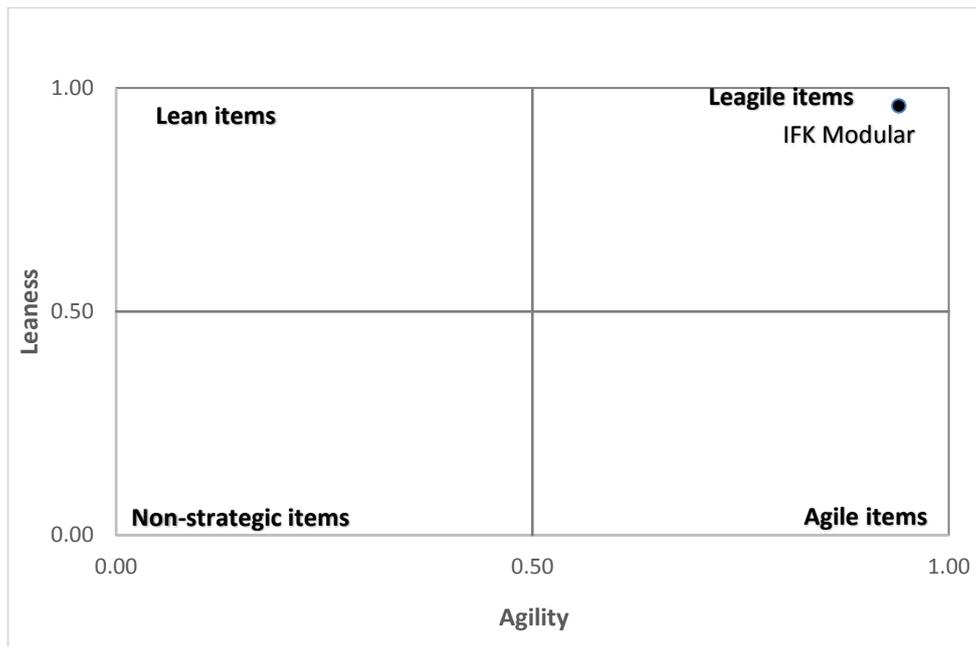


Figure 5. 28: Lean and Agile Portfolio Models for the Two Agencies

Source: Author

### 5.5.2 Comparison for Conceptual Framework Development

This section entails the profiling of each case, and hence the analysis probes whether different cases share parallel profiles that warrants a replication of the general case, or adequately different and viewed as contrasting case. A predicted similarity based on observed profiles confirms the original expectation, and disconfirms contrasting it. Tables 5.40 and 5.41 were examined for the analogous cross-case pattern and substantiated with an argumentative interpretation as suggested by Yin (2014, 2018). The cross- case synthesis revealed that the observed profile confirms to the original predicted similarity and hence connects well with prior research (Chakravarty 2011; Jahre and Fabbe-Costes 2015a) and these were reviewed to develop the conceptual framework of this study.

The most significant result is the association between the concepts of the study which arguably is visible. In addition to this finding, contingent factors to the conceptual model were also identified such as disaster occurrence uncertainty that involves flooding frequency, occurrence venue and its scale impacts purchasing managers' decision making on choices of flood relief items and the response adopted such as 'with or without' FOB's pre-positioning. In addition to this, the decision for a 'centralised versus de-centralised' procurement structure also gave impact to the choices of procurement method, in particular either FA or EPFA.

Table 5.40: Overall Case Profile of DSW for Flood Relief

<b>Regions</b>	Northern WM, Central WM	Southern WM, East Malaysia	East Coast Malaysia	All regions (inaccessible, remote areas and islands)
<b>Organization situation</b>	Uncertainly about the occurrence and intensity of flooding, large geographical coverage, manpower shortage, limited budget, de-centralized organization structure, state centralized procurement structure, disaster response-based SOP and top-down hierarchy order			
<b>Flood type</b>	Flash flood	Pro-longed flood	Pro-longed flood	Pro-longed flood
<b>Food frequency</b>	Occasionally, Annually	Annually	Annually	Occasionally
<b>Response through early preparation/forecasting):</b>	Disaster response-based SOP and top-down hierarchy order through federal, state and district disaster management committee and internal DSW meetings.			

<b>Response (pre-positioning)</b>	DRC	Pre-positioning (FOB) for inaccessible areas only, DRC focused	Pre-positioning (FOB) and DRC	FOB
<b>Response (buyer-supplier relationship)</b>	Short-term, preferred supplier	Short-term, preferred supplier		Short-term, preferred supplier
<b>Response (procurement strategy)</b>	EPFA	DRC)	FOB, DRC supplies, DRC - EPFA	Competitive bid, EPFA for continuity
<b>Food supplies</b>	Packed food, cooking at DRC (if prolonged)	Cooking at DRC, packed food (early stage)	Cooking at DRC	Modular (dry food)
<b>Supply objective</b>	Secure supply, reduce risk of supply	Secure supply, reduce risk of supply	Secure supply, reduce risk of supply	Best deal for one-off supply (3 or 7 days), if prolonged (supply continuity)
<b>FA characteristics:</b>				
<b>Geographical coverage</b>	Disaster area and district	Disaster area and district	Disaster area and district	Disaster area
<b>Term</b>	Short term	Short term	Short term or maximum 1 year	Short term
<b>Order quantity</b>	No-limit	No- limit	Competitive bid – contractual amount, however the one-year term is with no limit. EPFA – no limit	Competitive bid – contracted amount, EPFA – no limit
<b>Supplier base (trading)</b>	Small suppliers	Small to large supplier	Small to large supplier	Small to large supplier
<b>Buyer-supplier collaboration:</b>	Based on mutual decision making and reported high level of commitment, trust and reciprocal.			
<b>Information sharing by DSW</b>	Mostly during disaster, or on-notice and occasional early sharing	Mostly early sharing of information, with some during and on-notice	Mostly early sharing of information, with some during and on-notice	During disaster
<b>Reserve capacity by supplier</b>	None and minimum	Mostly moderate to high, and some minimum	Mostly moderate to high, and some minimum	Mostly none and some minimum

<b>FA features:</b>				
<b>Lean (wastages/price/cost)</b>	No ex-ante (reduce wastages) EPFA fixed price (RM20 per day)/price range	No ex-ante (reduce wastages) EPFA fixed price (RM10 per day)/price range for Southern WM EPFA East Malaysia (RM25 per person/day for packed food & RM220 per 10 person/day)	Contingency response FOB – contract price for one off tender or 1-year duration DRC – EPFA (RM6.50 for packed food), ad hoc tender based on fixed price & contractual price (1-year tender)	RM75 per pack (for East Malaysia) or Tender price. EPFA – price range
<b>Lean (quality)</b>	Good rating as quality is ascertained through Health Department checking, cooking committee checking, victims’ verification and stipulated in contract for FOB supplies.			
<b>Agile (flexibility) by supplier</b>	Modification flexibility on volume based on volatility. However, during large flood, some suppliers are not able to meet the demand.			
<b>Agile (delivery)</b>	Delivery by supplier, DSW and its strategic partner. Delivery is ascertained as on-time, however recorded delay was during first day of chaos or due to large flood.			
<b>SCM strategy</b>	Highly agile, lean consideration	Highly agile, lean consideration	Lean and Agile	Highly Lean
<b>Postponement &amp; de-coupling point</b>	None	None	FOB to DRC	None

Source: Author

Table 5.41: Case profile of NADMA-FAMA Collaboration for Flood Relief

<b>Regions</b>	All flood prone states and districts in the country
<b>Organization situation</b>	Uncertainly about the occurrence and intensity of flooding and large geographical coverage; dependent on NADMA’s directive and DSW’s information.
<b>Flood type</b>	All-natural disaster with DRCs (Distribution 90% for flood, 10% for fire, landslide and others).
<b>Food frequency</b>	Annual
<b>Response through early preparation/forecasting):</b>	Forecasting based on DSWs’ input and flood predictions by relevant government authorities (MET, DID and state disaster management committee).
<b>Response (pre-positioning)</b>	Pre-positioning at FAMA’s FOB (Operations Centre) and Distribution Centre (DC)
<b>Response (buyer-supplier relationship)</b>	Collaborative and alliance
<b>Response (procurement strategy)</b>	FA
<b>Food supplies</b>	IFK modular (consist of 15 SKU’s of instant food packets)
<b>Supply objective</b>	Secure long-term supply and create mutual commitment for long term-relationship

<b>FA characteristics:</b>	
<b>Geographical coverage</b>	Nationwide
<b>Term</b>	Long-term
<b>Order quantity</b>	No limit
<b>Supplier base (trading)</b>	Strategic supplier (single supplier with manufacturing ability)
<b>Buyer-supplier collaboration:</b>	Mutual decision making with NADMA, ascertained as very high on commitment and trust as well as reciprocal.
<b>Information sharing by DSW</b>	High rate of sharing during pre-disaster for forecasting and pre-position, and during disaster for delivery to DRCs
<b>Reserve capacity by supplier</b>	Capability to reserve high capacity with adjustment to minimal based DSW's input
<b>FA features:</b>	Contingency SCM approach
<b>Lean (wastages/price/cost)</b>	Reduced wastages as minimal pre-disaster pre-positioning in FOBs and order quantified before delivery to DRCs; Fixed price of the IFK modular of RM70 per family
<b>Lean (quality)</b>	High quality assurance with checking at DC and replacement of near expiry (3 to 6 months) SKUs
<b>Agile (flexibility) by supplier</b>	Highly flexible on volume fluctuation, product component modification (SKUs)
<b>Agile (delivery)</b>	Most delivery is performed FAMA except for inaccessible DRCs (delivered by DSW's strategic partners) and fast development speed of the modular.
<b>SCM strategy</b>	Leagile
<b>Postponement and de-coupling point</b>	Pre-positioning at FOB as first response, De-coupling point at DC once intensity ascertained and delivered to DRC

Source: Author

The following conceptual relationship were identified based on the comparative case studies:

***Buyer-supplier relationship.*** In all cases, the buyer-supplier relationship exists, and as revealed section 5.5.1 of the AHP results comparison, the decision on flood relief items or component drives the procurement or purchasing managers to the procurement strategy and buyer-supplier relationship. In this instance, within DSW organisations revealed a preferred supplier for pre-positioning purposes using competitive bid procurement method, whilst transactional buyer-supplier relationship was practised using EPFA procurement strategy for DRCs. However, the use of FA was observed for NADMA-FAMA collaboration and a single DSW state practise in east coast of WM, although the former is based on strategic supplier relationship and the latter was based on preferred supplier category.

***The use of FA.*** The analysis revealed that the regional DSW organisations evidentially used de-centralised FA or EPFA with predicted characteristics of fixed price or price range in most cases, with no-limit order quantity although short-termed in nature and covered district geographical area. Moreover, cases comparison with NADMA-FAMA collaboration also revealed the used of FA in centralised operations similar to term of fixed price that was no limit in order quantity. However, the FA was on longer term and covered larger geographical coverage for all flood prone states.

***Buyer-supplier collaboration.*** In addition to the buyer-supplier relational observation, the analysis also observed of collaboration between DSW as buyer and its supplier, and NADMA as buyer and FAMA as the supplier. Two collaboration efforts with varying degree was noted in sharing of information which resulted a minimal level of capacity reserving for supply for relief activity. Arguably, the relational type corresponds to the level, as well as stages of disaster, for information sharing between the buyer and supplier, and this in addition to the internal regulatory reservation on revealing information to third party observed by DSW as the buyer. In contrast, NADMA and FAMA are both governmental agencies that are not largely influenced by the regulation, and both enjoyed better information sharing which led to desirable reserve capacity engagement.

***Contingency response.*** Similarity was noted in the pattern of contingency response mechanism, minimal order for FOB and adequate quantity order for DRC fulfilment once intensity in east coast WM DSW cases and NADMA-FAMA collaboration. However, the variation differs in the procurement method as the former uses competitive bid with EPFA continuation, whereas the latter uses FA for all stages of order.

***Lean and agile outcome.*** Both within case and case-by-case analysis revealed an association to a lean and agile outcome. However, the mechanism of procurement differs as lean was promoted in DSW through minimal order with contractual price for FOB, and fixed price order for DRC. Whilst lean in NADMA-FAMA collaboration was based on minimal order a fixed priced for FA. Having said that, both case orders were based on prediction or forecasting, and quality was ascertained to be good which contributed to the outcome. Both cases shared similar profiles on agility, especially on delivery time through own or outsourced. Similarly, on flexibility of item volumes to

demand volatility, NADMA-FAMA collaboration shows greater flexibility traits of modifications. In addition to postponement, de-coupling point was demonstrated in the east coast DSW cases, and in fact better reflected in the NADMA-FAMA collaboration. In addition to these, in the case of DSWs in the region of Northern, Central, and Southern WM, agility outcome was observed to be superior to leanness, although both traits were visible.

## **5.6 Results of Corroborating Theoretical Associations**

### **5.6.1 Introduction**

This section illustrates the results of concept linkages which show association between the concepts of FA or EFPAs, buyer-supplier relationship, lean and agile or leagile to the underpinning theories of CT, SET and TCA based on *Atlas.ti* network diagram. Hence, the goal of this section: firstly, is to sharpen the construct by way of refining the definition, and building evidence measure; and secondly, verifying the emergent relationship between constructs fits the evidence in each case or searching evidence for the ‘why’ behind the relationship. Both steps arguably known to build internal validity.

### **5.6.2 Network View Results for Theoretical Associations**

As shown in Figure 5.29, this study was able to illustrate the linkages between constructs, concepts and the foundational theories. Firstly, the linkages shown in reflects codes derived from the concepts and theories under study. Generically, the network link displays a graphical representation of a semantic type linking between codes to codes also referred as first-class relations or strong-link, and, for second-class relationship or weak-link is in between memos and quotations, codes and quotation, and memos to memos. The second-class linkages represent evidential or specific meanings whilst the first-class relationships indicate the findings and the transitive relations of the respective RQs. While, the first-class relationships show the findings as well as the transitive relations, in other words, the answers to the respective RQs.

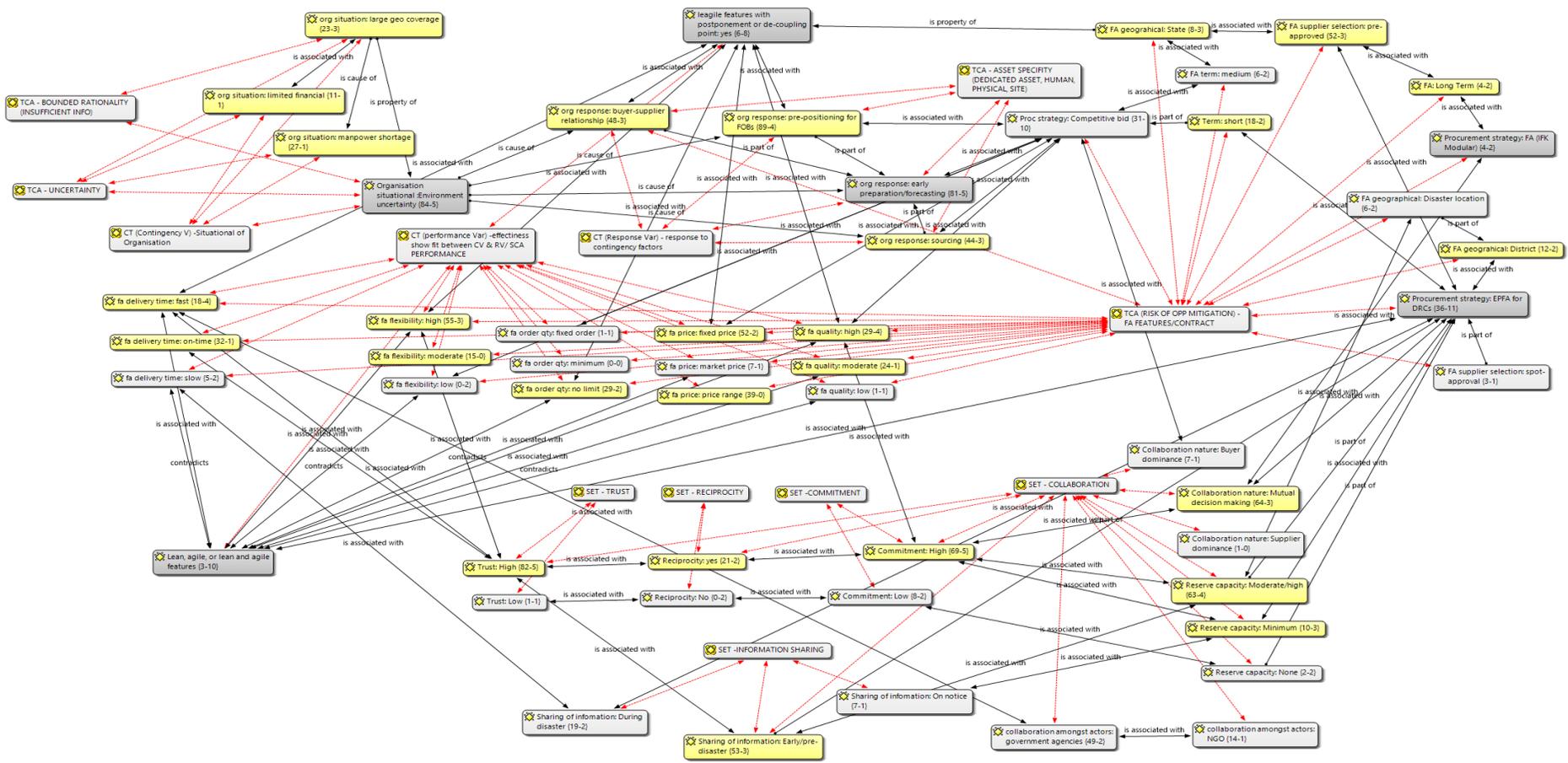


Figure 5. 29: Network View of Concepts and Theories Linkages

Source: Author

Secondly, this study adopts to the format used by Friese (2014) to discuss the findings comprises explanation of the major categories, showing the major findings, bringing the data life by showing illustration to the results, and, if necessary, supporting with research question memos. In addition to this, it is important to note that the graphical view does not attempt to show quotations as evidence as the codes used contain specific properties and dimensions (Corbin and Strauss 2008, 2015) and the strength is reflected in the grounded-ness and density counts, as shown the bracket ratio format. This is also exhibited in the perspective tabulation and graphs for each case study as displayed in Appendix 4.4, Table 1 and Figure 1, and, Table 2 and Figure 2.

Based on the voluminous links in Figure 5.30, the categories comprise theories: firstly, CT, with constructs of organisation situations, responses and performance; secondly, TCA, the constructs namely are bounded rationality, uncertainty, and risk of opportunity/mitigation; and thirdly, SET, represented by constructs of collaboration, information sharing commitment, trust, and reciprocity. The red lines represent links between the category to its constructs, and from constructs to codes, each with its property and dimensions. Next, the black lines represent the connection between the codes, which can be seen, run across categories and concepts such as FA and EPFA, and, lean and/or agile, leagile (with postponement/de-coupling point features).

The network view show major findings on the following complementary perspective: firstly, linkages between TCA constructs uncertainty to CT constructs of contingency variable of organisation situation on flood occurrence which includes environment uncertainty, large geographical coverage area, limited financial, and manpower shortage; secondly, linkage between TCA's construct bounded rationality with regards to insufficient information to CT's construct of organisational situation on environment uncertainty and the large geographical coverage; thirdly CT's construct of organisation response to contingency variable through buyer supplier relationship is linked to TCA's construct as asset specificity, and TCA's to construct to mitigate risk of opportunistic behaviour through FA characteristic for supplier selection, procurement strategy, geographical coverage, and terms; fourthly, CT's organisation's response to contingency factors through buyer-supplier relationship, pre-positioning

for FOBs, early preparation and forecasting, and sourcing requires TCA’s constructs of asset’s specificity which includes dedicated asset, human, physical, and site.

Fifthly, TCA’s construct of risk of opportunism behaviour mitigation through FA features cost, quality, flexibility and timeliness complements the CT’s constructs of performance, gauging the fit between contingency variable to response variable, and this is further complemented with concept of lean, agile or lean and agile; sixthly, SET’s constructs of collaboration, commitment, trust and reciprocity is associated to CT’s performance variable, TCA’s risk of opportunistic behaviour mitigation construct, and, lean and agile concepts; seventhly, SET’s constructs of collaboration, commitment, trust and reciprocity to procurement concept of EPFA and FA, as the procurement strategy adopted; and eighthly, TCA’s risk of opportunity or mitigation through procurement strategy of EPFA, and FA, to lean, agile, and, lean and agile or leagile features with postponement and de-coupling points. Table 5.42 shows the details of linkages of the complementary theories, constructs, concepts and the elements.

Table 5.42: Tabulated Evidence for Complementary Theories, Constructs and Elements of the Study

<b>Complementing/Contingent/Intersection Perspective</b>	<b>Constructs</b>	<b>Elements/Evidence</b>
Intersection of TCA and CT (Contingency)	TCA - Bounded rationality	Uncertainty due to environment (flood uncertainty), insufficient information
	CT - Contingency variable	Organisational situation dealing with environment uncertainty, large geographical coverage, limited financial & manpower shortage
TCA, SET contingent on CT (Response)	CT - Response variable	FA, buyer-supplier relationship, pre-positioning for FOB’s, early preparation/forecasting, and sourcing
	TCA - Asset specificity	Dedicated asset, human, physical and site for buyer-supplier relationship
	TCA - Mitigate risk of opportunism	FA characteristics (supplier selection, procurement strategy, geographical coverage & term)
	SET - Collaboration	Information sharing, commitment, trust, reciprocity

<b>Complementing/Contingent/Intersection Perspective</b>	<b>Constructs</b>	<b>Elements/Evidence</b>
TCA, SET causal for CT (Performance)	TCA - Mitigate risk of opportunism	Through FA features cost, quality, flexibility and timeliness
	SET - Collaboration	Information sharing, commitment, trust, reciprocity
	CT – Performance variable	Fit between contingency and response based on FA for outcome of Lean and agile, or Leagile (postponement/de-coupling points)

Source: Author

Based on the summary in Table 5.42 and a closer look of the corresponding Figure 5.30 and the perspective as captured in Appendix 4.4, Figures 1 and 2 respectively, TCA's construct on mitigating risk of opportunism by using FA characters and features underpin the core of the complementary theorisation perspective for this study. This is accentuated by the high response rate of both corresponding HRO's as exhibited in Appendix 4.4, Tables 1 to 2. Equally important to note is that for CT performance variable, which is the fit between organisation situation and the response taken, requires measurement of the FA or EPFA adopted, in order to scrutinise lean, agile and leagile SCM performance. To grasp a better understanding, this study examines the diagram based on the upper and lower sphere from the TCA's mitigation of risk opportunism construct. Firstly, based on the upper sphere, it could be articulated that based on the flooding uncertainty, actors of the relief activity encumber insufficient information of the magnitude of the possible area affected which is aggravated by the HRO's financial limitation and manpower scarcity.

Hence, the response adopted by the HRO procurement strategy FA characters as shown in the upper part of the network view in Figure 5.30, takes into consideration of the asset specificity of the assets (logistics capability, financial position), human (manpower for deployment and administration) and site (large geographical coverage). A pre-disaster response centred on early preparations is adopted which includes forecasting, fostering buyer-supplier relationship, sourcing and pre-positioning for FOBs. With the objective of ensuring continuous supplies during flood relief, HROs rely on forecasting (provided based on third party agencies dealing in flood predictions

and past year experiences) source out reliable suppliers using FA as well as competitive bids procedures for pre-positioning of stocks in FOBs. Innately, the decision for sourcing and the suppliers engaged are based on the type, stage of disaster and criticality of the required items during flood relief activity.

As has been noted, emphasis is given on food items, the most critical items, and as a result, are the only items that HROs in both case studies are strong-willed for FA based procurement to ensure supply continuity. Arguably, for FOBs pre-positioning purposes, HROs dealing with trading suppliers perform competitive bids, and in-contrast, HROs that deals with suppliers with manufacturing ability, opt for FA and long-term relationship. The benefits of the latter are as demonstrated in case study 2 is numerous, including stable cost during volatility, quality and returnable policy, high flexibility on volumes and pre-positioning on supplier's premise, and, timeliness of supplies throughout a large geographical coverage. Besides achieving lean and agile, leagile features with de-coupling point were apparent in this case study. Nonetheless, HROs which adapted a version of FA or EPFA also benefitted on continued supply and achieving greater agility especially in the food supplies in DRCs. Even though these HROs encountered glitches, they professed improvements on external, managerial and policy, which will be expounded in the conclusion chapter.

Secondly, by examining the lower sphere to TCA (mitigating risk of opportunism) and CT (performance variable), originating from the CT response variable is the buyer-supplier relationship. Using initiative of collaborative FA, HROs used FA as well as EPFA to rouse SET's construct of collaboration through information sharing to achieve trusts and commitment, while anticipating reciprocity in terms of longer relationship and prompt payment, as outcome. It could be advocated that HROs and suppliers with FA engagement on a horizontal and mutual decision making attained greater collaboration on information sharing, thereby benefitted from supplier's high commitment on reserving capacity. This resulted in high trust, placed by HROs on the supplier for greater delivery. Equally important to note, leagile features are demonstrated under this arrangement, in which using forecasting, suppliers produced and place food items (in modular form) in FOBs. As a first response to the flood occurrence, the postponed modular is mobilised to the DRCs. On de-coupling point, once the intensity of flood is ascertained, production and packaging were made on postponed materials at the supplier's operational centres and delivered to the

determined DRCs or outsourced to third party strategic partners for delivery in geographical challenging locations.

In contrast, for HROs and trading based suppliers adopting to EPFA procurement strategy, it could be argued that there are two outcomes to the collaboration: The first outcome is involving established large suppliers, and group of suppliers with track record for particular geographical location, an almost parallel collaboration, information sharing and reserve capacity to FA strategy were observed with high commitment and trust for on-time supply. Delivery were often done by the HROs or its strategic partners, although in some cases, suppliers with transportation capability also consigns. The second outcome is concerning small suppliers with new track record, the collaboration effort between the buyer and the suppliers appear to be truncated with minimal early sharing of information on disaster possibility, minimal to almost not at all reserving of capacity by suppliers hence suggesting a low sense of trust and commitment in the collaborations. In addition to these two observations, it is also noted that, HRO's adoption of the EPFA procurement strategy prioritised on SCM agility although uniquely accomplishing leanness through fixed-price or price-range mechanism with standard quality specifications.

In the final analysis, the case studies demonstrate that using TCA construct (mitigating risk of opportunism), CT's performance variable and SET's construct of collaboration, the complementing use of these theories for the most part explains that the procurement strategy of FA/EPFA could be utilised as possibly measurement tool in SCM of disaster relief. This measurement is represented by SCM concepts of lean (cost, quality) and agile (flexibility, time). In addition to this, it is noted that the hybrids of lean and agility, or leagility concepts are visible and possible identification could be established in the supply process, as exhibited in the case studies. Hence, in summation, the results of the study support complementing theory perspective in explaining one view point of disaster relief, focusing on food supplies SCM in flood relief activity involving civil service as the direct corresponding actors.

## 5.7 Chapter Summary

The data collection and analysis structure presented in this chapter support the preliminary proposition and theory generation of this study, which was drawn from prior research. Starting from the research design, this study attempted to demonstrate how the data collected and subsequent analysis link to the findings in a coherent way. Whilst progressing this attempt, quality of the research was notably given serious considerations, in which data collection and analysis were made to adhere to the validity and reliability test, as proposed for case study design studies. In addition, while analysing the data, within-case analysis reveals familiarity, while cross-case patterns unfold beyond the initial impression seen through multiple lenses. As the study is informed by the theory, analytical generalisation based on the study's complementary theory perspective were compared with the empirical, and as a result, replication logic was observed in cross case synthesis, at the same time, the within cases reveal similar results with interesting contrast on particular cases. As a step-in building theory, this study also shows the iterative tabulation of evidence for sharpening the constructs and demonstrating the evidence behind the emergent relationship. The outcomes of this chapter are as follows:

*RQ1: The positioning of food item variants (modular and non-modular) in lean, agile and leagile quadrant of the lean and agile purchasing portfolio model.*

*RQ2: The association between concepts of FA, buyer-supplier collaboration, contingency response, and agile/leagile.*

*RQ3: Challenges of FA implementations includes red-tapes, threat of large-scale disaster, price hikes due to external factors, and late payment issues that has an impact on trust. Improvement suggestions are directed towards managerial and policy changes.*

Henceforth, the findings from this Chapter will be discussed for theory development in the next chapter.

## CHAPTER 6: DISCUSSION

### 6.1 Introduction

An important attribute of theory building is comparing the emergent concepts, theory or proposition to extant literature. For example, under the pre-text of enfolding literature, Eisehardt (1989) argues that comparing with similar literature sharpens generalisability, improves construct definition, and raises theoretical level, whilst if comparison are made with conflicting literature, the results could possibly build internal validity by not ignoring conflicting findings at the same time harnessing the equal benefit from similar literature comparison. In addition to this, the author argues that conflicting literature may represent an opportunity or juxtaposition of the results may force researchers into create thinking for deeper insight of emergent theory as well as sharpening the limit of generalizability of the research. In terms of generalisability, Yin (2014) contends that analytical generalisability should not just be confined to abstract theory building but should represent a conceptual level higher than that of a specific case. Hence, the discussion of the findings results will be based on the derived model and conceptual framework, its key constructs, phases and propositions. Next, the discussion will establish linkages and explanation on how existing literature on the phenomenon corroborate or differ from the derived mode. To establish the relationship of the concepts, the core proposition is revisited as follows:

*HROs prefer using FA instead of contracts, to secure food supplies based on buyer-supplier relationship, and this is believed to be more efficient and effective in the supply chain.*

#### 6.1.1 Confirming Food Variants' Purchasing and Supplier Strategy

**Key findings 1:** *The positioning of the variant of food items in lean, agile and leagile quadrant of the lean and agile purchasing portfolio model.*

The AHP analysis employing the lean and agile purchasing portfolio model concerns the positioning of food items in the respective quadrants. As exhibited by the two case studies as elaborated in sections 5.4.1 and 5.5.1 respectively, the relief items consist of food, hygiene kits, clothes, sleeping aid, and tent/partition. When measured using

the AHP analysis, the findings revealed that non-food items are positioned as lean item whereas variant of food items are placed in the following quadrants: (1) lean, includes modular (dry food, bottled water) for pre-positioning in FOB to be used for DRC, and, remote/inaccessible areas; (2) agile, cooked meal or fresh raw food for DRC; and (3) Leagile, IFK modular consisting instant food items provided to all DRCs.

The positioning of these variant food items reflects the classification of products on the impact of each relief items based four competitive priorities comprising the cost, quality, time and flexibility. From the findings, the classification of the variants for humanitarian aid food items extends the limitation as highlighted in section 2.3.5 on generalising the lean and agile purchasing portfolio model in two conceivable ways: first, that products could be classified as functional or innovative (captures the original foundation by Fisher 1997) to determine their suitability for lean and agile supply; and second, on the methodology of adapting comparative case study method to demonstrate how different type of product type requires different purchasing strategy; and third, on procedural of the AHP method to position purchased component into the model based on the four competitive priorities of cost, quality, flexibility and time.

Firstly, Fisher (1997) argued on the limitation in Kraljic's dimensional approach, and the right supply chain for the product is based to types: (1) functional product, characterised by stable demand, long life cycle, production driver based on forecast, low variety, and of standard components; and (2) innovative products typify for volatile/unpredictable demand, short life cycle, production driver based on demand/customer order, high variety, and, comprise of standard and specific component. As shown in section 5.5.2, modular food (dry food) for pre-positioning in the FOB and for prolonged flood condition in accessible areas fits the categorisation of functional product for humanitarian aid.

The items consist dry food items such as rice, sugar, salt, instant noodle, biscuits, canned food, cooking oil and water bottled. These items ruminates: (1) long life cycles (usually up to 6 months to two years) with exceptional of rice packets that could last up to two to three months; (2) low variety of standard component products or food relief items; and (3) the demands are forecasted during pre-disaster period. Due to a degree of predictability of the monsoon seasons, the relief organisations' operational requirement deemed sufficient 2 months in advance for pre-positioning, and the rice

expiry period, these items are stored at the forward operating bases approximately one or two months earlier before the predicted flood occurrence.

Meanwhile for functional product, the case study reveals that food supplies for DRCs consisting fresh food for cooking purposes, and packed meal, resembles an innovative product characteristics: (1) product life cycle is short (usually less than a week); (2) high variety of standard and specific component products or food relief items; and (3) the demands are unpredictable based on the volatility of number of victims at the DRCs. For this reason, this specific humanitarian aid category of food items resembles an innovative product which is more suited for agile supply with demand-driven planning to deal with their unpredictability.

Comparatively, the IFK modular relief items consist 15 SKUs instant based meal is uniquely placed in leagile quadrant which represents high in both leanness and agility of the product. By characteristic, the IFK modular and the SKUs are relief items such biscuits, porridge, noodles, anchovy paste, mixed coffee, mixed oats, jam, canned sardines, bottled mineral water, plastic spoon and fork that are stored into a plastic container. Hence, the IFK modular resembles an innovative product in which the product life cycle is long (ranges from one to two years), also shows innovative characteristics as the item differs in terms demands (both forecasted and demand-driven), and high variety of standard and specific component products or food relief items. This due to the fact that some of the SKUs may be replaced based on expiry of existing product and availability of alternatives. This condition is consistent with previous study's finding that a typical customised product, approximately 80% of components are standard while 20 per cent are specifically designed (Barker 2001).

Hence, this study expands the notion that functional product are suited to lean supply, which aims to provide low cost (specifically benefitting from low pricing) and quality, and achievable in humanitarian context through standard modular food items for humanitarian aid (Christopher and Towill 2000; Mason-Jones, Naylor and Towill 2000; Jahre and Fabbe-Costes 2015a). Equally important, this study highlights that for an 'innovative' relief items comprising of modular base food items for pre-positioning purposes, and non-food items such hygiene kit, clothes, sleeping aid and tent/partitions, the relief organisation had utilised competitive bidding as the chosen procurement method. For the most part, the finding of this study supports that standard

components or leverage relief items correspond to functional products that are suited to lean supply, while specific components bottleneck relief items relate to innovative products so they are suited to agile supply. As a matter of fact, this study also accentuates that strategic products or relief items harness the benefit of an innovative product in agility coupled with features of high leanness, supporting the work of authors (Lo and Power 2010; Drake, Lee and Hussain 2013) and expanding it to humanitarian aid food items.

Based on both case studies conducted, the second key finding of this study support that FA approach is desired by the purchasing officers in both government organisations of the country under study dealing in humanitarian aid, as oppose to an incentive contract. The reason as stated in section 5.5.2 was due to the fact that FA provides the flexibility that is required in a contingency responsiveness during humanitarian aid operations. For example, the NADMA-FAMA collaboration reliance on the use of FA in the form of arrangement within G2G framework with the FA features: (1) fixed pricing of the IFK modular item at RM70 per box, (2) the FA stands and has been in used since 2015, making it within the intended framework time, (3) pre-approved supplier, based on NADMA's explanation on the Malaysian Cabinet approval, and (4) the unspecified amount of products over a specified period, arguably the cycle of the yearly monsoon period. The feature fits the definition provided by CIPS (2015) as an arrangement for the procurement of unspecified amount of product over a specified time as compared to a framework contracts, which is a commitment of buying at least a certain volume of certain goods.

As discussed previously under section 5.5.1, the lean and agile purchasing portfolio results in positioning the three different types of food items for humanitarian aid which corresponds to the purchasing thrust and strategy, and the type of relationship sought with the supplier. The case study demonstrates that each food items requires the purchasing official of the relief organization to apply different purchasing strategy and supplier strategy. For example, food items for pre-positioning purposes require an *ex-ante* preparation to leverage on cost savings as well quality, apparent is the east coast region of West Malaysia for the use of DRCs and remote area. On the other hand, for food items for DRC (as the victims are occupying the DRCs, the east coast region of

West Malaysia will use the prepositioning stocks and will move on to use the EPFA for raw food supply.

In contrast, the other four regions which do not pre-position at FOBs will utilise the EPFA on *post-ante* response to secure fresh and raw food supplies for cooperative cooking or packed meal for DRCs. Hence, the buyer-supplier relationship was based on transactional supplier for agility, however as leanness is also desired, the role of EPFA evidently becomes important. Next, on the IFK modular, a strategic supplier relationship is desired as the objective of the buyer in this context is to create mutual commitment from a middle-term to long-term relationship for the continuous supply of the modular items, harnessing the full benefits of cost containment, quality assurance, volume and modification flexibility, and reliable as well as on-time delivery besides the advantage of speed of development of the food items.

Hence, the FA in the context was used for a modular product. Therefore, this study also confirms to arguments by authors (Holweg 2005; Fabbe-Costes and Jahre 2009; Jahre and Fabbe-Costes 2015a) that the generic nature of being responsiveness is based on standard and modularity for agility. However, a slight variation is presented by this study which says the standard modular items could be customised based on demand entry and in its individual entry of the respective items into a modular box for humanitarian aid. As suggested by the explanations from NADMA-FAMA case study, the individual product entry consists of the respective SKUs

This study however acknowledges that FA and EPFA is quite distinctive in the context humanitarian aid in the country: firstly in terms of power distribution, FA is a centralised arrangement between G2G whereas the EPFA is decentralised in which state agencies passed on powers to its district branches to engage with its suppliers under the supervision of the district management committee; secondly, the coverage of geographical area in which EPFA comprises single to few suppliers covering a single district or a remote inaccessible flood prone area and this differs for FA which covers the whole country's flood prone area by a single supplier with manufacturing ability; thirdly on the nature of food items, the EPFA consist raw or fresh food and packed meals which has short life cycles and require to be consumed immediately, while the FA consist of instant food products in modular form with long life cycles

and could be used by victims at their disposal; fourthly, returnable policy by the FA supplier which are not feasible to implemented under EPFA; and lastly, as will be discussed in the next section, FA involves *ex-ante* and *post-ante* leagile supply with de-coupling point whilst the EPFA operates on *post-ante* agile responsiveness.

However, arguably EPFA too inherits lean and agile where leanness is made through its features of fixed or price range and quality assurance, both made possible by the dyadic relationships between buyer-supplier during pre-disaster arrangement. When compared to the seminal work by Balcik and Ak (2014), this study offers somewhat different perspective by offering EPFA and FA in the form of arrangements with no commitment to minimum quantity as compared to quantity flexible contract, which requires the relief organization to purchase minimum total quantity over an agreement and horizon. The EPFA arrangement on high impact area is softened by price range arrangement on the volatility of demand against supplier's sourcing activity that could be affected due to inaccessibility of supplies to the area. Also, as EPFA involves within district arrangement with third party support of delivery, supplier term is minimal for lead times and prices for delivery of such geographical coverages. The same could also be said about the FA, as the suppliers agree to cover large geographical area under the arrangement with no additional cost due to G2G arrangement and the "1 Malaysia 1 price" policy by the government.

Based on the findings on the positioning of relief supplies items on the lean and agile purchasing portfolio model and the discussion thereon, this study presents a modified version of Kraljic's expanded matrix (Kraljic 1983; Tate 2014) of purchasing product portfolio and supplier portfolio for humanitarian aid relief supplies narrowing to food supplies. Figure 6.1 shows the overall positioning of purchasing strategy for humanitarian aid supplies items based on its lean, agile, leagile characteristics and the corresponding categorisation of commodity, and the relationship strategy of the relief organisation for the four types of suppliers. However, as food items variants fall onto three categories namely leverage commodity – preferred supplier, bottleneck commodity – transactional supplier, and strategic commodity – strategic supplier, this section focuses further the discussion based on its relevancy.

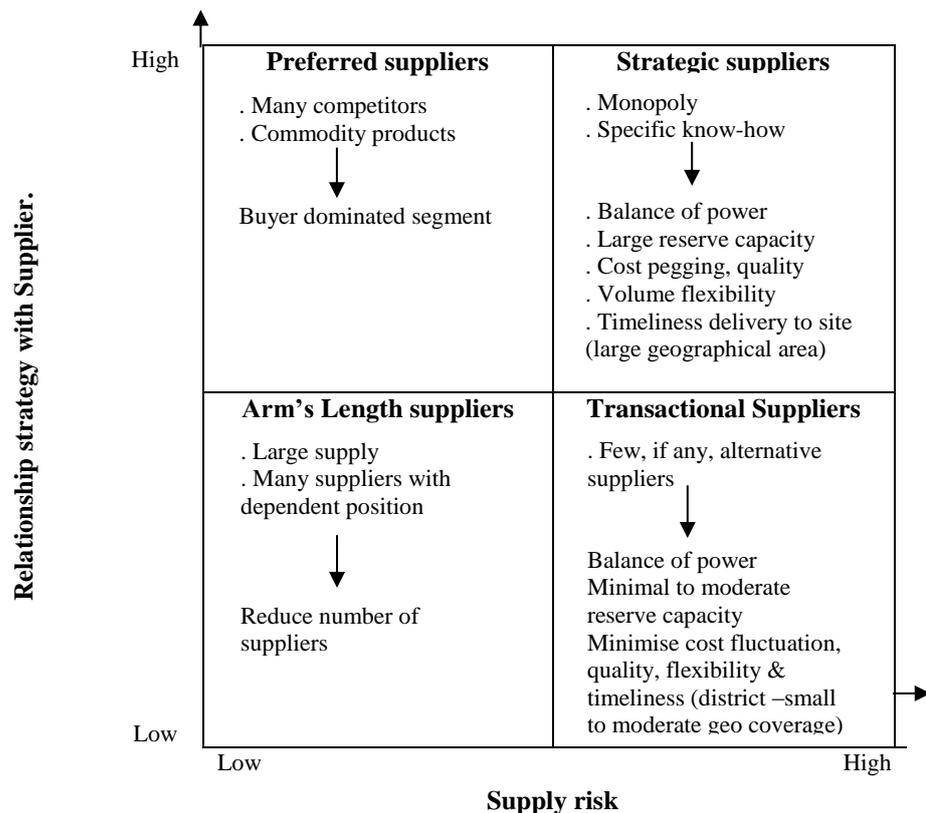
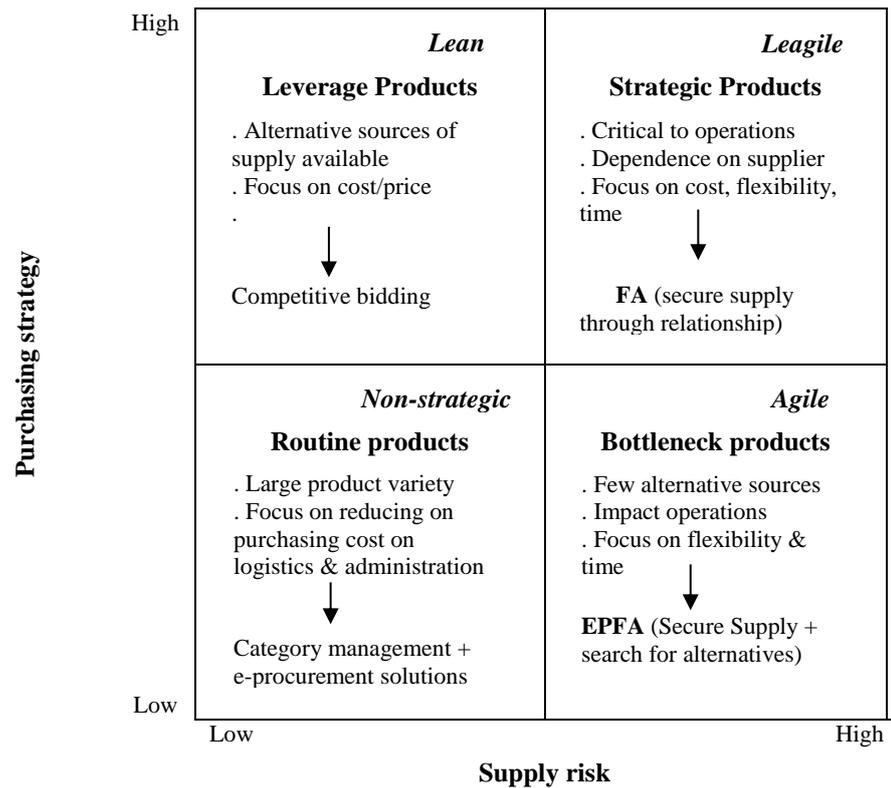


Figure 6. 1: Purchasing Product Portfolio and Supplier Portfolio for Humanitarian Food-Aid

Source: Adapted from Tate 2014

### **Purchasing strategy and supplier strategy for leverage commodity**

The primary concern of the purchasing team of a humanitarian organisation on leverage commodity is the pre-positioning purposes at the respective FOBs or remote and inaccessible areas. As pre-positioning is made possible during pre-disaster stage, arguably there is only minimal pressing time concerns. The goal is to reduce cost and ensure quality by leveraging on both volume and spend, as well as to create a more competitive environment achieved through the competitive bidding process and contracts. In addition, although this is a buyer dominated segment, collaborative efforts between buyer-supplier is possible in improving processes for example concerning delivery time, routing and place. However, the collaborative efforts are limited to the contract obligation and this reduces flexibility during humanitarian activity.

### **Purchasing strategy and supplier strategy for bottleneck commodity**

As demonstrated in the case study involving food supplies for DRCs which consist raw/fresh food for cooperative cooking and packed meals for the victims, these food items are categorised as bottleneck commodities. This commodity in the context of humanitarian is important to the operations and is difficult to obtain during disaster relief mainly due to three factors: (1) demand that exceeds the supply; (2) slow replenishment factor due to inaccessibility inwards the supply premise; and (3) suppliers themselves are affected by the on-set disaster. As item in this category are required in large quantity, on seasonal basis and might be a one-time purchase, a transactional relationship between buyer-suppliers is desired and, in some business, cases are based on short-term contract.

However, as highlighted in the findings of the case studies, flood occurrence is a yearly phenomenon due to the monsoon seasons, nonetheless is unpredictable in its intensity and on-sets. In addition, it is also noted that humanitarian organization that employs EPFA deals with either single or a few suppliers in the districts. Equally important, the behaviour pattern of the unit of analysis appears to support that the same supplier may occupy two different categories of matrix in in different horizons. For example, in the case of East Coast Malaysia DWS and for remote areas, the buying organization utilises the same supplier for: (1) before disaster occurrence, purchases for pre-positioning purposes; and (2) during disaster for purchases of food supplies for DRC.

Although this may be true, in majority of the cases are utilising EFPA, the single or few suppliers at the districts are appointed to supply for DRC, in other words as transactional suppliers. In essence, the EFPA in this case is for the humanitarian organization to secure supply while leveraging on flexibility of not committing to any specified quantity amount over a horizon.

### **Purchasing strategy and supplier strategy for strategic commodity**

For a strategic commodity, the idea is to develop suppliers' capabilities and increase the role of suppliers in processes improvements and new product development (Tate 2014). In the same fashion, a humanitarian buying organization views a supplier in this category as strategic supplier or an important supplier, and it is vital that exposure to risk such as disruptions are minimized through relationship management. To enumerate, NADMA-FAMA collaboration for continuous improvement process to optimise packaging of SKUs in the modular, forecasting for reserve capacity or pre-positioning, distribution structure and delivery, and inter-agency communications for responses could be aligned with intended idea of developing supplier's capability and reducing risk of disruption during crises. For this reason, the FA employed is regarded as basis of a deeper collaboration between the buyer and seller in this case. This effect resulted in the agreed price of RM70 per box, quantity flexibility, increased supplier reserve-capacity, and timely delivery.

The segmentation of the commodities under discussion enables purchasing team of a humanitarian organization to better understand how important the items are to its operations, and hence are able to propose suitable strategy for managing the variants of food supplies and the associated supplier relationships. It is imperative to note that classification within quadrant is company-specific, and that it is not a none size-fits-all strategy as pointed by Tate (2014). As such, the commodities placement differs between companies based on its item's criticality to its operations. In relation, arguably the same applies in humanitarian aid as demonstrated by this study that food supplies are perceived as more critical than non-food supplies in terms of purchasing strategy. Moreover, within the variant of food supplies, food items for pre-positioning purposes are regarded as less critical by the purchasing manager as compared to raw food

supplies or packed food for DRC, as evident from the case study. This answer RQ1 as follows:

*How existing procurements strategies impact on the competitive priorities (lean [cost and quality] and agile [time & flexibility]) at component level and how does this lead to buyer-supplier relationship tendency?*

The relationship is stated more succinctly:

P1- Decentralized HROs leverages through competitive bidding on preferred supplier for leanness on food modular for pre-positioning purposes, and moves to relational procurement mechanism as EPFA with transactional supplier (sometimes the same preferred supplier) for agility to cater for volatility in demand of standard modular and additional material for cooking and pre-packed meals; while (b) centralized HRO focuses more on standard modular leveraging on unilateral lean and agility supply chain through strategic partnership with strategic supplier.

Therefore, the relationship established between procurement trust and buyer-supplier relationship on what is observed in the literatures matches the predicted outcome of the sub-proposition that HROs adopts the right procurement strategy for each relief items based on its criticality during environmental uncertainty.

### **6.1.2 Confirming Constructs and Relationship of Conceptual Framework**

*Key findings 2: The association between concepts of FA, buyer-supplier collaboration, contingency response, and leagile*

Correspondingly, based on both the case studies performed, the key findings with regards to the conceptual framework concerns: firstly, the confirmation of the concepts/constructs namely FA, buyer-supplier collaboration, contingency response and lean, agile and leagile as performance measurement and indicator; and secondly, with regards to the links between these concepts. To enumerate, the findings are based on case studies that this research opines to have rich empirical descriptions based on triangulation of data, a theory building approach as advocated by scholars (Yin 1994; Eisenhardt and Graebner 2007). As can be seen from the final analysis in Chapter 4,

by employing within-case analysis on five regions' subject of the same organization, the DSW, the study was able to exploit replication logics, both literal and theoretical replications, intended for preliminary theory generation and confirmation (Yin 2014; Eisenhardt 1989b). Next, a cross case pattern search performed between DSW and NADMA-FAMA discovered collaborations for contrasting situations towards replication of predictable contrasting result but for predictable reason.

Firstly, concerning what Eisenhardt (1989b) terms as sharpening of constructs which based on two processes: (1) refining the definition of construct; and (2) building evidence which measures the construct in each case. Tabulated evidence of constructs of the three complementary theories was presented in section 5.6. Further deliberation is in section 6.3 on theory building. However, with regards to the abstract concepts of the study, the features of the concepts are clustered, associated and mutually reinforced. Hence although it appears to be smaller than a theory, nevertheless it helps to build a full one. For this study, each concept was measured using multiple source evidence, through an iterative process. According to Eisenhardt (1989b), this approach increases validity of the concepts/constructs. Hence, it could be argued that definition of the concepts such as FA, buyer-supplier collaboration, contingency response, and lean, agile or leagile, are an established concept from the existing literatures and the concept measures were further validated by this study through multi-source evidence which includes quantitative measures such as AHP, and qualitative source of evidence that includes field observations, semi-structured interviews and secondary data such as documents.

However, this study notes several iterations to the existing concept measurements. For instance, lean is measured through cost containment of the FA through fixed price and price range, while agility concepts include flexibility measures that includes volume flexibility of the relief supplies. Hence, this reduces the redundancy of including a separate flexibility concepts into that the conceptual framework, when compared to the seminal work of Jahre and Fabbe-Costes (2015a) that placed flexibility as an outcome for standards and modular. This study argues that to address uncertainties, flexibility is a strategy adopted by HROs for responsiveness (Gerwin 1993), and uncertainty could be addressed by enabling buyer-supplier collaboration (Overstreet et al. 2011; Burnes and New 1997). In addition, this study developed and included three new concepts which incorporates uncertainties of disaster occurrence and

intensity (information on disaster frequency, disaster scale/geographical area, disaster type), assessment of organisation situational characteristics (ability to cover large geographical area, manpower, financial position, coordination capability, decision making), and organisation response (mechanism includes fostering buyer-supplier relationships, forecasting, sourcing, pre-positioning and training).

Next this study works with regards to verifying the emergent relationship between the concepts through the logic of replications based on each case to confirm or disconfirm the preposition of the study. In addition, this study treats the multiple cases as analogous to multiple experiments, and as each case confirms to the emerging relationship, this enhances validity of the relationship as pointed by authors (Yin 1984; Eisenhardt 1989b). Meanwhile, disconfirming relationship may lead to emergent theory. Based on the summarised (derived from each case profile) and tabulated evidence as shown in Table 67, the multi experiment of HROs were treated as analogous. A replication logic as addressed earlier following Yin (2014) was employed for each case from the six case studies (representing in actual case subject of eight) based on the following premise that: (1) literal replication predicts similar results and evidence from multiple cases are more compelling and therefore more robust; and (2) theoretical replication predicts contrasting results but for anticipatable reasons.

Beside predictions, the analogous to that of six experiments also provides theoretical interest and substantial support to the initial proposition, when the entire pattern is formed based on substantial number of the aggregated cases. For example, in Table 6.1, six out of six cases support literal replication of the use FA, in its direct form or modified form of EPFA to the initial proposition. In this instance, NADMA-FAMA collaboration and East Coast WM DSW was the only cases that satisfied the initial proposition, whereas the DSW cases were contrasting cases presented for the study differing in its flood type and adopted response. For example, both northern and central region WM DSWs encounter possible annual flash flood, and these regions' response is not to hold any pre-positioning rather focus on buyer-supplier collaboration for the victims at DRC on a reactive response. Meanwhile, the Southern region WM and East Malaysia region shares similar pro-longed flooding covering large geographical area. However, as the flood recedes swiftly, pre-positioned were only focused for remote inaccessible areas such as islands inhabitants or indigenous settlement while for DRC, similar approach to the northern and central region WM DSWs were adopted.

Hence based on the replication logic of these cases, the evidence suggests of direct replication of initial propositions on two analogous case studies, the NADMA-FAMA collaboration and the East Coast WM DSWs, although in actual total there were 4 subject cases (three DSWs in East Coast WM). On understanding the “Why” the emergent relationships hold, this study’s qualitative data provides the understanding the underlying dynamics that both cases share similar profile: (1) handling pro-longed disaster i.e. floods; (2) large scale geographical coverage with potential victims in tenth of thousands, and in DSW cases it is worsened by river overflow; and (3) contingency response mechanism of pre-positioning in FOB. In contrast, the study also found contrasting relationship in the East Coast WM DSW cases, the upstream supply chain in which for pre-positioning purposes competitive bidding or in one particular subject case, a quantity flexible contract was performed.

Meanwhile for downstream supply chain, the FA was used in reactive response mechanism. Hence, it could be considered that the impact of the use of FA is based on a third-party variable such as the food variant that is based on its lifecycles as well as suitability for pro-longed disasters utilisations. For example, after three to some even 7 days, (depending on FOBs pre-positioned stocks), the HROs (sometimes influence by political will) decide to provide co-operative cooking for its victims which requires the purchase of raw and fresh food material. Therefore, the downstream processes in particular DSWs involves an agile process in which once the intensity and volatility in demand could be practically ascertained, the actual purchase is made using EPFA. In contrast, the NADMA-FAMA collaboration SCM visibility is direct as it only focuses on the modular items although customization of SKUs and order-to-make occurs at the de-coupling point and delivery thereafter. This confirms to similar observation that leagile SC orientation led information visibility and better involvement between partners, reduced order time and performance objective system (Gaudenzi and Christopher 2015). Hence, this pattern emergence provides clarity of sub-RQ2 questions as followings:

- i. How is leagile demonstrated?*
- ii. How is de-coupling point formed?*
- iii. How does leagile supply connect to contingency response?*

Similar evidence is also noticeable in the rest of the regions involving the DSWs in which EPFA were performed in reactive responses and hence brought about contrasting than predicted of the emergent relationship in the visibility of SC downstream. However, all four regions of the DSWs' operations namely Northern WM, Central WM, Southern WM and East Malaysia confirm to the proposition that the use of FA (in these cases referring to EPFA) led to more engagement at the façade of the buyer-supplier, and this led to SCM performance of lean and agile. The difference however is at the upstream variation where the Northern and Central states has different disaster relief uncertainties (the States are more prone to flash flood, smaller radius of geographical coverage) as compared to the Southern WM and East Malaysia region (these States receives are more prone to pro-longed flood and larger geographical coverage).

However, the response that was adopted was identical on all four regions where no pre-positioned for FOBs which was due to previous experience of wastages immaterialised prediction of disaster occurrences as well as less than expected quick receding flood waters. If any, the pre-positioned was focused on small numbers of difficult to reach places involving islands and inaccessible remote areas, where supplies were deemed adequate as the supplies were provided for longer period. Hence, it appears that there is high dependency of these regions on the FA during flooding occurrences, amounting to reactive responses. Nevertheless, the negative effect of reactive response such as price hikes due to demand volatility and inability to meet the sudden rise in quantity requirements are cushioned by the FA mechanism and the buyer-supplier relationship for reserve capacity. As such, this study argues that the understanding of this dynamics establishes the internal validity of the emergent relationship. In addition, the aggregated arguments also provide clarity for the specific sub-RQ2:

*How framework arrangement promotes buyer-supplier relationship and what is the impact?*

Table 6. 1: Tabulated Summary of Evidence for Humanitarian Aid Procurement and Supply Concepts and Constructs<sup>14</sup>

HRO	Uncertainty	HRO		FA/Contract	Supplier base	Buyer-supplier Collaborations	Contingency Response on FA/Contract	Lean and agile on FA/Contract	Replication Logic	Conformity to Proposition
		Situational Characteristics	Response							
DSW Northern WM	Disaster occurrence and Intensity	Flash flood, de-centralised district coverage and procurement.	Focus on relief centre and purchases at district level ( <i>post ante</i> )	FA (EP)	Few (small)	Information sharing (low), Supplier reserve capacity (none to minimum). Moderate level of trust, commitment, and reciprocal	No	Lean (high): Price fixed Quality Assurance  Agility (high): Volume flexibility Delivery on-time	Literal (FA to Lean & Agile) and theoretical (FA on reactive response)	FA as agility driver with lean traits
DSW Central WM	Disaster occurrence and Intensity	Flash flood, Annually, de-centralised district coverage and procurement.	Focus on relief centre and purchases at district level ( <i>post ante</i> )	FA (EP)	Few (small)	Information sharing (low), Supplier reserve capacity (none to minimum). Moderate level of trust, commitment, and reciprocal	No	Lean (high): Price fixed Quality Assurance  Agility (high): Volume flexibility Delivery on-time	Literal (FA to Lean & Agile) and theoretical (FA on reactive response)	FA as agility driver with lean traits
DSW Southern WM	Disaster occurrence and Intensity	Pro-longed flood, Annually, large geographical coverage including remote areas (Island), Manpower issue	Pre-positioning for remote areas, Focus on relief centre and purchases at district level ( <i>post ante</i> )	FA (EP)	Single (large)	Information sharing (High), Reserve capacity (Moderate), trust, commitment, and reciprocal (moderate)	No	Lean (high): Price fixed Quality Assurance  Agility (high): Volume flexibility and on-time Delivery	Literal (FA to Lean & Agile) and theoretical (FA on reactive response)	FA as agility driver with lean traits

<sup>14</sup> Adapted from case profile summary

DSW East Coast WM	Disaster occurrence and Intensity	Pro-longed flood, Annually, large geographical coverage including remote areas (Indigenous community), man power	Pre-positioning in FOB for DRC (3 to 7 days' supply) followed by post-ante purchases by district level.	FA (EP)	Few (large) on contract, few (small) on EFPA	Information sharing (High), Reserve capacity (moderate) High level of trust, commitment, and reciprocal	Yes, on competitive bidding (support from main warehouse and limited to modular) and continued with FA (EP), Yes on contract (quantity flexible contract) – single state case however also depends on district FA (EP).	Lean (high): Price fixed Quality Assurance  Agility (high): Volume flexibility Delivery on-time	Literal (FA to Lean & Agile) and theoretical (Quantity flexible contract on contingency response)	FA as Leagile driver, FA agility driver with lean traits, Contract as leagile driver (single case) however depending on FA at district
DSW East Malaysia	Disaster occurrence and Intensity	Pro-longed flood, large geographical coverage including remote areas (Indigenous community)	Pre-positioning for remote areas; Focus on relief centre and purchases at district level ( <i>post ante</i> )	FA (EP)	Few (Large and Small)	Information sharing (High), Reserve capacity (Moderate), trust, commitment, and reciprocal (moderate)	No	Lean (high): Price fixed Quality Assurance  Agility (high): Volume flexibility Delivery on-time	Literal (FA to Lean & Agile) and theoretical (FA on reactive response)	FA as agility driver with lean traits
NADMA-FAMA	Disaster occurrence and Intensity	Large geographical; 3 <sup>rd</sup> party directive and information dependent (H)	Pre-positioning and collaboration	FA (Modular)	Single (Very Large with manufacturing capability)	Highly collaborative on sharing information, reserve capacity (high), level of trust, commitment and reciprocal (high)	Yes, on FA. Continuous SC and triggers Decoupling point	Lean and agile (Leagile)	Literal	FA as leagile driver

Source: Author

## **FA as causal mechanism or agile (with lean traits), and leagile driver**

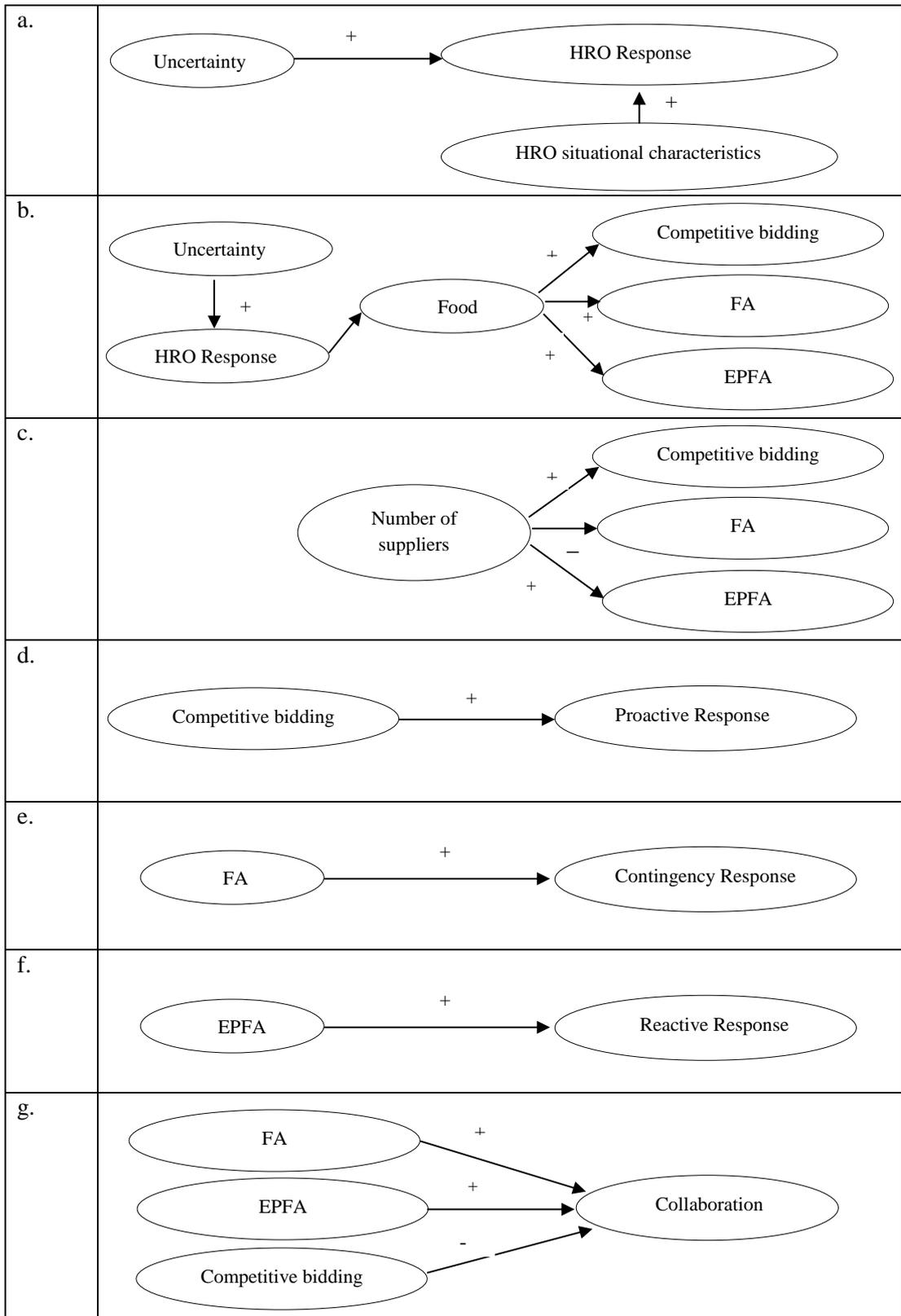
Given these points, this discussion continues in establishing FA as causal mechanism or agile (with lean traits), and leagile driver before the final representation of the refined conceptual framework for the study. For this purpose, this study adopts theoretical explanation approach by Neuman (2014) for the concepts associations following an adjusted order: (1) temporal order; (2) an association between phenomena; (3) specifying the mechanism in causal relationship; (4) eliminating alternative; and (5) outlining the causal chain. As this study has already addressed the prediction aspect based on replication logic and conformity to the proposition, the next level involves a logical arguments that tells why something takes form or occurs, in which connections among concepts were constructed. Neuman (2014) argues that a good explanation also predicts. In this sense and with the depicted theoretical lens and proposed conceptual framework, this study takes the causal form of explanation, more specifically a cause-effect relationship among concepts, and the how or why the causal process thrives.

### *Temporal order, association, and causal mechanism*

By definition, the temporal order refers to cause that must come earlier in time than an affect, association means a general idea of two phenomena that occur together in a patterned way, and causal mechanism is explained as an arrangement of opportunities or individual desires, which are more general than a particular opportunity or one desires (Neuman 2014, pg. 74 & 77). By the same token, the definition of causality requirement meets the initial conceptual framework of the study premised on the followings: (1) temporal order, relief items purchase requirement drove the extend of engagement of HRO-supplier relationship, and this led to lean and agile outcome; (2) association, the occurrence of buyer-supplier relationship is more likely related to the occasion of lean and agile or leagility in humanitarian aid; and (3) causal mechanism, the relationships of the predicted concepts of the proposed framework meets the requirement of more than two variables conditions of correlations (Hedstrom and Swedberg 1998). More succinctly, the FA was proposed as causal mechanism that connects: firstly, the input of relief requirements to outcome of buyer-supplier relationships; secondly, that connects the buyer-supplier relationship to contingency

response of the humanitarian aid supplies; and thirdly that connects the contingency response and occurrence of de-coupling point to the outcome of leagile.

Through the empirical evidence from the case studies, additional concepts were identified to be included and more explicit association of the phenomena could be better explained. By referring to the previous summary of evidence of the concepts in Table 6.2, each cause and effect concepts were able to be correlated by using the positive or negative relationship, in which the former refers to higher value of cause and goes with a higher value on the effect while the latter refers to a reversal relationship value of cause and effect. The breakdown of each cause and effect concepts relationships is expressed in Figure 6.2. With the exception of part (c) of the diagram, the rest represents the actual concept of the study, both new and the original concepts. To clarify, part (c) was included to reflect the relationship of the number of suppliers to the three procurement methods cited by this study. As exhibited in the diagram, there are nine cause and effect diagrams, from part (a) to (b), and (d) to (j). Detailed explanation is provided on the relationships between the concepts at the end of the diagram.



Source: Author

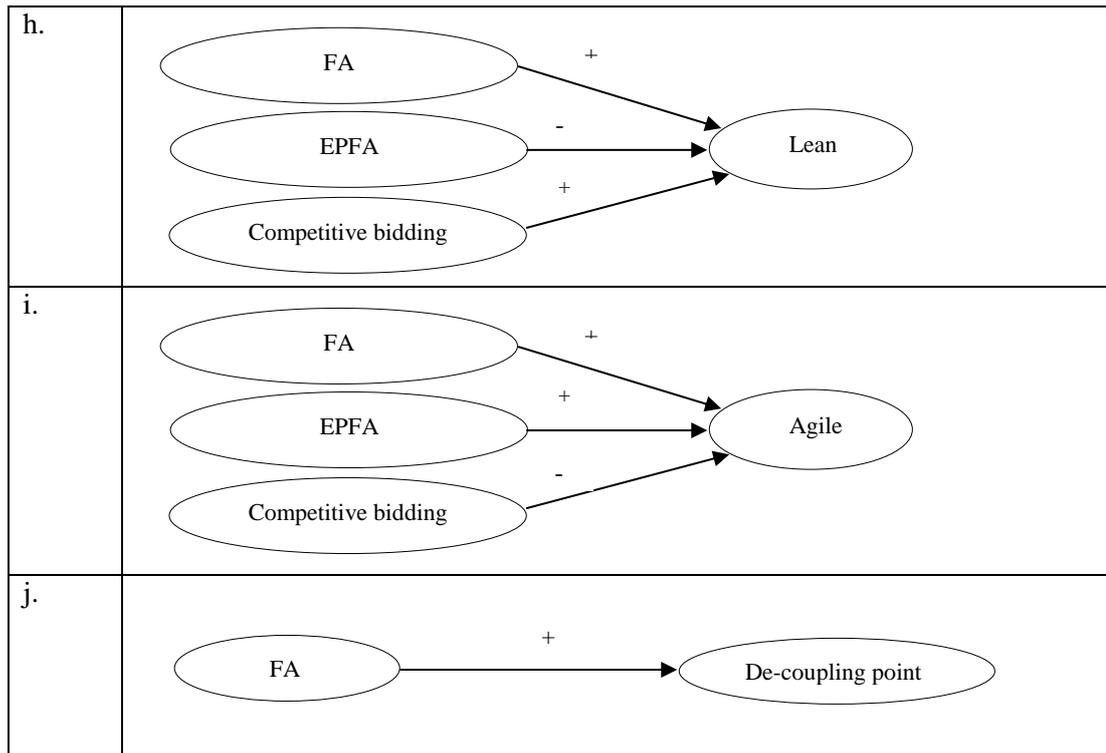


Figure 6. 2: Casual Diagram with Explanation of the Association of Concepts

Table 6. 2: Explanation of Relationship in Each Diagram

a.	<p>Uncertainty (flood occurrence and intensity) is positively associated with organisation response (FOB - <i>ex ante</i>, DRC - <i>post ante</i>, procurement method of competitive bidding, FA or EPFA), relief supplies priority - food, non-food, buyer-supplier relationship - preferred, transactional, strategic). While, uncertainties are positively associated with organisation situational characteristic is positively associated with organisation response.</p>
b.	<p>Uncertainty and HRO response are positively associated with the variant of food items, and variant of food item are positively associated with the type of procurement method (either competitive bid, FA, or EPFA) and buyer-supplier relationship (either preferred, transactional, or strategic).</p>
c.	<p>Number of suppliers is positively associated with competitive bidding and EPFA, however negatively associated with FA.</p>
d.	<p>Competitive bidding is positively associated with pro-active response (<i>ex-ante</i>).</p>
e.	<p>The FA is positively associated with contingency response, both <i>ex-ante</i> and <i>post-ante</i> (pre-positioning of supplies at FOB and supplies to DRC).</p>
f.	<p>The EPFA is positively associated with reactive response (supplies to DRC)</p>
g.	<p>The FA and EPFA is positively associated with the level of collaboration of the buyer-supplier (trust, commitment, reciprocal), while competitive bidding has negative association with the level of collaboration.</p>
h.	<p>Competitive bidding and FA are positively associate with Lean, however EPFA is negatively associated with Lean.</p>
i.	<p>FA and EPFA is positively associated with agile, competitive bidding are negatively associated with agile.</p>
j.	<p>FA is positively associated with de-coupling point.</p>

### *Eliminating alternatives*

***Key findings 4:*** *FA has been much more in focus than contractual method in procurement for HRO.*

Although there is evidence to suggest that quantity flexible contract was used, the aggregated evidence of the case studies suggest that HRO prefers FA instead of a quantity flexible contract. Moreover, it was established from the case study that despite the quantity flexible contract was made on central level at the state to support district needs during disaster, however the particular state also relied on its district branches to established EPFA to support DRCs in particular when the appointed supplier for quantity flexible contracts could not meet the delivery timeline. In addition, it is also noted that the HRO at state level are confined to the contract obligation and there was minimal sharing of information of disaster occurrence. More importantly, the quantity flexible contract could not be implemented at the district level for this particular case mainly due to bureaucracy, meeting the fixed price and specifics product obligation, and the reluctance in placing bonds. Hence, the suppliers at the district level prefer a flexible approach of EPFA on transactional basis.

In the particular case in which modular product was pre-positioning in FOB with the support of large storage, the competitive bid supports contingency response with the replenishment from the large storage. However, the item is limited to standard and modular products. Conversely, EPFA was subsequently employed to meet cooperative cooking meet during pro-long flooding often detected in the East Coast States of the country under study. In view of this, the EPFA offers greater flexibility of the type of product to that the organisation could provide for its intended customers, in this case the victims in DRC. Even in such motivation, evidently the use of EPFA with fixed price or price range features and quantity volume flexibilities, supports the HRO in achieving lean and agile performances. Therefore, this study professes that the alternatives detected from the study represents no spuriousness therefore could be eliminated, and that FA was the apparent causal relationship to the effect.

### *Outlining casual chain*

The final process to the casual explanation is outlining the causal chain. This discussion has so far detailed the causal requirement which includes temporal order,

empirical association, and the elimination of plausible alternatives. Next, causal chain were divided into nine parts based on the summary of evidence and empirical data, and were evaluated on positive and negative relationship. These nine parts causal chain diagram were re-plotted in the initial conceptual framework of the study. Part (c) of the causal diagram in Figure 6.3 was not included, however reflects the actual representation of the data from this case studies. For example, the number of suppliers is negative when associated with FA, but positively associated with competitive bid and EPFA. All things considered, this study finally presents the refined conceptual framework FA procurement and supply of Humanitarian Aid as shown in Figure 6.3. The refined conceptual framework is explained in three parts: (1) need for flexibility; (2) the use of FA with particular focus on (a) the use of FA on modular type humanitarian aid, and (b) option of combining the use competitive bid with EPFA, or a standalone use of the EPFA; and (3) SCM performance.

### **Need for Flexibility**

Firstly, the need for flexibility arises from the unidirectional relationship of three concepts namely uncertainty, followed by HROs' assessment of its situational characteristics, and finally the determination of HRO's response mechanism. The cause and effect relationship of the three concepts internally within its sphere establishes the need for flexibility. For example, the HRO's uncertainty includes concern on disaster occurrence and its intensity. More specifically, the uncertainty involves when and where the disaster will occur, the geographical coverage of the disaster which could involve high density to low density areas as well remotely inaccessible areas or difficult to assess areas such as islands. More profoundly, uncertainty is the causal mechanism of the HROs to assess its situational characteristics and the response adopted thereon. HROs situational characteristics includes considerations of its manpower capability including assets to handle large geographical coverage of the disasters or accessibility to remote areas.

Apart from this, administrative concern includes limitation of its financial sources as well as accountability on prudent spending with minimal wastages, and the bureaucracy adherence of a top-down structure for procurement process and SOP related. Next concept is the response adopted by HRO that concerns the need to be flexible in humanitarian aid mission. Based on experience of past handling of

uncertainty with consideration of its situational characteristics, the HRO decision on whether to adopt pro-active, contingency, or reactive response is to mitigate risk while achieving efficiency and effectiveness in the humanitarian mission. The risk in relation to food as a relief items includes wastages of the food items, high prices during disaster, inability to meet the sudden demand, storage scarcity and victims complain of quality of food or even type of food. To reduce risk and to achieve performance, the HRO needs to find the fit between its situational characteristic assessment and response adopted so that flexibility requirement could be met.

### **The Use of FA**

Hence the flexibility requirement is the causal relationship use to adopt FA to achieve performance. The decision for adoption of FA is based on two type of food i.e. modular or raw/fresh or supplier of packed food and reducing risk by of inadequate supply while minimalizing wastages. This led to two response mechanisms and employment of FA in two parts in conceptual framework:

#### (a) The use of FA for modular type humanitarian food aid

As the case study in NADMA-FAMA collaboration demonstrates, the FA on modular item (IFK) with fixed price and quantity flexible features is associated with high level of collaboration between buyer and supplier. This involves information sharing from the buyer (HRO) and commitment to reserve capacity at the upper stream of the SC or the ex-ante, in which forecasting plays a crucial role. As intensity of the disaster is ascertained, the postponement of modular item at the supplier's premise are supplemented with make-to-order of new batch of modular item to meet the demand requirement. This is the de-coupling point in the chain, in which SC is altered to reactive or post-ante response for agility, and rely on known figures. The empirical data also supports that a large supplier with manufacturing support is ideal in ensuring sustainable supplies as compared to a trading supplier. Such supplier would be considered as a strategic supplier as there are only few or lesser, and therefore is very critical for the HRO to engage and to secure supply and the relationship may spur leverages on other aspects of the humanitarian aid including delivery improvement process.

(b) Option of combining the use competitive bid with EPFA, or a standalone use of the EPFA

The FA could be utilised for combination of modular and fresh/raw/packed food or standalone of the latter. This is demonstrated in most of the cases involving DSW as the HRO. In both cases, the FA by the HRO also reduces risk in securing supplies while harnessing the benefit of cost containment, quality assurance, volume flexibility and timely delivery, as agreed by the buyer-supplier collaboration. The FA here supports agility or *post-ante* response. The empirical evidence from the DSW cases show single large supplier or few small suppliers support the arrangement for district level supplies. However, the level of collaboration is still low as has been noted in the exchange of information between the actors and minimal commitment of reserving capacity by the supplier. However, there are contrasting cases where the supplier reserves capacity to sufficient level (involving single large supplier of a district) and this is achieved with trust over time and understanding of the reciprocal benefits. It is also noted that information sharing is high in the cases.

### **SCM Performance**

As an effect to the causal relationship, SCM performance of lean and agile, or leagile is achieved. The leagile performance inherits high leanness (cost containment and high quality) and high agility (meeting volume flexibility and timely delivery). Whereas lean and agile as displayed in the right dimension of the conceptual framework, refers to achieving high agility while inheriting leanness. In particular, this refers to meeting demand volatility and delivery requirements with pegged prices either on price range or fixed price while maintaining standard quality requirement. The lean and agile has a positive association with FA performed through emergency purchases at decentralised HRO's procurement, while leagile is positively associated with centralised HRO's procurement. This outcome in performance is a testament to the assertion that FA is the causal mechanism for the procurement and supply of food in humanitarian and SCM performance of lean and agile, and leagile.

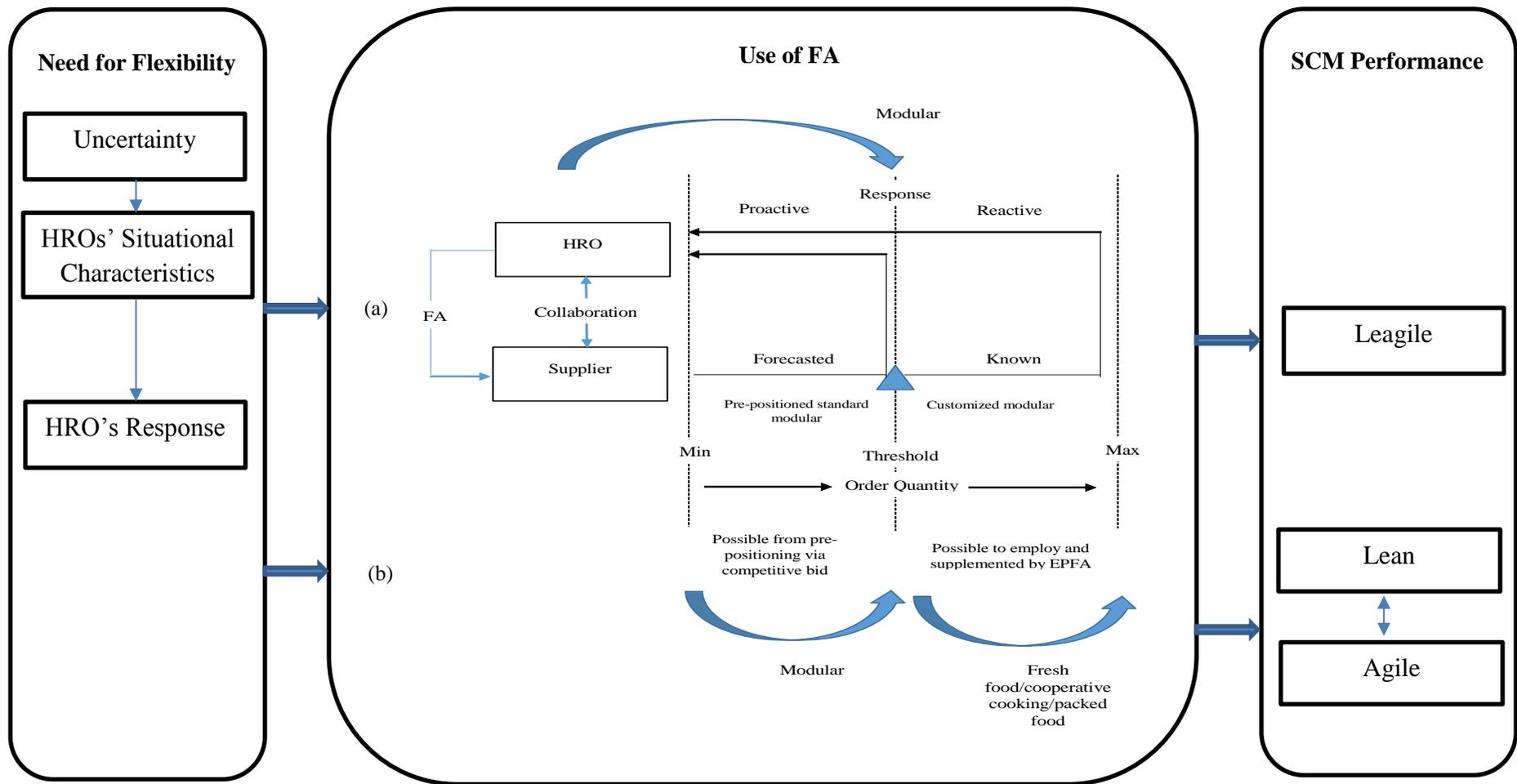


Figure 6. 3: Refined Conceptual Framework of Agile and Leagile FA in Purchasing and Supply for Humanitarian Food-Aid

→ Relationship reported in literature

➡ Relationship from this study

Note: (a) FA operational area for pure modular item

Source: Author

The refined and final conceptual framework as discussed display the relationships between the concepts. This study opines that the final framework meets what Miles and Huberman (1994, pg. 18) said as intellectual “bins” comprise description of the constructs’ relationship. The multiple case studies performed for literal and theoretical replication provided valuable insights to this study. As Small (2009, pg. 28) profoundly explained:

“Generally, the approaches call for logical rather than statistical inference, for case rather than sample-based logic, for saturation rather than representation”.

The next step of this discussion is enfolding literatures or comparison with extant literature on the emerging concepts. Conflicting literatures builds internal validity while similar literatures sharpens generalizability (Eisenhardt 1989b). Firstly on contrasting literatures, which includes generalization of incentive contract made by Chakravarty (2011) to support contingency response arguably requires accentuation on the details. For example, efforts that was presented by prior researchers in equating the term such as the use of “pre-purchasing with an option contract” (PPOC) for pre-disaster preparation, in which a specific premium paid by the buyer enables the supplier to lock in specific quantities (Wang et al. 2015). Similarly, Balcik and Ak (2014) in their study on FA focuses on quantity flexibility contract in which the HRO commits to purchase of minimum quantity over a fixed-agreement horizon in exchange for supplier reserving capacity and delivery. The outcome of the study shows that supplier selection and cost are sensitive of the impact level of disaster.

While both approaches arguably reduce stock withholding at the buyer’s end, the risk of underutilisation of these resources if disaster is not frequent causes considerable concerns to the buyer’s organization especially for HROs that operate on public source or donors. Donors are concern of their donations are used in possible way, although they could not directly measured the impact (Tatham and Hughes 2011). A respondent from this case study argued why their organisation should bear such cost if the disaster did not occur. In fact, on both of the previous study, the risk associating commitment for reserve capacity with cost fluctuation may be higher with the forecasting of disaster impact. Instead, instead it could be contended that an incentive contract in this sense bears risk of non-leanness and wastages. Therefore, now more frameworks are focusing on building good relationship especially with large suppliers and leveraging

on the relationship (Lu, Goh and Souza 2014). As evident in this study, building relationship with the suppliers increases trust and enables suppliers the commitment to reserve capacity. The collaboration effort reduces the risk of wastages occurring at the supplier's end, in which the supplier is still able to divert these resources for profit. Therefore, this demonstrates internal validity of FA as the main concept of the study.

Over a decade ago, authors (Beamon 2004; Beamon and Balcik 2008) profess that measuring performance of aid agency is difficult due to the intangibility of services offered and characteristics of humanitarian operations. In this sense, donors or taxpayers had to rely on financial indicators in the financial accounts as well as visibility observation at response phase to gauge the performance of the aid agency (Wakolbinger and Toyasaki 2014; Jahre and Heigh 2008). The gauge is impacted by issues detected in the financial indicator such as overhead cost and fund raising cost, percentages are currently viewed as not consistently defined measures, data quality is often regarded as low, and purposeful under reporting (Wakolbinger and Toyasaki 2014; Krishnan, Yetman and Yetman 2006).

This study contends that while efforts are being made on identifying consistent performance measurement through the financial indicators, non-financial performance indicators such as lean, agile, and leagility could fill the gap for the HRO's performance measurement and gauge difficulties faced by donors/taxpayers. The non-financial indicators as demonstrated plausible measurement: (1) Cost control/containment, based on fixed price or agreeable price range; (2) quality, based on the number of victim's complaints, standards/checking by third party such as the medical corps, and the aid's agency's report on supplier's performance on quality adherence; (3) flexibility based on supplier's ability to meet the fluctuation of demand; and (4) delivery, meeting the timely date line and destination of the consignment. Therefore, it is proposed that HROs could convince the donors with the non-financial indicators of lean and agile for performance gauge. This, combined with visibility in the response phase may increase the donor's confidence.

Moving on to similar literatures in which this study proposed analytical generalisation of the concepts of the framework by binding underlying similarities with other non-associating phenomena to enhance internal validity. To begin with, this study's argument on the analytical generalisation of humanitarian aid SCM to other

phenomena is based on the commercial SCM where the origin of the concepts are embedded in. The literature analysis of this study had covered substantively on SCM concepts applied in businesses. Firstly, validating the association of uncertainty to situational assessment and responses for flexibility taken thereon. For example, the need of address demand uncertainty through flexibility has been pioneered by Alderson (1957), and in particular flexibility as mean to an adaptive response to environmental uncertainty (Gerwin 1993). Manufacturing industry for instance, requires flexibility in as a response strategy to uncertainties (Chandra and Grabis 2009; Jeeva and Dickie 2009; Wadhwa, Mishra and Saxena 2007).

Secondly, on the use FA for modular, buyer supplier collaboration and response mechanism: (1) FA for close relationship with suppliers, as supported in literatures for streamlined procurement process which guarantees availability, quick delivery, and cost effective procurement of critical items, through increased relationship with supplier, and contractual agreements in the disaster-preparedness stage (Balcik and Ak 2014; Lu, Goh and Souza 2014); (2) the association of modularity to responsiveness and flexibility and achieving de-coupling point (Catalan and Kotzab 2003; Reichhart and Holweg 2007; Squire et al. 2009) (3) associating food to agility and *post-ante* responses (Cozzolino, Rossi and Conforti 2012; Jahre and Fabbe-Costes 2015a); and (4) food SC related to de-coupling point (Van der Vorst, Dijk and Beulens 2001).

Thirdly, associating the use of modular to SCM performance of lean and agile, this study's argument was premised on the seminal work by Jahre and Fabbe-Costes (2015a). Other study on modularity, FA and SCM performance also show similarity in the predicted effect. For example, based on a study on IFRC, the NPO collaboration with its suppliers using the FA shows increased response capacity by 28%, reduced delivery date of 13% and reduction of cost of 7-14% supports the generalisation of FA to increased performance, and the use lean and agile constructs to measures SCM performance (Balcik and Ak 2014). Identifying agility and leagility drivers was also similarly captured in various phenomena that includes electronics, automotive, fashion, manufacturing-OEM, construction, chemical and telecommunication (Gaudenzi and Christopher 2015; Scott et al. 2002; Jayaram, Vickery and Droge 2008; Garcia-Arca and Prado-Prado 2010; Krishnamurthy and Yauch 2007; Chen 2012; Guisinger and Ghorashi 2004).

To substantiate case of the use of FA with buyer-supplier collaboration in other phenomena, this study makes a case point in the innovative construction industry by the introduction of the use FA with collaboration between client and contractor organisation (Oladapo and Quinn 2016; Latham 1994). This resulted in the general benefit: (1) producing less waste and duplication; (2) reducing transaction cost; (3) saving on tendering costs; (4) building of trusting, long term relationships; and (4) bringing of all “project knowledge” together at the inception of a project (Bresnen and Marshall 2002; Khalfan and McDermott 2006; Goodier et al. 2006) . While, the benefits to client include: (1) improved design and delivery; greater cost certainty and better whole life costing; (3) improved project quality; and, for the contractor: (1) the security of long term work programmes; and (2) improved cost recovery and relatively secure margin (Khalfan and McDermott 2006; Bresnen and Marshall 2002; Abbott, Jeong and Allen 2006). Hence, based on this mutual adaptation framework in the construction industry, it is professed that this enriches the conceptual level to this study.

The results of this enfolding literature discussion on similarities of the findings encompassed an extant literature that supports wider generalization and enriched the conceptual level of this study. In addition, it is professing that this discussion strengthens the findings of this study with stronger internal validity. This supports RQ2 as follows:

*How leagile is achieved using framework arrangement (which promotes buyer-supplier relationship and flexibility of supplies in a proactive and reactive response)?*

The relationship is stated more succinctly:

- P2- Uncertainty in environment in the casual mechanism of flexibility through FA is based on its unilateral effect and HROs situational characteristics and response adopted;
  
- P3- The FA as causal mechanism, and agile or leagile driver, has a positive effect on: (a) promoting buyer- supplier collaboration for a reciprocal and mutual benefits; (b) supports contingent response for modularity with de-coupling point in the SC, and agile response for combination of modularity and fresh

supply of food (raw/fresh material for cooking, and pre-packed food) or standalone of the latter;

- P4- The need for flexibility through the use FA for buyer-supplier collaboration on different food variant, and the henceforth FA use as responsive mechanism is positively associated to lean and agile or leagile SCM performance.

Therefore, the above relationship (P2, P3, and P4) derived from the conceptual framework corroborates with what is observed in the literatures and the predicted outcome of the sub-proposition. Therefore, based on the empirical evidence from this case study, the refined sub-proposition is that the HROs adopts FA for buyer-supplier collaboration strategy on contingent and reactive response in humanitarian aid for leanness and agile SCM outcome.

### **6.1.3 Practical Aspect of the Conceptual Framework**

This section of the discussion although has less implication to theory discussion, nevertheless is important especially on managerial, external and policy implications of the collaborative FA, in particular concerning practitioners. For further discussion, a summary of the findings is presented in Table 6.3. In terms of practicality of the conceptual framework, the implementation of FA/EPFA were not without any hindrance. However, the fact that FA are considerably new mechanism that was adopted by governmental base HROs in the country reflects that of its opportunity of further refinement through changes in policy, and the external and internal managerial aspect. For instance, modular based aids are less impactful on challenges due to strategic collaborations. Common implementation of the FA and EPFA are red-tapes, threat of large-scale disaster, price hikes due to external factors, and late payment issues that has an impact on trust. These challenges are most likely could be addressed during the pre-disaster preparations through engagement between actors through managerial approach. Hence, the improvement suggestions which require accommodative approach for the FA implementation is professed as a step forward that could drive the efficiency and effectiveness of the SCM. Moreover, the fact these are perspectives from the practitioners, this reduces biasness, and brings this study closer to the context.

Table 6. 3: Practical Aspect of FA Implementations: Challenges/Barriers and Suggestions for Improvement

HRO/FA Type/Food Aid Variant	Challenges/Barriers	Emphasis	Overcoming Suggestions	Emphasis
NADMA-FAMA (Collaborative FA /Modular)	Intra-agency red-tapes/bureaucracy	Affecting communication between the actors	Streamlining directives to improve communications	<b>External</b> – to improve interagency collaborations on pre-positioning and delivery
	Pre-positioning wastages	1. Forecasting flaws due to insufficient from corresponding agencies 2. Uncertainty in the environment		<b>Managerial</b> - Improve forecasting and adjusting minimum reserve capacity
	Large scale flood	Affects delivery to remote areas Untested capacity limits in production to meet high demands	Interagency simulations and ‘dry run’ exercises	<b>External</b> - to improve delivery/distributions of the items; To improve inter-agency communications; <b>Managerial</b> - to test production capability and speed of development.
	Price hikes	Affected by market mechanism on raw materials, government regulation on tax for selective items, volatility of fuel prices	Exclusion of tax elements for food raw materials and incentives introduction for humanitarian aid suppliers.	<b>Policy/regulation</b> - Intervention by government for the selective items vastly used for production of modular; <b>Managerial</b> - collaboration to improve modular designs; Mutual discussion on external factors effects for ‘win-win’ situations
	Late payment	May affect tier-supplier’s ‘rice bowl’ and possible trust deficit for the main supplier	Improve collection procedures, fine tune circulars between agencies  Perfection of documentation procedures	<b>Policy/regulation</b> – MoU specific terms to expiry of items and replacement

HRO/FA Type/Food Aid Variant	Challenges/Barriers	Emphasis	Overcoming Suggestions	Emphasis
DSWs (Collaborative EPFA/Non-modular – fresh food/Raw/Pre-packed)	Red Tapes and grey guidelines	<ol style="list-style-type: none"> <li>1. Inconsistency in practice for agility - Some HROs practises ad-hoc tender as rather than EPFA which resulted supplier's complexity in meeting demand and relationship with main/tier suppliers.</li> <li>2. Issuance of LPO as supporting documents to EPFA.</li> <li>3. Supplier continuity decisions by third party.</li> </ol>	Streamlining directives to improve communications	<p><b>External</b> – EPFA refined for standardised used.</p> <p><b>Managerial</b> – Improved internal process to expedite LPO issuance.</p> <p><b>Policy</b>- Strengthening MoU and formalization of FA implementation with requirement on price ranges or fixed price.</p>
	Large scale flood	<ol style="list-style-type: none"> <li>1. Limited capacity of small supplier including manpower - reduce ability to meet high demand;</li> <li>2. Supplier's sourcing difficulty with the main supplier limited by cash transactions security;</li> <li>3. Locality of suppliers near disaster area – premise/warehouse is affected;</li> <li>4. Delay in delivery – both to supplier and to victims.</li> <li>5. Supplier's withdrawal due to the above.</li> </ol>	Categorically this refers to disaster management phase two and three, state and national scale in which Federal support will be required.	<b>External</b> – FA at Federal level with unaffected states and large suppliers.
	Reserve capacity	Supplier's anxiety – lack of information and trust limits supplier's commitment. Priority concern – Trading supplier's also supplies to walk-in and other consumers.	Approval for stock keeping for selective suppliers under HRO.	<p><b>External</b> – Approval agency dealing with 'competitive act' control</p> <p><b>Policy</b>- To allow formation of joint supplier to support capacity requirement</p> <p><b>Policy</b>- Directive on agency that controls consumer and anti-competition act to allow stock withholding for HROs' suppliers</p>

	Late responses of actors	Affects delivery – Usually occurs in the early response stage after disaster.	Encourage more sharing of information and engagement	<p><b>Managerial</b>- Sharing of disaster forecast especially near disaster, field engagement to gauge reserve capacity preparation.</p> <p><b>Policy</b> – HROs should loosen their circulars on sharing of information with selected suppliers.</p> <p>Manpower resource sharing- to support and expedite responses</p>
	Late payment	Delays- the supply was during response, while the consolidated payment is during post-disaster period, and documentation procedures.	To build trust with supplier and understand their commitment to their vendors/tier-suppliers	<p><b>Managerial</b>- Improve internal process of fund allocation, accounting processes for speed in payment.</p> <p><b>Policy</b>- Special exemption to allow year end payments</p>
	Price hikes	Affected by market mechanism on raw materials, government regulation on tax for selective items, volatility of fuel prices	Affected by market mechanism on raw materials, government regulation on tax for selective items, volatility of fuel prices	<b>Policy</b> - Exclusion of tax elements for food raw materials and incentives introduction for humanitarian aid suppliers.
	Lack of Assets	Rural area branch HROs and suppliers have limited investment for assets capacity and affects the overall delivery especially in remote areas.	3 <sup>rd</sup> party logistics	<b>External</b> – engaging interagency collaboration for transportation during preparedness stage,

Source: Author

Equally important to note, existing literatures with regards to FA implementation and other procurement method related to humanitarian aid revealed some similarity and contradictory findings. Firstly it is vital to note that relations between actors on resources that will be drawn in response phase (temporary SC structure) are developed and maintained at the preparedness stage (permanent SC structure), and at response phases are mainly action based on the earlier drawn strategy (Jahre, Jensen and Listou 2009). Hence, visibility during response stages of the success drawn implementation policy and the management of such resources in the context of humanitarian aid relies heavily on what is being done at preparedness stage. In the context of alternatives to FA, for instance as cited previously on the seminal work of Wang et al. (2015) on PPOC, the option pricing and exercise pricing mechanism are placed in the coordinating contracts.

Similarly, on OC as argued by Wang (2012), the unit price adjustment, performance timeline, quality, performance bond or default clauses, are all pre-set terms before responses. By the same token, the implementation of FA with a number of suppliers before disaster occurrence was to secure supplies, efficient procurement and effectiveness by quick delivery to the affected areas of sudden-onset disaster (Balcik and Ak 2014), in which engagements were made on pre-specified agreement terms that may differ based on geographical locations and predictions of disaster impacts. Hence, as the FA in this study were implemented in the preparedness stage, the refinement as suggested by the practitioners could be emulated at the preparedness stage for visibility in the responses.

Next, in detailing the complexity in the implementation of OC, Wang (2012) informs on the chaotic experience in the implementation of OC with regards to regulations, contract preparation and contract execution. Similar complexity was traced for example high unit price due urgency of needs and performance bond or default clauses, which is discouraging for contractors to enter into relationships. Suggestion from the study includes adopting price schedules, civic contract instead of administrative contract format (arguably rigid in regulations, certified contractor database, liability definition between contractor and government (with regards to bidding alternation after public announcement, payment rate to be explicitly mentioned and inclusion of

cost such as maintenance, and bonus incentives for contractor whom is ahead of schedule.

The study argues that all of this suggestion is to increase contractor's desire and service level (Wang 2012). While this study notes that most of the suggestion are on contract base which is contradictory to the theme of this study, similarity is noted in terms of incentives to suppliers, adoption pricing schedules or price range mechanism and liability definition especially on reserve capacities. Similarly, in FA implementation, Balcik and Ak (2014) study's provide some observation on supplier selections decision for FA in particular on reserve capacity and effect of agreement. The study informed that the number of suppliers is smaller for large geographical area, changes in reserve capacity and cost is larger in medium to high-impact disaster area, and total procurement cost increases with the service level requirements i.e. quick response time. However, the cost decreases with incentives such as lead time discounts and quantity discounts.

In contrast to this study, the pre-specified terms on pricing collaborative FA are minimal in transportation cost, and that pricing are fixed for modular while non-modular food are determined with price schedules. The base price may differ between rural and urban area as the former's base pricing is generally higher due to transportation cost. However, the price schedules when designed would have factored the transportation cost. It is a known fact that price hikes on high- impact disaster area, however this is mostly due the case of equilibrium of market mechanism rather than service levels. Moreover, the gauge on reserve capacities minimum-maximum commitment are not through incentives, but through relationship management involving trust building and reciprocal benefits. Hence in concluding these comparisons, it could be asserted that collaborative FA are much easier to be implement with much relaxed pre-specified terms, although there is still some refinement work to be done in perfecting it.

## **6.2 Theoretical Synthesis on Complementary Perspective**

At theoretical starting point of this study during literature analysis in Chapter 2, this study justify the adoption of complementary and borrowing perspective (Halldórson, Hsuan and Kotzab 2015; Halldorsson et al. 2007), to explain humanitarian aid SCM.

For this reason, the discussion on the refined conceptual framework is based on the managerial implication, based on lower part of the two-part middle-range theoretical frame of reference for SC introduced by Halldorsson et al. (2007, pg. 292). This section intends to discuss the deeply rooted theoretical underpinning of the refined conceptual framework, much like how one observes a tree, from its obvious concrete looks down to the curiosity of the shape of its root. This is the final step of the development of theory by modification based on two-case study procedure (Yin 2014) adopted for the study.

Central to this discussion is how the theory is explained and modified based on two strategy: (1) explaining the SCM structure of the phenomena based on CT-TCA-SET by adopting second part or the higher part of the middle-range theoretical frame of reference for SCM as outlined by authors (Halldorsson et al. 2007; Halldórson, Hsuan and Kotzab 2015); and (2) explaining the integrative nature of the theory based on its intersection for knowledge creation supported by literatures (Bowersox 1969; Ellram and Cooper 1993; Burgess, Singh and Koroglu 2006; Klaus 2009; Ellram and Cooper 2014; Halldórson, Hsuan and Kotzab 2015). Halldórson, Hsuan, and Kotzab (2015) refer to integrative nature of concepts influence on SCM theory development, and that integrative approach gives meaning to facts by placing them into a broader view of the supply chain. These are primarily based on the model of academic scholarship (Boyer 1990), which emphasises the three dimensions that can be associated with SCM: (1) knowledge created at intersections; (2) knowledge creation goes in both directions, practise to theory, and vice versa; and (3) from applied field toward actionable knowledge.

However, before proceeding further and for clarity, this study re-caps the important aspects that has been grasped accordingly with the progress of this research. The study begun with the specific research problem of the less known use of collaborative FA in humanitarian aid SCM and adopted concepts that were less clearly specified in its relationship from multi-disciplinary literature survey. In fact, recent studies of HLSCM argue the discipline lacks theoretical base and directions (Jahre, Jensen and Listou 2009; Burcu Balcik et al. 2015). This is followed by an understanding of the potential of new institutional economic perspective as potential explanation for this research due to the logic that SCM contains an interconnected socio economy, and that the management of such system is in relation to a particular structure of independent

organisations. Following this, a complementary theory perspective was adopted based on middle-range theories as theoretical frame of reference, mainly due to reasons that it contains broader theoretical range which contains more concepts for formal theory. As suggested by Burcu Balcik et al. (2015), a trend to use “middle range theories” is evident, and that HLSCM preparedness and responses stage studies consist mainly of models and frameworks.

From the complementary theory perspective, two suggested dominant theory occupies SCM lacuna predominantly PAT/TCA which is argued to be complemented by RBV/NT (Halldorsson et al. 2007; Halldórson, Hsuan and Kotzab 2015). However, this study’s theoretical stand consists CT-TCA-SET combinations, and contended of the unsuitability of including PAT, as the theory is pre-dominantly contract based and formed largely to mitigate risk of asymmetric information between firms. Pointing that PAT’s applicability is less to collaborative FA, a rival theory proposition is therefore formed for the study. Correspondingly other theories such as SET was adopted rather than NT, as the scope of the phenomena under study has been limited to a dyadic relationship between firms, and not inclusive of nodes consisting tier-supplying. Another important addition to complementary perspective to the study was adoption of CT based on: (1) contradictory explanations of some complementary theories and that these arise as reaction to contingencies (Barney 1999); and (2) theoretical intersection of supply and relationship must align with strategies of the firm (Cousins 2005).

Next, using the inductive approach, a set of key assumptions as shown in Table 6.4 was employed for the research design. Table 6.4 was drawn from the seminal work of Halldórson, Hsuan, and Kotzab (2015) which were tailored to the phenomena of the study based on extant literature of disaster relief and SCM. An iterative theory to data process was applied for theory development which add further clarity to the concepts and propositions. As a result, from the conceptual framework, the study establishes four relationships as described in section 6.2.1 and 6.2.2 of this study. Hence, the final step of discussion for theoretical modification will be based on these relationships, the structure of the SCM based on TCA, its contingencies and complementing perspective based on the intersections of the theories.

Tabulated evidence for complementary theories, constructs and elements of the study  
(Reproduced for discussion)

<b>Complementing/Contingent/Intersection Perspective</b>	<b>Constructs</b>	<b>Elements/Evidence</b>
Intersection of TCA and CT (Contingency)	TCA - Bounded rationality	Uncertainty due to environment (flood uncertainty), insufficient information
	CT - Contingency variable	Organisational situation dealing with environment uncertainty, large geographical coverage, limited financial and manpower shortage
TCA, SET contingent on CT (Response)	CT - Response variable	FA, buyer-supplier relationship, pre-positioning for FOB's, early preparation/forecasting, and sourcing
	TCA - Asset specificity	Dedicated asset, human, physical and site for buyer-supplier relationship
	TCA - Mitigate risk of opportunism	FA characteristics (supplier selection, procurement strategy, geographical coverage and term)
	TCA – Governance Mechanism	The governance of the structure
	SET - Collaboration	Information sharing, commitment, trust, reciprocity
TCA, SET causal for CT (Performance)	TCA - Mitigate risk of opportunism	Through FA features cost, quality, flexibility and timeliness
	SET - Collaboration	Information sharing, commitment, trust, reciprocity
	CT – Performance variable	Fit between contingency and response based on FA for outcome of Lean and agile, or Leagile (postponement/de-coupling points)

Source: Author

Table 6. 4: The Theoretical Framework Applied to Procurement and Supply of Humanitarian Food Aid

Characteristics	CT	TCA	SET
Behavioural assumptions	<p>1. For procurement and supply of humanitarian food aid, contingent response as HRO's hybrid approach for organizing, and the HRO structure is appropriately align to the nature of the SCM, centralised structure for long-term or de-centralised for short-term.</p> <p>2. Relationship between two variables are contingent upon some third variable, the usual contingency factor is in relation to uncertainty of the environment and situational characteristics of the HRO</p> <p>3. FA as response mechanism for contingency factors</p> <p>4. Lean and agile as SCM performance measure represents the fit between HRO's environment uncertainty and situational characteristics to FA response mechanism.</p>	<p>1. Bounded rationality during uncertainty</p> <p>2. Determination of firm's boundary based on collaborative FA to reduce risk of opportunism</p> <p>3. Firm reduces transactional cost (<i>ex-ante and post-ante</i>) based on cooperation with supplier</p> <p>4. Performance implication on buyer-supplier relationship based on decision (vertical integration versus market mechanism) depends on monitoring cost (bounded rationality and behavioural assumptions)</p> <p>5. Governance mechanism of centralised and de-centralised</p>	<p>1. Collaboration for mutual benefit transfer of information</p> <p>2. Dyadic relationship built on trust commitment for reserve capacity, reciprocal on payment</p>
Problem orientation	<p>1. How do HRO predict uncertainties and optimise its situational characteristics to rationalise buyer-supplier FA as response mechanism that could reflect efficiency and effectiveness of its sub-systems?</p> <p>2. How SCM performance lean and agile based on non-financial indicator could reflect the fit between its contingency and response?</p>	<p>HRO may have risk on shortage of supplies and be forced to incur short term transaction cost based on price hikes due to opportunistic behaviour of supplier during temporary SC</p>	<p>How collaboration reduces risk for reserve capacity for less disaster occurrence?</p>

Characteristics	CT	TCA	SET
Time dimension	All three stages of disaster i.e. preparation, response, and post disaster stage.	<ol style="list-style-type: none"> <li>1. Preparation stage for establishment of non-contractual buyer supplier relationship for price negotiation and reserve capacity commitment (<i>Ex-ante</i>),</li> <li>2. Pre-positioning or reserve capacity (<i>Ex-ante</i>)</li> <li>3. Response stage for visibility of supply (aid quality, volume and delivery) (<i>Post-ante</i>)</li> </ol>	<p>Short term for non-modular supplier (trading)</p> <p>Long term for modular supplier</p>
Unit of analysis	Documents: SOPs, circulars, decision records.	Collaborative FA (cost containment, aid quality, quantity flexibility, delivery timeliness) – transaction attributes	Relationship between the buyer and its supplier
Nature of relations	Contingent relations to the FA mechanism	<ol style="list-style-type: none"> <li>1. Dominant indicator</li> <li>2. Transactional base during response stage (trading supplier for non-modular)</li> </ol> <p>Strategic base (modular)</p>	<ol style="list-style-type: none"> <li>1. Complement relationships to domain</li> <li>2. Transactional base during response stage (trading supplier for non-modular)</li> </ol> <p>Strategic base (modular)</p>
Primary Domain of interest	Fit between response strategy to contingencies	Transaction cost and relationship	<ol style="list-style-type: none"> <li>1. Mutual sharing of information for reciprocal benefits</li> <li>2. Securing supply for environmental uncertainty</li> <li>3. Development of trust and commitment</li> </ol>

Source: Author

### **6.2.1 Intersection of TCA (Bounded rationality) and CT (Contingency)**

P2- Uncertainty in environment in the casual mechanism of flexibility through FA based on its unilateral effect and HROs situational characteristics and response adopted.

Existing literatures suggest that organizing structure and management style are dependent on contingency factors, usually uncertainty refers to instability in the environment and the situational characteristics as exogenous to the decision makers (Tosi Jr and Slocum Jr 1984; Zeithaml, “Rajan” Varadarajan and Zeithaml 1988). Meanwhile, TCA under bounded rationality outlines key assumption that decision makers’ intention to being rational is distorted by the ability to manage and error in the communication are problems during such unpredictable environment uncertainties, and that this condition could create opportunism guided by self-interest behavioural of firms in the market (Rindfleisch and Heidi 1997; Grover and Malhotra 2003).

This research findings show that environment uncertainty in particular disaster occurrence and intensity, and the ability of the organization to support certain threshold of disaster is limited due to information limitation on accurate prediction of the disaster’s occurrences, and also limits the capability of the HROs resources which include manpower, financial, sound procurement decision and delivery co-ordination. This confirms the existing body of knowledge on uncertainty, which refers to lack of information that affects alternatives and outcomes predictability (Hickson et al. 1971). Hence, it could be asserted that CT explains TCA specifics problem to limitation of information due uncertainty in environment. More specifically, under environment uncertainty condition, HROs is limited on information for accurate prediction for the volume of pre-positioning stocks required to leverage on purchasing and reducing wastages.

Secondly, this condition of bounded rationality suggests that HROs would rely on market mechanism to make decision, therefore is possibly prone to risk of opportunism behaviour by the supplier. Hence, the overlapping of the uncertainties in both theories explains of the possible risk of the buying firm. More specifically, it could assert that based on the findings of the study, HROs are vulnerable to market volatility during

disaster occurrence, which are affected and usually are short in supplies to meet the rising demand of buyers including consumers for stock keeping in withstanding the duration of the disaster. Hence arguably, the risk of opportunistic behaviour by supplier imposing premium price is plausible. Moreover, the HROs or buyer in this context are also exposed the risk of shortages of supplies, low quality product and inability to meet the delivery timeline to relief centres. This study professes the intersection of CT (bounded rationality) and CT (contingency) deepens the incremental insights of SCM theorizing perspective.

### **6.2.2 Need for Strategy in Dealing with Uncertainty**

P1- Decentralized HROs leverages through competitive bidding on preferred supplier for leanness on food modular for pre-positioning purposes, and moves to relational procurement mechanism as EPFA with transactional supplier (sometimes the same preferred supplier) for agility to cater for volatility in demand of standard modular and as additional material for cooking and pre-packed meals; while (b) Centralized HRO focuses more on standard modular leveraging on unilateral lean and agility supply chain through strategic partnership with strategic supplier.

Existing literature emphasised that contingency theory posits on assumption that there is no best ways to organise under all conditions and that the structure of the organisation should be appropriate to the environment to be effective (Schoonhoven 1981). This study's finding revealed that depending on assessment of the environmental uncertainty and possible disaster impact, HROs aligned its structures, and procurement strategy of food variants befitting the relational strategy with its supplier, in an effort to be more flexible, efficient and effective. More specifically, a centralised structure was adopted for modular food variant and a strategic relationship is assumed with its supplier to secure supplies for large geographical coverages of humanitarian aid. The structure resembles a permanent network (weighted in preparedness stage) versus temporary network (prominent in responses stage) as discussed by Jahre, Jensen, and Listou (2009).

In contrast, a de-centralised structure was preferred for smaller geographical coverage, in which non-modular food component are used to be closer to the context, a

transactional relationship with its supplier is concentrated. The findings are in tandem with the intersection analogy proposed by (Cousins 2005) that supply and relationship modes must align with strategies of the firm. Hence, this study's generalisation on the discussion is that a befitting procurement and supply strategies could be employed by the firm on its structure and organizing context which are appropriate to its assessment of the environment. This is consistent with existing literatures that uncertainty forecasting could be utilised in coping with uncertainties (Hickson et al. 1971). Secondly, the adoption of FA for flexibility and the appropriateness by buyer-supplier strategy, confirms to the existing body of knowledge that flexibility and collaboration are plausible strategies in dealing with uncertainty and can enhance SCM practices in the disaster-relief sector (Gerwin 1993; Maon, Lindgreen and Vanhamme 2009).

### **6.2.3 CT as Contingent for TCA and Complemented by SET**

P3- The FA as causal mechanism, and agile or leagile driver, has a positive effect on: (a) promoting buyer- supplier collaboration for a reciprocal and mutual benefits; (b) supporting contingent response for modularity with de-coupling point in the SC, and agile response for combination of modularity and fresh supply of food (raw/fresh material for cooking, and pre-packed food) or standalone of the latter.

Prevailing literatures advocate that at preparedness stage, FA as having contractual agreement and close relationship with suppliers were increasingly being established by HROs to streamline the procurement process and guarantee the availability, quick delivery, and cost effective procurement of critical items after a disaster (Balcik and Ak 2014; Lu, Goh and Souza 2014). This study shows the evidence of collaborative FA with transactional to strategic relationship with suppliers are established at preparedness for similar purpose, that is to rationalize the procurement process and guarantee the availability, quick delivery, and cost-effective procurement of critical items i.e. in this case referring to food aid for pre-positioning and after disaster utilization. More specifically, the study shows that HROs' collaborative FA which was based on G2G arrangement, MoU generic award letters from the respective HROs, and being listed as suppliers in the respective level of Disaster Management Committee had no agreement terms such as fixed agreement fee for reserve capacity. However,

the collaborative FA was made in accordance to pre-specified terms such as pricing, quality, delivery, and quantity flexibility.

Other terms such as price for delivery varies based on geographical coverage. However in most case the price of the delivery cost is exempted as due to supplier's operations being near the locality of the geographical coverage area or it was assisted by third party agency with the co-ordination of the HROs. In addition, there was no element of discount rates for the pricing schedules but a modular supplier of large capacity which included manufacturing was able to provide substitution/replacement of the expired elements in the pre-positioned modular. Cost for this replacement is bared by the HROs. This is however subject to the agreement of the respective corresponding HROs as actors' endorsement on the forecasted amount for pre-positioning of stocks. Modular cases with FA were negotiated to be pre-positioned at the supplier's premise and for non-modular cases (e.g. raw material for cooking at relief centres or pre-packed food supplied for the relief centres) are based on supplier's commitment for reserve capacity. Collaboration on information sharing, trust and realization of reciprocal benefit are central to the supplier's commitment for reserve capacity.

This study asserts that this segment's portrayal of relationships demonstrated SCM theorization of complementary, and contingent perspective based on the empirical evidence provided by the case studies. Microeconomics theory as TCA and SET were heavily weighted in procurement and relationship in SCM research. TCA has been extensively used to explain inter-firm governance and collaborative relationship which originated from SET (Williamson 1979; Richey and Autry 2009). More recent studies have also shown that concepts from a complementary theory result in combinations of concepts from the theory borrowing, demonstrate a particular aspect of SCM for example trust in TCA (Cheng and Tu 2008; Pomponi, L. and Tafuri 2015; Halldórson, Hsuan and Kotzab 2015).

Hence when plough back to this study, FA's is a tool to manage buyer-supplier's relationship involving information sharing on the forecasting of disaster intensity and possible geographical coverage, which the respondents of this case expressed will build trust, commitment and reciprocal benefits. The architecture of this relationship relies on FA: (1) in the context that arise as response mechanism, which is represented

of the response variable (Zeithaml, “Rajan” Varadarajan and Zeithaml 1988); (2) is used to reduce the risk of opportunistic behaviour of suppliers in temporary supply chain arising from disaster; (3) as a governance mechanism, setting boundary to manage the collaborative relationship. Next, the dyadic relationships of the buyer-supplier relationship is explained by SET and the construct consist trust, collaboration, commitment and reciprocal. The resultant of this study demonstrated positive association of these SET constructs to TCA’ construct in particular in mitigating risk of opportunism especially in pricing, and that the HROs incurred minimal transaction cost due to minimal asset specificity for this purpose. Therefore, this demonstrates that SET complements TCA in the use of FA for collaborative relationship. Secondly, the relationship of TCA and SET is arising from and contingent upon CT as response variable.

#### **6.2.4 TCA complemented by SET as causal/moderating for CT**

P4- The need for flexibility through the use FA for buyer-supplier collaboration on different food variant, and the henceforth FA use as responsive mechanism is positively associated to lean and agile or leagile SCM performance.

Supply chain performance is a heated topic as the search for definitive measures is still on-going (Abidi, de Leeuw and Klumpp 2014; Morgan 2007). However, the use of lean and agile as SCM performance measures and strategy for purchasing purposes has been cited by previous literatures (Jahre and Fabbe-Costes 2015a; Cozzolino, Rossi and Conforti 2012; Drake, Lee and Hussain 2013). Moreover, it benefits the effectiveness and efficiency of the internal operations management as well as being responsive (Olhager 2003; Narasimhan, Swink and Kim 2006; Olhager, Selldin and Wikner 2006). As previously cited, studies suggest that the use of FA could led to quick delivery, and cost effective procurement of critical items after a disaster (Balcik and Ak 2014). This study demonstrated the lean and agile that cost, quality, flexibility and timeliness of delivery in: (1) the procurement decision assessment through AHP method; and (2) visibility of actual context of the supply perspective coupled by interviews with the actors and victims, and secondary documentation content analysis. The results show that cost, quality, flexibility and timeliness are positively associated with the procurement and supply of food variant. More specifically, this means that

HROs' decision to contain cost and ensure supplier adherence to quality, meeting quantity demand and delivery lead time could be translated into lean and agile SCM performance.

In terms of SCM theorization, the three intersections are as follows: (1) CT–performance variable (fit between contingency variable to responses variable i.e. uncertainties and HROs situational characteristics to the response adopted); (2) TCA in mitigating risk of opportunism, through the features of FA for fixed to price ranged, aid quality, quantity flexibility and meeting lead time; (3) TCA in FA implementation that reduces transaction cost for monitoring and administration cost for procurement; and (4) TCA-SET on cost of pre-positioning/stock withholding and risk of wastages, which was as result of governance of the relationship collaboration, and the reciprocal mutual benefits, commitment as well as trust. The effect of price containment, minimal quality complains, records of meeting voluminous demand and lead time at DRC in the humanitarian aid confirms the performance variable of CT, and the perspective of TCE complemented by SET.

In essence, this section confirms that the refined conceptual model extends the adopted combined CT-TCA-SET theoretical lens. In deriving to confirmatory, it first eliminated rival theory of CT-PAT-SET combination. This discussion reaffirms complementary theoretical aspect as amongst the current trend in the logistics and SCM research domain. As a matter of fact, the funnelling of this theoretical discussion further supports TCA reign as one of microeconomics dominant used theories in SCM's research. Furthermore, the adoption of TCA, CT, and SET is consistent with the body of knowledge that half of the research in SCM, combines theories (Defee et al. 2010). This study also demonstrated and reacted to the aforementioned author's call for: (1) a clearly stated and explained element of theories used in new conceptual model and constructs; and (2) research to explore the use of other theories for the development of a cohesive theory of logistics and SCM.

### 6.3 Chapter Summary

This Chapter discusses the key findings in relations to the concept and constructs of the study. The result, derived from multiple case studies which underwent iterative research process and support by multi-sourced triangulation of evidences provided the stud with several key findings of the concepts and its associations. A causal explanation of the concept was employed to the study, and the following themes were established: (1) the need for flexibility to address uncertainty; (2) the use of collaborative FA; and (3) SCM performance of Lean and Agile, and Leagile. Based on this, the presentation of the *Refined Conceptual Framework of Agile and Leagile FA in Purchasing and Supply for Humanitarian Aid (Food)* was made, and explanation of each propositions and research questions were rendered.

In doing so, this study explained how existing literatures on the phenomenon corroborate or differ with the derived conceptual framework. As a result, the study observes four (4) relationships that are critical to the theoretical synthesizing. Next, explanation was provided on how these relationships that stemmed from the conceptual framework extends the adopted theoretical lens of this study which was based on SCM borrowing and complementary theories perspective. Following this, in the next and final Chapter of this study will conclude by addressing the research problem of the phenomenon and explaining the theoretical and practical contributions of the study, limitations, and suggestion for future research.

## CHAPTER 7: CONCLUSION

### 7.1 Introduction

The previous chapter discussed the findings of the two-case studies with multiple units of analysis comparison, and the presentation of the *Refined Conceptual Framework of Agile and Leagile FA in Purchasing and Supply for Humanitarian Aid (Food and theoretical synthesizing employing SCM's borrowing and complementary perspective on four (4) relationships established from the study*. This chapter presents the overall conclusion of the study. The order of the explanation is particularly emphasised and narrowing towards the theoretical and practical contribution of the study, its limitation and suggestion for future research. The outline is as follows: section 7.2 re-caps the research objectives, methodology, and methods; section 7.3 summarises the main findings of the three research questions; section 7.4 describes the implications for theory and practice drawn from this study; section 7.5 underscores the strength of the study; section 7.6 draws attention to the limitations of the study and suggestions for future research; and finally section 7.7 ends the chapter with concluding remarks.

### 7.2 Review of Research Objectives, Methodology and Methods

The stimulus to assume this study was based on twofold reasons. Firstly, at global stage, natural disasters which includes amongst it, floods, wildfires, storms, volcanic eruptions, earthquake and landslide, are on the rise and scholarly assumptions suggest possible occurrence incremental of five-fold over the next 50 years. This phenomenon expounds the need for an effective and efficient humanitarian relief operation. Logistics and SCM occupy 80% the cost of humanitarian relief operations, and that 65% of these cost concerns procurement and supply activities. Scholars have been racing against time to assist practitioners in this discipline. However, humanitarian relief operations' supply and purchasing issues have long plagued practitioners and scholars, in particular in addressing uncertainties of the intensity and occurrence of disasters owing to lack of information, meeting the volatile demands of relief supplies, and addressing government and private donor's interest that their donations are used in the best possible way i.e. the performance measures and accountability.

Arising from the seminal work of Chakravarty (2011) in evaluating contingency relief response that include both *ex-ante* and *post-ante* capacity and supply acquisition, the author suggests contingency response as an ideal response mechanism for more effective and efficient relief supplies, and gap which is central to this study specifying that contingency mechanism will have to be supported by an incentive contract, and communication through collaboration. Consequently, many initiatives have been made in the humanitarian logistics and supply chain management area to bridge this gap through collaborative and incentive-based procurement such as the use of indefinite quantity contracts or quantity flexible contracts, OC, PPOC and an increasing trend by NPO on the use FA.

FA in relief practice are contractual agreement with few qualified suppliers initiated during disaster preparedness stage and focus on quantity flexibility contract, in which the relief organization commits to purchase of a minimum total quantity from each framework supplier over a fixed agreement horizon, and, in return, the suppliers reserve capacity for the organization and promise to deliver items according to pre-specified agreement terms. It is premised on contingency approach, and is said could address the dilemma of wastages from *ex-ante* purchases, and higher transaction cost as well as more time consuming of *post-ante* purchases. A critical aspect and gap for the study is based on authors', Balcik and Ak (2014), work on supplier selection for FA in humanitarian relief, in which the authors suggested small organisations may not use quantity discount due to small orders and will benefit from the use of collaborative agreements. The authors recommended that future work on examining the effects of collaborative agreement on procurement cost and responses, and under which condition the agreement will be beneficial. In like manner, the deficit in HLSCM studies on humanitarian aid performance, in which the SCM concepts of lean, agile or leagile is slowly being recognised as relief activity's performance indicators, needs further empirical evidence for generalisation.

Secondly, at a more local context in Malaysia, in which this study was premised on, yearly monsoon floods pose a major concern to the country's largely governmental based humanitarian relief organizations. FA based on non-contractual agreement has been focusing on relationship with supplier, initiated under MoU with qualified suppliers during preparedness stage in 2011. However, the practise then was not wide spread and more of a state centric that in line with the constitutional obligations of

individual state in disaster management. However, arising from the devastating impact of the 2014 large scale flood which resulted in chaos in the procurement and supply of food aids, more states have begun to utilise FA for their localised disaster areas in districts. At the Federal level, modular based food aid was introduced through collaborative FA on G2G arrangement with the marketing agricultural arm of the government, capable in producing and supplying food aid products.

On both phenomena, despite a general perception of its success based on visibility in the responses stage, it is unclear how collaborative FA works in practice specifically in understanding how uncertainty is addressed through the use of the collaborative FA, and its performance gauge. In addition, the fact is, most humanitarian aid activities involve pre-purchasing and instant purchasing activity, and pre-positioning of relief supplies. Hence, the motivation of the study to continue the attempt to bridge the gap presented by Chakravarty (2011) focusing on this phenomenon and realisation of the potential benefits in generalisation of the findings for academia and for practitioners' future reference. Given these arguments, the aim of the study is to develop a conceptual framework for the procurement and supply for humanitarian food aid that exhibits the linkages between the use collaborative FA, SCM performance, and contingent key concepts of disaster management and SCM i.e. uncertainty and flexibility.

In tackling the research aim, this study was guided by SCM borrowing and complementary theories of CT, TCA, and SET, which formed the theoretical propositions. A two-case study procedure with mixed method design was employed to provide an explanatory, and cross-case synthesis. The method was in line with the current trend of HLSCM research domain, and justified for RQs with the adoption of 'how' and 'why' questions, which are commonly associated with explanatory purpose. The aim of this study was to propose a conceptual framework, which was conceptualised using multiple concepts derived from literature analysis of multidisciplinary area comprising SCM, HLSCM, disaster management, and procurement. The study's design was further supported by predicted proposition and theoretical proposition, and aimed to reject rival explanatory of the phenomena. Ultimately, the case studies were performed for analytical generalisation to concrete situations and to contribute to the body of knowledge by advancing the theoretical concepts, by corroborating evidence for the theoretical propositions and rejecting the rival propositions.

Comparative case studies on two governmental HROs that focuses on supply of food aid (variants, of modular and non-modular) in Malaysia, a flood prone country, was conducted based on purposeful sampling. Data collection performed in three phases of the research stemmed from a pilot study conducted earlier. The results of the pilot study support the concepts confirmation, procedures and instruments. Next, an inductive direction strategy was employed using the triangulation of multi-sourced evidence on collaborative FA of two case studies, comprising embedded unit of analysis that includes five regions of the country with eight subjects of HROs engaging with transactional base supplier, and non-modular food aid, comparing to one subject of collaborative HRO with governmental arm suppliers with manufacturing ability of modular food aid. In essence, the following are the procedures undertaken for each RQs:

#### **RQ1: Analytical Hierarchy Process (AHP) Approach via *PriEst* Software**

The aim of this procedure is to determine the purchasing and buyer-supplier strategy based on the product type. The HROs relief supplies category of product and procurement trust (leverage product- lean- competitive bidding, strategic product - leagile- collaborative relationships, routine product - non-strategic - e-procurement, and bottleneck product – agile - secure supply approach), and link to the buyer-supplier relationship approach (preferred supplier, strategic supplier, arm’s length supplier, and transactional supplier). The procedures were adopted from Lean and Agile Purchasing Model by Drake, Lee, and Hussain (2013), a self-constructed AHP evaluation form was constructed to measure the importance of four important factors to Lean (cost and quality) and Agile (flexibility and time), followed by and assessment of the strength of 12 impact factors to the components, three from factors of cost, quality, flexibility and time, and the final evaluation involves direct measurement to each component of six relief supply items including non-food items. A total of 12 key respondents representing each HROs participated for both case studies AHP evaluation.

#### **RQ2 and RQ3: Narrative and Content Analysis Approach via *ATLAS.ti* Software**

This study conducted multiple case studies supplemented by multi-sourced qualitative data from the nine HROs comprising: (1) interviews with 47 respondents from various interview comprising of HROs key procurement and operational personnel, suppliers and victims; (2) three direct observations on three HROs DRC and pre-positioning

sites; and (3) 24 documentary evidence. The HROs key procurement and operational personnel also provided the response on practical insight on the use of FA including challenges of its implementation, and improvement suggestions, in line with RQ3. Data analysis was conducted based on narrative and content analysis procedures, followed by within-case analysis, and comparative case analysis for replication logic. The study presents a case background and theoretical interpretation of the collaborative FA supported by buyer-supplier relationship implementations of the focal case organisations. The iterative process between the data and theory, and derived evidence sharpens the concepts and construct of the study, the associations between the concepts, and complementary theoretical evidence for synthetizations.

### **7.3 Summary of Main Findings**

This section summarises the main results for all the three RQs, which relates to the findings discussed in Chapter 6 of this study. The summary is as follows:

#### **7.3.1 Research Question 1**

*How existing procurements strategies impact on the competitive priorities of lean [cost and quality] and agile [time and flexibility]) at component level and how this led to buyer-supplier relationship tendency and the procurement strategy adopted?*

The result from the nine AHP evaluation on seven relief supplies comprising modular (dry food/bottled water), non-modular (cooked meal or fresh/raw food material for cooking), modular (instant based food), hygiene kit, clothes, sleeping aid, and tent/partition, were plotted in lean and agile purchasing model as proposed by Drake, Lee, and Hussain (2013). The model shows food variant positioning in the quadrant of the model: (1) lean quadrant, modular (dry food/bottled water) is positioned within this quadrant; (2) agile quadrant is occupied by non-modular (cooked meal or fresh/raw food material for cooking), and (3) leagile quadrant positions modular (instant based food). Based on the result and when compared to Kraljic's expanded matrix (Kraljic 1983; Tate 2014), the outcomes are demonstrated as the followings: (1) modular (dry food/bottled water) is categorised as leverage commodity with purchasing strategy of competitive bidding, and requires relationship a preferred supplier; (2) non-modular (cooked meal or fresh/raw food material for cooking) is

categorised as bottleneck commodity with purchasing strategy of securing supplies for a short term sourcing, and requires a relationship with transactional suppliers; and (3) modular (instant based food) is categorised as strategic commodity with purchasing strategy of securing long term availability, and requires relationship a with strategic supplier;

By triangulating the evidence from the HROs' interviews and documentations, the results confirms that modular food (dry food/bottled water) was purchased through competitive bidding by DSWs for the purpose of pre-positioning in the FOBs and remote areas, and it was revealed that collaborative FA was practised by NADMA-FAMA collaborative HROs (centralised base procurement) for modular (instant based product), and a variation of a contractual buyer-supplier FA with spot/emergency purchasing mechanism or (EPFA) was used by DSW HROs (de-centralised base procurement). The findings could be used to supplement Kraljic's Portfolio Model in the strategic product quadrant that requires a purchasing strategy to secure long-term availability to adopt FA, and for bottleneck products that require a purchasing strategy of securing short-term supplies to embrace EPFA. This corroborates with the body of knowledge that humanitarian aid procurement involves pre-purchasing and instant purchasing activity.

In addition to this, the findings also revealed similarity to product classification to functional or innovative type product (Fisher 1997; Drake, Lee and Hussain 2013). For instance, the nature of modular (dry food) fits the categorisation of functional product as the items has long life cycles, standard and forecasted. On the other hand, non-modular food fits the nature of an innovative type product. While, modular (instant based product) harness the benefit of an innovative product in agility coupled with features of high leanness, supporting the work of authors (Lo and Power 2010; Drake, Lee and Hussain 2013). In summary, the findings with the sub-proposition of the study that HROs adopts the right procurement strategy for each relief items based on its criticality during environmental uncertainty, and this satisfies the above RQ and is explained through the following relationship:

P1- Decentralized HROs leverages through competitive bidding on preferred supplier for leanness on food modular for pre-positioning purposes, and moves to relational procurement mechanism as EPFA with transactional supplier

(sometimes the same preferred supplier) for agility to cater for volatility in demand of non-modular supplies; while (b) centralized HRO focuses more on standard modular leveraging on unilateral lean and agility supply chain through strategic partnership with strategic supplier.

### **7.3.2 Research Question 2**

*How leagile is achieved using collaborative framework arrangement (which promotes buyer-supplier relationship and flexibility of supplies in a proactive and reactive response)?*

The content analysis of the triangulation of multi-sourced qualitative evidence resulted in descriptive and conceptual level results. Concepts that were measured through its property and dimensions in the codes provided patterns and relations required for within-case analysis, and comparative analysis for replication logic. The results were shown in graphs, diagram and tables to tabulate evidence, and to ease readability. Key findings include the sharpening of concepts and its constructs, which were arranged under three themes: (1) the need for flexibility involving concepts of uncertainty, HRO's situational characteristics, and HRO's response; (2) the use of FA which includes FA, buyer-supplier collaborations, in relation to FA response (contingency response, and reactive response); and (3) SCM performance which includes lean and agile, and leagile. By applying theoretical explanation, causal relationship and effects between the themes and concepts, the study presents the Refined Conceptual Framework of Agile and Leagile FA in Purchasing and Supply for Humanitarian Aid (Food).

Through enfolding of literatures, contrasting literatures revealed that buyers need to pay specific premiums for the supplier to lock in reserve capacity such as in the case of PPOC (Wang et al. 2015). Similarly, on quantity flexible contractual FA study in which the HRO commits to purchase of minimum quantity over a fixed-agreement horizon in exchange for supplier reserving capacity and delivery. A respondent from this case study argues that why should their organisation bear such cost if the disaster did not occur. Therefore, more frameworks are now focusing on building good relationship especially with large suppliers and leveraging on the relationship (Lu, Goh and Souza 2014), in which highlights the strength of this study. In fact, building relationship with the suppliers increases trust and enables suppliers the commitment

to reserve capacity. The collaboration effort reduces the risk of wastages occurring at the supplier's end, in which the supplier is still able to divert these resources for profit.

Meanwhile, similar literatures for generalisation reveal manufacturing industry for instance, requires flexibility in as a response strategy to uncertainties (Chandra and Grabis 2009; Jeeva and Dickie 2009; Wadhwa, Mishra and Saxena 2007). In terms of SCM performance, a study on the use of FA for NPO revealed increased response capacity by 28%, reduced delivery date of 13% and reduction of cost of 7-14% supported the generalisation of FA to increased performance, and the use lean and agile constructs to measures SCM performance (Balcik and Ak 2014). While on asserting FA as leagility driver, de-coupling point on the contingency response as indicator, similar to application of various industries that includes electronics, automotive, fashion, manufacturing-OEM, construction, chemical and telecommunication (Gaudenzi and Christopher 2015; Scott et al. 2002; Jayaram, Vickery and Droge 2008; Garcia-Arca and Prado-Prado 2010; Krishnamurthy and Yauch 2007; Chen 2012; Guisinger and Ghorashi 2004). Finally, FA with buyer supplier-collaboration and SCM performance, could be generalised based on the use in construction industry in which reportedly resulted in (1) less waste and duplication; (2) reduced transaction cost; (3) saving on tendering costs; (4) building of trusting, long term relationships; and (4) bringing of all "project knowledge" together at the inception of a project (Bresnen and Marshall 2002; Khalfan and McDermott 2006; Goodier et al. 2006).

The results of this enfolding literature discussion on similarity of the findings encompassing an extant literature support wider analytical generalization of the conceptual framework of the study. In summary, the findings corroborate with the sub-proposition of the study that HROs adopt FA for buyer-supplier strategy for a contingent based response in disaster relief efforts for leanness and agile SCM outcome, and rejects of contract base FA. This satisfies the above RQ with following relationship established from the study:

- P2- Uncertainty in environment in the casual mechanism of flexibility through FA based on its unilateral effect and HROs situational characteristics and response adopted;

- P3- The FA as causal mechanism, and agile or leagile driver, has a positive effect on: (a) promoting buyer- supplier collaboration for a reciprocal and mutual benefits; (b) supporting contingent response for modularity with de-coupling point in the SC, and agile response for combination of modularity and fresh supply of food (raw/fresh material for cooking, and pre-packed food) or standalone of the latter;
- P4- The need for flexibility through the use FA for buyer-supplier collaboration in different food variant, and the henceforth FA use as responsive mechanism is positively associated to lean and agile or leagile SCM performance.

### **7.3.3 Research Question 3**

*What are the challenges and practical issues (regulation and contract management) of the conceptual framework?*

This exploratory RQ was addressed by the respondent of HROs and Supplier. The fact that FA are considerably new mechanism that was adopted by governmental base HROs in the country reflects that of its opportunity for further refinement through changes in policy, and the external and internal managerial aspects. Common implementation of the FA and EPFA are red-tapes, threat of large-scale disaster, price hikes due to external factors such as fuel price that is highly influenced by market mechanism, and late payment issues that has an impact on trust. These challenges are most likely could be addressed during the pre-disaster preparations through engagement between actors through managerial approach. Meanwhile, the suggestion for improvement are perspectives from the practitioners which reduces biasness, and brings this study closer to the context.

Suggestions to support FA implementation includes: (1) managerial approach, improving forecasting through consolidating better information to improve better estimation of reserve capacity, and improving financial process for payments; (2) externally, improve the collaboration between inter-agency's support in particularly for distribution and delivery; and (3) policy, on standardization of the use of FA in all HROs and at central level procurement for high impact disaster, strengthening the existing MoU with fixed price or price range mechanism, FA to allow formation of

joint supplier for reserve capacity and pricing benefits to the HROs, special directive for HROs suppliers for increasing stock keeping that could impact ‘competitive act’ of the country, and exemption of goods and sales tax for relief supply items. The benefit of pre-specified term was discussed in previous studies involving FA (Balcik and Ak 2014; Lu, Goh and Souza 2014).

### **7.3.4 Addressing Theoretical Gap and New Synthetization**

The theoretical perspective of the study is explained in two strategies: (1) explaining the SCM structure of the phenomena based on CT-TCA-SET by adopting second part or the higher part of the middle-range theoretical frame of reference for SCM as outlined by authors (Halldorsson et al. 2007; Halldórson, Hsuan and Kotzab 2015); and (2) integrative nature of the theory based on its intersection for knowledge creation supported by literatures (Bowersox 1969; Ellram and Cooper 1993; Burgess, Singh and Koroglu 2006; Klaus 2009; Ellram and Cooper 2014; Halldórson, Hsuan and Kotzab 2015). The argument was based on results of the complementary theory network view diagram in Figure 5.29 as presented in this study.

The study establishes three complementary perspectives: (1) intersection of TCA (Bounded rationality) and CT (Contingency); (2) CT as Contingent for TCA and Complemented by SET; (3) TCA complemented by SET as causal/moderating for CT; and (4) need for strategy in dealing with uncertainty. Each relationship established in the RQs was explained on these established SCM perspective supported by extant literatures. In summary, this section confirms that the refined conceptual model extends the adopted combined CT-TCA-SET theoretical lens. In deriving to confirmatory, it had eliminated rival theory proposition of CT-PAT-SET combination. Moreover, it is professed that the adoption of TCA, CT, and SET is consistent with the body of knowledge that half of the research in SCM, combines theories (Defee et al. 2010).

### **7.3.5 Implication to the Overall Study**

*How Collaborative FA could be an agile or leagile driver for the procurement and supply of humanitarian food-aid?*

The key findings and discussions satisfy all the three RQs that were the pinnacles of this study. Therefore, these corroborate with the main proposition of the study that HROs prefer using buyer-supplier relationship's FA instead of contracts, to secure food supplies based on buyer-supplier relationship, and this is believed to be more efficient and effective in the humanitarian aid supply chain. Hence, it could be established that the implication to the overall study's RQ is that collaborative FA supports agile/leagile procurement and supply of humanitarian for food aid. Therefore it could be established that: (1) collaborative FA with spot/instant purchasing is the agile driver in reactive response for non-modular food aid procurement and supply, (2) collaborative FA as leagile driver in contingency response for modular food aid procurements and supply, and (3) that the theoretical underpinnings for this phenomenon is explained based on SCM borrowing and complementary perspective of CT-TCA-SET.

## **7.4 Implication for Theory and Practice**

Implications of this study are derived from the process of conducting the research finding of the study which have contributed to better understanding of the phenomena and its settings to the theory and knowledge, as well as the practical use.

### **7.4.1 Theory and Knowledge**

This study contributes to the theory and knowledge in several ways:

#### ***Literature of the phenomenon***

Firstly, in addressing the stem of this study based on gap provided by Chakravarty (2011) that an incentive in contract and communication through collaborations supports contingent response for more effective and efficient relief supply supplies. It is argued that the contribution to the understanding of the body of knowledge that an incentive-based contract is not the only mean of support for a contingent response. Previous studies have elaborated on how incentive based contact such OC, PPOC and quantity flexible contract FA could make an impact on the efficiency and effectiveness in humanitarian aid procurements, however these studies are limited to the specific terms, and has less empirical evidence to show on the supply perspective especially on contingent response that actually lead to performance. Moreover, the perspective of

collaborative relationship to the context of supporting contingent response is not addressed together with the incentive contract. Hence, the generalization in the context of what the above gap is with regards the contingent response idealism, appears below the whole context. On the other hand, this study supplemented academia of the use of collaborative FA as an alternative option for considerations.

In doing so, this study demonstrates how collaborative FA could be used to promote buyer-supplier relationship on contingent response perspective. In addition to this, it also identifies that for contingent response, modular based food supplies are suitable fit for pre-purchasing activity in *ex-ante* or disaster preparedness stage for pre-positioning, and *post-ante* supplies during responses stage. Other contribution includes that a collaborative FA are a feasible option for spot purchasing during responses stage or *post-ante* supplies, involving in particular non-modular food supplies that have short life-cycles and the demands are unpredictable for example food such as fresh meat and poultry, fresh vegetables and fruits. This study demonstrated that such spot purchasing risks of cost inflation due to market mechanism in disaster situation could be soften with the collaborative FA' fixed or scheduled price mechanism. This is supported additionally by buyer-supplier collaboration in sharing of information on disaster intensity and predictions. This supports the action of suppliers to reserve capacity, thereby provides additional security in the availability of supplies for the HROs. This is not explicitly mentioned in the FA through the exchange of information from relationship and based on the understanding of reciprocal benefits between the two parties in collaboration for such commitment.

In supporting such responses, first the HROs need to make feasible prediction of the disaster intensity based on information from multiple agencies providing the information, and thereon make assessment on the situational characteristics such as supplier availability, manpower, ability to cover geographical area, assets considerations, the existing SOPs and internal directives pertaining to procurement and supply structures. This gives further understanding of the motivation for HROs adoption for proactive, contingent, or for a reactive response approach to its humanitarian aid supplies. Hence, arising from this is the response mechanism that requires flexibility to handle *ex-ante* and *post-ante* needs. Hence, the adoption of the use of FA is elaborated. Based on its assessment of the suppliers' ability and financial positions, and willingness for placement of particular pre-specified forward payments,

the HROs decided on collaborative FA and leverage of buyer-supplier relations to leverage on its securing supply needs especially on non-modular food supplies needs in the relief centres.

Moreover, as there is no contract obligation, the payments were supplemented by direct purchases or spot purchasing strategy and especially applicable in rural area and districts. To supplement such activity, a de-centralised purchasing empowers the field officers at districts to act for the collaboration benefits during preparedness stages and co-ordinate the supplies during responses stage. In the instances for remote areas and unreachable disaster affected area, a pre-positioning of modular (dry food) is performed at the FOBs complemented by competitive bidding performed through centralised purchasing at the state level. Arguably the method of procurement is adapted as result of HROs' decision to be flexible based on rural needs, and the availability few capable suppliers which are on transactional basis.

Similarly, to ensure the needs of immediate supply of responses for the traumatised victims for all areas of disaster, the HROs adopted a standard modular approach of instant food. Based on its accessibility of supplier's capability for manufacturing and the similar nature of governmental agency, the HROs adopted buyer-supplier FA based on G2G arrangement (which exempts for forward payments) and strategic relationship. This is to leverage on bulk purchasing for cheaper cost, and the high-level sharing of information to facilitate reserve capacity arrangement, arrangement for storage of pre-positioning at supplier's warehouses and for timely and adequate responses. In addition to this, high level exchange of information has allowed the supplier for postponement of its production, and produce for responses based on order-to-make. This could be generalised to NPO HROs at a global level practices, and SCM league practise is based on de-coupling point, which is common in manufacturing and fashion industry.

Arising from the current scarcity in HLSCM performance indicator, despite being vital for donors or taxpayer's confidence of the prudent management of the funds for humanitarian aid, this study contributes to the body of knowledge which has been lacking empirical evidence for SCM lean and agile adoption. More specifically, previous studies have asserted that it is difficult to encapsulate speed, agility and flexibility in mid-range theories, and that present study lack the "*how to get there?*"

(Burcu Balcik et al. 2015). Although this study does not claim to possess an absolute measurement tools for the humanitarian aid performance gauge, nevertheless the findings of this study offer some directions on encapsulating these concepts in mid-range theories and add to the existing academia's understanding. Moreover, the fact that the lean and agile concepts were used in both procurement and supply (the former to gauge purchasing strategy and corresponding supplier relationship based on relief supplies commodity, while the latter based on the supply process of contingent or reactive response), demonstrate the possibility for generalisation in future works.

Hence, based on the revelatory insight of the phenomena, it could be articulated that the contribution of this research is on the originality of buyer-supplier relationship FA use, in which the study is offering a critical redirection of existing view on the phenomena as stemmed from the seminal work of Chakravarty (2011), with respect to localised small suppliers. This study refutes that contract with incentive is not the only direction to attain contingent response in humanitarian aid, and in likely manner a collaborative and relational theme also presents possible explanation of the phenomena. In doing so, this study also provides incremental insights and adds to the body of knowledge of humanitarian aid logistics and supply chain management area concerning the followings: (1) on the role of collaboration in humanitarian aid procurement; (2) on uncertainties and strategies as contingent factor to the adoption of FA as response mechanism; (3) on the perspective of FA for spot purchasing for non-modular food aid supplies and to the existing knowledge of FA on modular food aid; (4) on SCM lean, agile, and leagile as non-financial indicator for humanitarian aid performance; and (5) register FA as possible leagile drive based on postponement and de-coupling points supported by the exchange of information between buyer and supplier.

*The study suggest critical redirection of existing view on the phenomena as stemmed from the seminal work of Chakravarty (2011) .*

### ***Literature on theoretical lens***

The contribution based on incremental insights of theoretical lens could be accentuated as follows:

### ***Empirical Statement Generalised to Concepts and Theory***

The case study and in particular the respondents from AHP and interviews coupled with the triangulation of data from observation and documentary evidence provided this study the empirical statement that is generalised to concepts and theory. For instance, the explanation provided on the use of FA for spot purchasing for non-modular food aid based on transactional relationship to secure short term supplies, and FA for modularity based on strategic collaboration supports the postulation of its inclusion as mean to expand the existing body of knowledge on Kraljic's expanded matrix of purchasing strategy and the adopted supplier strategy based on commodity (in this case the relief supplies) arising from the empirical statements. Another example is on confirming the concepts and construct, as well as the causal explanation of the relationships between concepts forming the refined conceptual framework of agile and leagile in purchasing and supply for humanitarian food aid as advocated by this study are evidently derived from these empirical statements.

*The study contributed in expanding the existing body of knowledge on Kraljic's expanded matrix of purchasing strategy, and the adopted supplier strategy based on commodity (in this case the relief supplies) arising from the empirical statements.*

### ***Generalising from Concept to Theory, and Construct or another Concept***

This study demonstrated the analytical generalisation of the concepts and of its relationship to other fields for instance fashion and manufacturing, thereby establishing its internal validity. The direction of this study was premised on SCM complementary perspective adopting CT, TCA, and SET assumptions to guide the construct measurement of the concepts which originated from SCM including procurement and disaster management. In addition to this, this study employs constructs' property and dimension as measurement tools of grounded theory, which originated from authors (Corbin and Strauss 2008), and measure of assessment and strategic performance measures for example high, moderate and low, owing to SC performance measures depicted in the literature (Gunasekaran, Patel and McGaughey 2004). The constructs for TCA i.e. bounded rationality (insufficient information), uncertainty, assets specificity, risk of opportunity mitigation (in particular using FA

characteristics of fixed or price range, quality, flexibility on quantity voluminous, and timeliness of delivery), for SET [trust, commitment (on reserve capacity), collaboration (on information sharing), reciprocal benefits], and for CT based on contingency variable, response variable and performance variable, an architecture of the CT-TCA-SET relationships and point of convergent were able to be identified. The network view derived using CAQDAS software were used to establish relationship between concepts, and hence forth to theories.

From this point forward, the relationship established from the concepts forms the basis for theoretical explanation based on how TCA interacts is contingent upon CT, and is complemented by SET, based on its construct's relationship. The study confirms that the refined conceptual model extends the adopted combined CT-TCA-SET theoretical lens and provides HLSCM body of knowledge a clearly explained element of theories used in new conceptual model and constructs, and contributes to the development of a cohesive theory of logistics and SCM (Defee et al. 2010). It also provides further in-depths use of microeconomic perspective and middle-range theories to explain SCM complementary theory using the theoretical frame to explain the managerial arena of SCM based on two questions: first, how to structure a supply chain when perceived as institution, which was TCA; and, secondly, what is needed to manage this structure, justified by utilising SET for this study. This provides further empirical evidence to contend previous study's finding that HLSCM literatures lack theoretical developments and remains at conceptual level (Burcu Balcik et al. 2015).

*The study contributed to the refined conceptual model and extends the adopted combined CT-TCA-SET based on SCM complementary theoretical lens, provided HLSCM body of knowledge with a clearly explained element of theories used in new conceptual model, and empirical in contending that HLSCM research remains at conceptual level.*

### ***Methodology***

This study's adoption of purposeful sampling was on all disaster-prone states of the country, in which eight states categorised into five regions. The categorisation is made based on flood profile similarity and the disaster response taken by the HROs. The purposeful sampling in this manner provided richness in the data for logical inference. In addition to this, this study also professes that the purpose sampling resulted in

stronger generalisation of the study, especially that data can be generalised to un-sampled portion of a population portion those not interviewed in the remaining state that are less flood prone. Hence, this study contributed methodologically in generalising from data to description, and henceforth giving a stronger analytical generalisation of the phenomenon to another phenomenon.

Next, this study also contributed methodologically by employing performances measures of cost, quality, flexibility, and time on both area of the phenomenon namely on procurement, and the supply chain of humanitarian aid. For example, for procurement in understanding the HRO's strategy for based on relief supplies commodities, and what is the right purchasing strategy and thereupon the supplier relationship that be employed as strategy for flexible responses. Secondly, on measuring the performance of buyer-supplier relationship and the corresponding supply chain, in which in line with the existing body of knowledge need that performance evaluation of buyers or suppliers is simply not enough – relationship must be evaluated (Gunasekaran, Patel and McGaughey 2004, pg.336)

In line with the call from HLSCM's literatures on employing more case study research and that literatures also indicate that case studies as the most used method to investigate the topic of performance measurement in humanitarian supply chain (Van Der Laan, De Brito and Vergunst 2009; McLachlin, Larson and Khan 2009; de Leeuw 2010; Abidi, de Leeuw and Klumpp 2014), this study upholds by employing two-case study procedures with multiple unit of analysis, and in particular with mix-method approach. As demonstrated in the case studies, the combination of AHP technique and triangulation of multi-source evidence from interview, observation, and documentation resulted in convergence of decision-making strategy to explanatory aspect of the research more succinctly.

More importantly is the feat of employing Lean and Agile Purchasing Model by Drake, Lee, and Hussain (2013) and its constructs measurement consisting cost, quality, flexibility, and time, on humanitarian aid relief supplies. These measurement are classified as strategic level measures, which can be generalised based the SC performance metrics framework proposed by authors (Gunasekaran, Patel and McGaughey 2004), and in the same manner it is more reflective of strategic response and nature of business relationship as argued by authors (Kaplan and Norton 1996).

This is coupled with the argument that an operating system must try to meet the strategic objectives of quality, speed, dependability, flexibility and cost (Gunasekaran, Patel and Tirliroglu 2001; De Toni and Tonchia 2001; Slack et al. 1995; Gunasekaran, Patel and McGaughey 2004). Moreover, the findings of categorisation of the relief supplies into lean, agile, leagile and non-strategic items correspond to finding in the triangulation of multi-sourced data on the purchasing strategy that was employed by both HROs i.e. FA and EPFA with the prevailing buyer-supplier's relationship strategy. The usefulness of the model to measure various types of commodity reflect of its generalisation for future utilisation in other disciplines.

*The study contributed through methodological in generalising from data to description (un-sampled portion of population), the use of performance measures on procurement as well as the buyer-supplier relationship to gauge SCM performance of lean, agile, or leagile, and in generalising the employment of Lean and Agile Purchasing Portfolio Model in field of humanitarian aid's procurement.*

#### **7.4.2 Practice and Policy**

Practically, the main purpose of this study is to offer empirical evidence to the policy makers, regulators, and HRO practitioners on the implementation of collaborative FA. The general concern in the body of knowledge is that current research management is irrelevant to practitioners and primarily written to academics (Pfeffer and Fong 2002). Hence, this study's approach considers these findings, and steps have been taken to include not only scientific usefulness but also of practical usefulness, among others is by dedicating RQ3 for this purpose. Implication of the findings to practice and policy are as follows:

##### ***Practical usefulness of collaborative FA***

The followings are in relation to the wider use for collaborative FA:

##### ***Generalising the use of collaborative FA in a wider context***

This study is built upon a premise that much focus in the body of knowledge is a one-sided representative of NPO based such as United Nations World Food Programme (WFP), IFRC and affiliations such as MSF, and other NGOs alike. Studies that included governmental based HROs would benefit in better representation for both

academia, and in particular a wider spectrum of humanitarian practitioners. This is because humanitarian aid actors varies in stakeholders especially in funding (donors for NPOs, taxpayers for governmental), the structure and operations (NPOs are limited by its capabilities for immediate response, whereas governmental are more equipped for responses including large scale disasters and of remote areas, which may require special clearance and assistance from authorities), and also in goals in procurement and supplies of humanitarian aid (NPOs are mostly driven by the need for immediate assistance for the victims whereas governmental are additionally driven by the larger economic, social and political benefits. In addition to this, governmental and NPO HROs also share the same accountability and transparency to their donors (tax payers in the case of government) in managing an efficient and effective humanitarian aid, in which the former strives to achieve Value for Money, a core principle in good governance.

Moreover, the fact that this study adopts a governmental HROs approach to the sampling may likely to be similar to most developing countries in Asia and Africa. As in the case of Malaysia, the role of governmental in humanitarian aid is particularly specified in the constitution of the country, and in practice NPOs fills a more complementing role. Therefore, the existence of collaborative FA practices in Malaysia probably exist in larger context of the world especially the least developing countries. Apart from this, collaborative FA may also benefit sectors such as the example cited by study for use of FA in construction industry and demand volatile sectors such as manufacturing and service industry including governments, for example, meeting the need for a political representative who are high on the move in servicing the people's need.

*The study contributed in generalising collaborative FA: (1) generalised its use within humanitarian practitioners; and (2) for other phenomenon generalisations.*

***Addressing the concern of the use FA for Localised Small Supplies and Improved Market Engagement for Local Economics' Goals***

As addressed previously from the seminal work of authors (Balcik and Ak 2014) on the prospect of collaborative FA for small suppliers, who are limited by its financial

mean to adhere to pre-specified terms such as quantity discounts, the variant of FA as postulated in this study presents strategic opportunity in addressing this concern as well supporting the economic benefits of localised small suppliers in humanitarian aid. This corresponds to some of the challenges raised by academia arising from recent disasters (Asian Tsunamis, Pakistan floods and Haiti earthquakes) and the emergence of humanitarian aid responses tailored to mid-sized emergency which a possible avenue for more localised market engagements to create valuable micro-economic impact (Fenton, Goodhand and Vince 2014). Hence, the strategic factors in terms of engagement which are important to collaborations as highlighted by this study, include frequency of sharing information in terms of disaster occurrence and its intensity, delivery of information to HROs and relief centres, pricing, appointment letters by committees, and reserve capacities could be used as means of more market engagements. Hence, the contribution of this study is in providing such directions based on its empirical evidence.

#### *Leveraging on the use of FA for the Limitation of Capabilities of HROs*

The study stresses that the collaborative act between buyer-supplier could lead to mutual benefits in humanitarian aid activity. For instance, localised based HROs are limited in its assets such as cold-storage warehousing capabilities and vehicles which could affect delivery. Hence as exhibited by this study, HROs especially benefit in terms of reducing its transaction cost on asset specificity for this purpose through collaborations. The supplier with decent capability may resume the responsibility for some reservation of stocks especially short life-cycle non-modular food based for humanitarian aid purposes, and this support is evident in a long-term relationship cases involving transactional small to large supplies of a local area disaster. Furthermore, some suppliers also demonstrated commitment in delivery to relief centres at no additional cost as a result of the relationship established through FA. Henceforth, this contributes by providing the real context as empirical proof to support current practise, the importance of nourishing long-term relationship even in mere transactional cases, and the potential benefits of such relationship in humanitarian aid.

*The study provides real context evidence of the benefits of collaboration for practitioners' generalisation of its benefits.*

### ***Practical Use for Humanitarian Aid***

The following highlights how humanitarian logisticians could improve current practice with FA:

#### *Understanding the importance of trust in collaborative FA*

Firstly, the finding of this study reveals that the core of collaborative FA is trust. In short, the nature of the collaborative FA is non-contractual unlike contract which are usually bounded pre-specified terms in exchange for supplier's reserve capacity, and lead time for a particular geographical area. Instead, this study found that trust binds the collaboration between the HROs and suppliers. Transactional suppliers' collaborative strategies are short-termed and aimed for securing of bottleneck supplies, which explains why HROs lesser engagement with the suppliers of this relationship. However, the concern is that lesser engagement means little trust, which impacts supplier's willingness and commitment for reserve capacity, and thus this adversely impacts the outcome of the humanitarian aid. In contrast, HROs effort to promote higher levels of engagement with strategic supplier for strategic relief supplies category resulted in high level of trust between the HROs and of their suppliers.

The impact as demonstrated in this study, is empirically proven that collaborative engagement involving high level of trust, voluminous and flexible reserve capacity and leagile based productions, which benefits the practitioners to secure long term as well as immediate supplies of modular food-aid with large geographical coverage, and for high impact disaster. Therefore, the contribution of this research is for practitioner to understand the importance of building trust in a collaborative FA to increase the commitment and better management of reserve capacity commitment of HRO's suppliers for more effective and efficient response.

*This study contributes for HROs' understanding of trust as an important element of collaborative FA and the prediction of its use to reduce risk and secure supplies for responses for short-term and long-term of humanitarian aid.*

### ***Importance of Humanitarian Aid Assistance Tools – Forecasting and Improved Predictions, and Responses***

The use of assistance tool is important in the context of humanitarian aid. This is because tools may provide the knowledge that is required for an effective decision making. This study identified that HROs have advanced in the use of mobile apps for example ‘*infobanjir*’ or flood information apps for shared information between buyer-suppliers. They provide daily updates for responses stage on the number relief centres opened, its location and the number of victims involved, which benefits the suppliers to gauge daily needs and for preparations of future needs. This is supplemented with the use WhatsApp apps to enhance communication between HROs and suppliers which also includes third party agencies for distribution and delivery. The practise is smaller that of the satellite telephones calls used in humanitarian operations in Africa, however the significance of communication through the use of technology could be generalised.

Despite this, it could be articulated that HROs still lacks the use of tool whether manual or computer-aided for forecasting and predictions. As a result of this, most decisions for pre-positioning and reserve capacities were made on previous years’ track record, which could be inaccurate at times. Authors (Scholten, Scott and Fynes 2010) state that for integration of humanitarian supply chains, greater use of information technology is needed. There has been some improvement elsewhere on disaster management: (1) Enterprise Resource Planning (ERP) used by WHO and IFRC; and (2) the use of other ICT solutions that for disaster risk management such as Advancing ICT for Disaster Risk Management (AIDA), and GMEC systems to aid authorities’ response time, both with the assistance of sensors and satellite imagery. This study contributes in highlighting the use of ICT tools in HRO’s current buyer-supplier relationships, and the lack of it in addressing uncertainty.

### ***Improving the Management Structure for Early Engagement, Frequency and Type of Data for Information Sharing, and Improving Payment Mechanism***

Another practical perspective arising from this is the need for improvement in management of the supporting structure of the FA. Current practices especially in

transaction supplier relationship reflects shortages in information sharing and there are no standards in practice between the HROs. This study discovers that the collaboration lacks early engagement (in some cases it is in the response stage), low frequency of engagement, and lacks the relevant data exchange that both the actors of the collaboration need. This resulted unpreparedness, lack of commitment and trust at supplier's end in the seriousness of the FA implementation. Hence, it is an important aspect that need to be addressed by the HROs on this volatile relationship in a non-contractual arrangement.

Secondly, late payment has been mentioned by HROs could affect their relationships especially for small suppliers. Hence, it is equally important for the HROs and practitioners to improve the management aspect for speedier payments. This includes getting special approval as the government system is not based on accrual but on yearly budget basis, and the fact that flooding occurs at year end in most parts of the country could affect the payment process due to documentation process, availability of funding and these had past the accounting period. Hence, it is the practical issue of a collaborative FA that need addressing.

*This study contributes by highlighting practical issues impacting the collaborative FA, which needs addressing for better effectiveness.*

### ***Practical Use for Regulators, and Policy Makers***

Practitioners driven initiative are needed in the area of SCM performance (Gunasekaran, Patel and McGaughey 2004), and hence the prior discussion on RQ3 had recognised genuine practitioners view on policy changes that is required for this study. The following highlights how regulators and policy makers in the context of the country under study, could enhance the implementation of collaborative FA for efficiency and effectiveness by policy changes:

- (a) strengthen MoU and formalization of FA implementation with requirement on price ranges or fixed price;
- (b) allow formation of joint supplier to support capacity requirement;
- (c) provide directive on agency that controls consumer and anti-competition act to allow stock withholding for HROs' suppliers;

- (d) encourage HROs to loosen their circulars on sharing of information with selected suppliers;
- (e) permit special exemption to allow year end payments; and
- (f) allow the exclusion of tax elements for food raw materials and incentives introduction for humanitarian aid suppliers.

*This study contributes by highlighting on practitioners' view for policy changes that are required in relation to the case on-contractual collaborative FA to improve its implementation, overall effectiveness and efficiency.*

### **7.5 Strengths of the Study**

This study has several strengths worth mentioning. Firstly, the format of the thesis adopts case study reporting as advocated by Golde-Biddle and Locke (1997); Yin (2003) which consist six standard sections: (1) Introduction, (2) Literature Review, (3) Research Method, (4) Results, (5) Discussion, and (6) Conclusion. However, this study presents the six critical component and introduced a minor variation by adding an additional component of conceptualisation and proposition, as this particular part drives the case study to a clear logic and enhances comprehensibility. The topic of this study covers both academics and practitioners.

Secondly, the topic started from real research problem occupying humanitarian aid procurement and supply chain management, an area where this researcher had some prior working experience. Based on specifics of this problem, a clearly defined gap from existing literatures as follows was explored: (1) Chakravarty (2011) suggested future work to possibly use of incentive contract and collaboration to support contingent response in humanitarian aid; and (2) Balcik and Ak (2014) suggested that future work on collaborative FA as alternate for pre-specified term contracts, examining the effects of collaborative agreement on procurement cost and responses, especially for small suppliers.

Thirdly, following a multi-disciplinary literature review, the structured account and presentation based on diagram of literature analysis identifies complementary theory perspective, concepts to be adopted, and constructs to be used for the study. This is followed by the research design, in which the study identifies case study approach as

the RQs are based on ‘how’ questions and that this study is intended to understand specific phenomena. The ontology of this study is based on a relativism realm and the epistemological is based on pragmatic approach based on two case studies (with multiple unit of analysis) employing mix method design of AHP converging for triangulation of evidence with interview, observations and documentary evidence. The results were based on AHP and content analysis, were then further analysed for within-case and comparative analysis and findings were done based on replication logic, for theoretical development of the study. Table 7.1 summarises the relevant test of validity and reliability undertaken by the study.

Table 7. 1: Four Design Test as Tactics for the Case Studies

Test	Case Study Tactics	Evidence	Phase of Research in which Tactics Occurs
<b>Construct validity</b>	(1) Use Multiple source of evidence (2) Establish chain of evidence (3) Have key informant review draft (4) Case study report	(1) AHP, Interviews, Observation & Documentary evidence. (2) Case study data base (3) Key Informant is a Senior Assistant Director from HRO. (4) Report base on dissertation format	See Chapter 3 and 4
<b>Internal validity</b>	(1) Used pattern-matching (2) Address rival explanation (3) Use comparative case study	(1) Proposition versus empirical evidence (2) Rival explanation rejected (3) For prediction and contrasting view	See Chapter 3 and 4
<b>External validity</b>	(1) Used complementary theory assumptions (2) Used replication logic for two case study with embedded unit of analysis	(1) CT-TCA-SET (2) Within case analysis and comparative case studies	See Chapter 3 and 4
<b>Reliability</b>	(1) Used Case Study Protocol (2) Developed case study database	(1) Before data collection (2) Refined after data collection	See Appendices 1.0 and 3.1

Adapted from Yin (2014)

Finally, this study’s strength is that the research was undertaken to the very ability to follow a good research criterion of originality, relevant/utility, and rigorousness. In addition to the rigorousness discussed earlier, the originality of this study is that it is based on research idea that is less exploited, and the discovery of new entity, the use

collaborative FA in the procurement and supply of humanitarian food-aid. It provides relevancy in presenting the usefulness of this study to the humanitarian aid and SCM context by providing incremental contribution to the body of knowledge in the development of conceptual framework to understand the association of relation between the strategy to address uncertainty through flexibility, the use of collaborative FA, and link to SCM performance of lean, agile and leagile.

The architecture of the relationship is explained through CT-TCA-SET complementary theoretical perspective, which contributes to the HLSCM body of knowledge, which was in scarcity of the use of theory. In doing so, this study demonstrated originality by combining existing theories to gain better insights about an application area. In addition to this, this study demonstrated a novel use of methodology using existing theory, and possibly contributed to new methodology by exhibiting dual use of the SCM performance concept of lean, agile, and leagile in the procurement as well as the supply of humanitarian aid of food supplies. Other contributions worth mentioning includes of utility for practitioners, and policies recommendations. Finally, acknowledging the strength of the study, nevertheless does not mean that this study is not without any limitations. The next section will discuss the limitation and suggestion for future work.

## **7.6 Limitations and Directions for Future Research**

This study takes a first step by addressing the use of collaborative FA in the procurement and supply of humanitarian food aid. As with many other studies, this study acknowledges of its limitations, and given the lack of studies on this topic, it further identifies and discusses several avenues for future works.

### ***Limitation of data employed***

The first limitation as has been noted in the case study database includes the small number of observations that were conducted as well as documentary evidence collected in comparison to almost 50 interviews that were able to be performed. As addressed earlier, the imbalance was partly due the fact that for the year of under study, there were very less flooding occurrences which affected the data collection on the humanitarian aid activity. Some disaster occurred in far-fetched area from the

researcher's location, and the contacted HROs were not able to provide any logistics support due to unpredictability in the disaster timing and that most were in the form of flash flood and receded quickly. Similarly, some data were acquired from underrepresented HROs due to unavailability of the officers and also due to small organisational structure as in the case of NADMA.

***Future studies may employ multiple researcher strategy for multiple case studies.***

The capacity of this case study involves numerous travels and logistical preparation as his study's case are similar to a multiple case studies' multitude. In addition, based on experience, data collection for these type of multiple case studies may incur high cost due to extensive travels often with own vehicles. Hence, future studies may consider few researchers working in teams, possibly from the locality of the affected states in disaster for a speedier deployment, cheaper cost and other benefits of staying longer to gain valuable insights during preparedness stage, responses stage, and post disaster. In addition, researchers should work to obtain earlier approval from the respective HROs, and for assistance to access disaster areas, which could be dangerous.

***Limitation of the conceptual framework.***

The second limitation is with regards to this study's conceptual framework, in which concepts arising from the empirical statements are reduced to uncertainty, situational characteristics and response under the theme of strategy for flexibility (left side of the framework), while on the right side is on SCM performance involving concepts of lean, agile, and leagile. Arguably the results supporting the conceptual framework was within the boundary case study. However, there are variations of concepts that were not within the case boundary, for example under the theme of needs for flexibility, uncertainty itself could be broken down into other characteristics such uncertainty of market reaction to disaster.

***Future studies may consider to expand or contend the conceptual framework.***

As per prior argument future study may consider to expand the use of other concepts for example: (1) uncertainty, may consider market reactions to disaster; (2) situational characteristic of the firm may expand to external factors such as its capability to engage third party logistics and firms capacity in using the technology; (3) SCM performance,

may include flexibility and integrations as suggested by previous studies on modular use and performance. Alternatively, as studies in SCM performance and searching for the right tool to measure is still on-going, future studies may also contend on the use of lean and agile as performance gauge, and suggest other means including financials as indicator for SCM performance.

***Limitation of the study arising from dyadic relationship approach.***

The third limitation is study is that this study's scope is on dyadic relationship of buyer-supplier in the context of humanitarian aid. However, the data that was collected based on the interview also includes the practitioners' highly regarded views on the government inter-agency collaborations that support the delivery of the food aids to the relief centres in both accessible and inaccessible areas. Worth mentioning is that the inter-agency collaborations supported the HROs and the suppliers for timely and reliable delivery and distribution of the food items to victims.

***Future study to expand on other actors and supply network perspective.***

Future works may consider to include a network perspective of the supply chain beyond the dyadic relationship. For example, Morgan (2007) professes the need to develop SCM performance measurement system to break the dyadic relationship barrier and make management of the supply network a more realistic aspiration. Other studies rationalise flexibility of a supply network, which includes two key sources which are vendor flexibility and sourcing flexibility, to extend the concept of leagile (Purvis, Gosling and Naim 2014). Hence, future work when working with supply network could explore the 'collaborations with other actors', and as pinpointed by this study to also include at inter-agency collaboration for delivery and HROs supplier collaboration with their vendor and tier-suppliers. In doing so, a different theorization prospect could be encapsulated, for example the use of network theory (NT) on a supply network perspective.

## 7.7 Concluding Remarks

This study imparts originality in the contribution of addressing a problem in the use of pre-specified terms of an incentive contract in the procurement and supply of humanitarian aid of food supplies. Collaborative FA require the humanitarian aid organisation to collaborate with pre-qualified suppliers to secure supplies during disaster preparedness stage. The humanitarian aid organization extends the framework to its supplier with an appointment letter during preparedness stages, and provides information in relation to potential disasters, the required food supplies details, and work on fixed or price range/schedules with quantity flexible order arrangements. This research studies the procurement method of collaborative FA mechanism for food supplies under contingent response, which includes *ex-ante* and post-ante supply responses. In doing so, the study also takes into account of contingent considerations for the FA to be adopted, and evaluate the FA as drivers of SCM performance.

A two-case study procedures involving embedded units of analysis of HROs in Malaysia was performed, premised on complementary theoretical assumptions as humanitarian aid is better understood from borrowing inter-disciplinary theories' perspective. Investigation includes employing AHP techniques to understand HROs purchasing and supplier strategy on each food variants, followed by convergence with triangulation of qualitative data from interviews, observation, and documentary evidence. The results provide the HROs with insights on addressing uncertainty with the strategy for flexibility, by employing FA (pre-purchasing or spot purchasing) on different food variants (affected by life cycle) to *ex-ante* and *post-ante* responses, and thereafter demonstrates the attainment of SCM lean and agile, and leagile from a procurement and supply perspective.

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**PROTOCOL FOR THE CASE STUDY  
AND SUPPORTING DOCUMENT  
FOR THE STUDY**

(APPENDIX 1.0)

## **A. Overview of the Case Study**

### **1.0 Background**

Logistics and the procurement function within forms 65% of the expenditure within the disaster relief. Such is the importance of having an efficient and effective procurement and supply management of disaster relief. However, scholars and practitioners have pointed out that supply and purchasing issues have long plagued disaster relief efforts. The United Nations highlighted about supply bottlenecks causing delays of the much needed relief items for international relief activities, and the same could be said at the local stage of many countries. One issue in particular in the efficiency and effectiveness, in particular in ensuring timely supplies, while maintaining the quality, cost and flexibility of the disaster relief items, commonly includes water, medicines, heavy machinery, tents, blankets and most importantly, food.

Next, disaster relief activity lacks performance measurement. In a recent development, practitioners have adopted the use of Framework Arrangement (FA), where procurement benefitted by being ahead of disaster using a pre-approved supplier with agreed pricing mechanism, no fixed quantity, quality and time adherence. However, the present study still lacks the use of FA and its association to enhancing performance regarding cost, quality, time and flexibility in disaster relief supply management. Also, a critical part of such study should look into the activity of the actors of FA, namely buyers and supplier's collaboration and information to support contingency response, the desired hybrid response in disaster relief and achieve performance in disaster relief procurement and supply.

Literature analysis points to concepts of few SCM concepts. Firstly on lean or agile or, lean and agile (leagile) to indicate strategic goals of performance. Secondly, on buyer-supplier relationships, gauged based on factors of information sharing, collaboration, trust as antecedents of SCM performance enablers. Thirdly, on contingency response, in which the number of relief items kept at minimal based on pre-positioning, and as the intensity of disaster determines the required supply quantity. These present a clear gap for the study on establishing the linkages between these concepts. Moreover, buyer-supplier relationship and the factors impacting it are deeply rooted in social exchange theory (SET), while contingency response is from contingency theory with the understanding that there is no best way to manage the organization because of its contingent upon several factors, the internal and external to the organizations. As literature also suggest a complementary theory perspective to explain disaster reliefs, a combination of SET and contingency theory seems a compelling semantic for this study.

## **2.0 Objective:**

- Goals reflecting the interest of the case study audience
- To establish linkages between the concepts of FA between buyer and supplier relationship governed by SET factors to contingency response and its impact on disaster relief using lean and agile factors as performance measurement.
- Sub-aims the case study:
- To understand the linkage of different strategies of procurement on the commodity to lean and agile perception in the disaster relief supply management;
- To understand the linkages of using framework arrangement supported by collaboration between actors to contingency response adaptation, and, lean and agile outcome;
- To explore the practical aspects of the conceptual framework.

## **3.0 Case Study Questions and Propositions**

Framework Arrangements promotes buyer-suppliers relationship through collaboration and information sharing to support contingency response of disaster relief activity, which leads to lean and agile SCM performance.

RQ1: How do current procurements strategies impact on the competitive priorities (lean [cost & quality] and agile [time & flexibility]) at the component level and how does this lead to buyer-supplier relationship tendency?

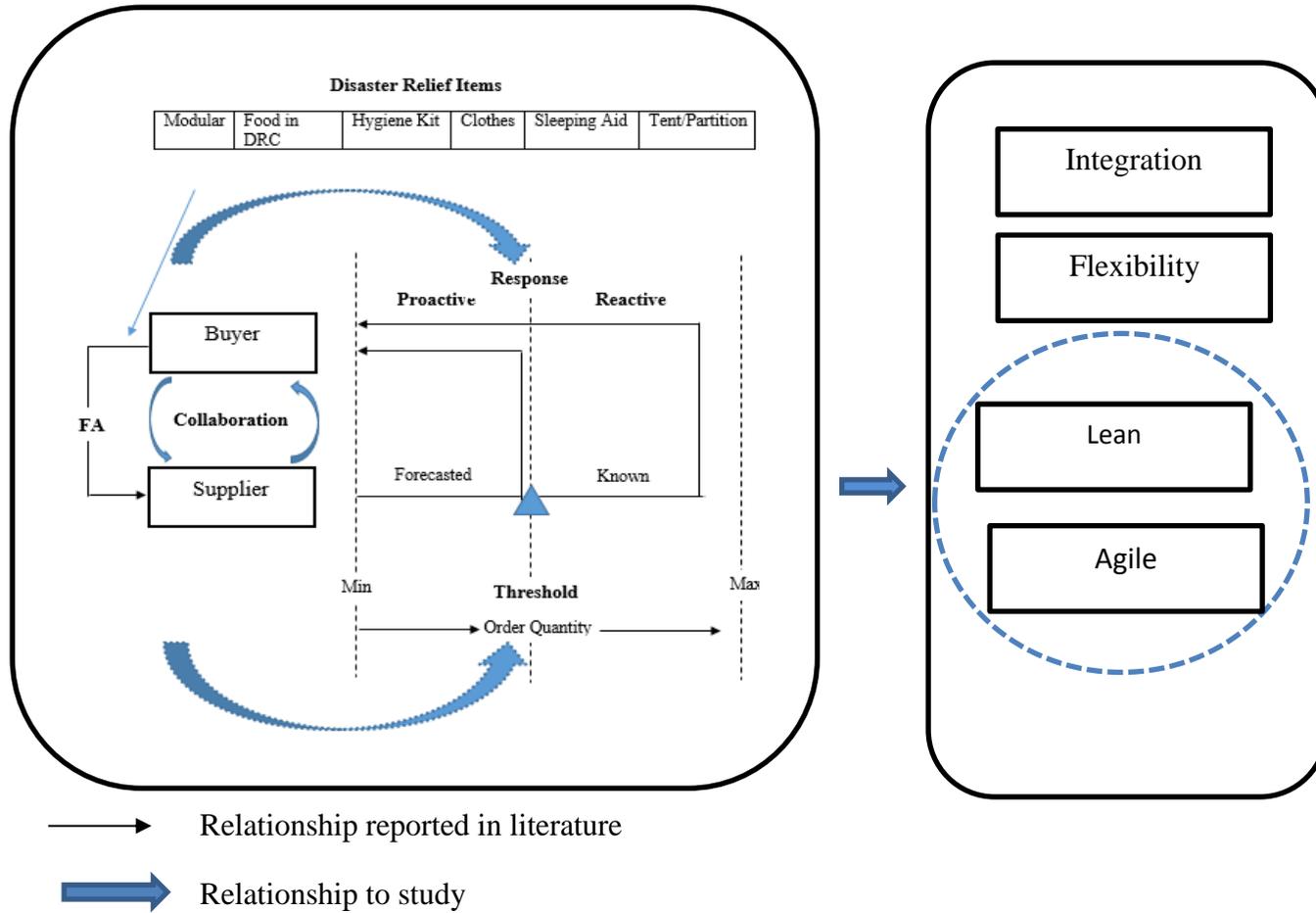
RQ2: How the conceptual linkages between framework arrangement, buyer suppliers relationship, contingency response, and lean, agile or leagile SCM performance of disaster relief, established?

RQ3: What are the challenges and practical issues (regulation and managerial aspects) of the conceptual framework?

## **4.0 Conceptual Framework for the Study;**

The proposed conceptual framework for the study is shown in Figure 1.

**Figure 1: Conceptual framework of lean and agile in purchasing and supply of disaster relief items**



Adapted from Chakravarty (2011) & Jahre and Fabbe-Costes (2015b)

## 5.0 The role of case study protocols in guiding researcher:

This case study protocol serves to keep the current researcher targeted on the topic as well as to anticipate the problems while conducting the study and removing the challenges to ensure quality reporting of the thesis.

## B. Data Collection Procedures

### 1.0 Ethic's Consent

- The Curtin University approves this study via its Human Research Ethics Office under the approval reference RSDE-71-15 dated 15 November 2015 for a period from 17 November 2015 to 17 November 2019.
- Participant information statement and letter of support are attached.

### 2.0 Identification of likely sources of data

The sources of data for the study is as shown in Table 1.

**Table 1: Summary Data Collection & Analysis for the Study**

Objectives & RQs	Data Required	Methods	Sampling	Subjects	Settings	Analysis
Objective 1 (RQ: 1)	Competitive priority factor and impact assessment	Interview	Purposeful sampling	Key Procurement personnel, operations (20 interviewees)	Eight identified government agencies	Analytical Hierarchy Process
Objective 2 (RQ: 2)	Qualitative (opinion – interview)  Real life situation	Case Study  DSW & NADMA-FAMA  (In-depth semi-structured Interview)  Observation		Key Procurement personnel, operations, Supplier (30 interviewees)	8 identified government agencies & Suppliers' Premise  Government premise	Content Analysis

	Quantitative (numerical data)	(Secondary Data)		Contract Documents  (mode sequentially)		
Objective 3 (RQ:3)	Qualitative (opinion)	Interview		Key Procurement personnel, operation	Government premise	Content Analysis

### 3.0 Data Presentation of Credentials to Field Contacts

The approval to conduct the study at the relevant Department is obtained based on the letter by Department of Social Welfare dated 25<sup>th</sup> October 2016 under the reference JKMM 100/12/5/2: 2016/244.

### 4.0 Logistics reminder

- i. Field observations:
  - Prior e-mails requesting approval by flood-prone states; and
  - Monitor the *Infobanjir* app for the latest position of flood relief activities
- ii. Interviews and secondary data:
  - Telephone calls followed by e-mail sent to the relevant state DSW office, to alert any branch if its required;
  - A pilot study will be performed in DSW Sarawak in April 2016;
- iii. Routing chosen is as following:
  - Central to South Peninsular Malaysia: State of Selangor and Johor;
  - Peninsular Malaysia eastern states are from the state of Pahang, Terengganu, Kelantan heading towards the northern Peninsular state of Perak and Kedah;

## **C Data Collection Questions**

### **1.0 Specific Question**

Referring to Yin (2014), the specific question is the ones posed to the researcher, helping to remind of the information needs to be collected, and why.

Below is the vital protocol question for the case study:

- Define the nature of operations of disaster relief and contingency response, how the organization perceives contingency response as ideal?
- What is the nature of flood occurrence in the State that the organization handles?
- How does the organization prepare for disaster relief?
- Describe the flow of procurement and supplies between the HQ and branches of the organization?
- Describe the selection of suppliers and the engagement, the nature of geographical coverage of the supplies, and, the responses adopted by the organization and supplier.
- Define the FA practices of the organisation (DSW) with its suppliers, and how is the management of the collaboration?
- What are disaster relief items most relevant for the use of FA?
- What is the nature of collaboration efforts between the buyer and suppliers?
- What are the factors that bind the collaboration?
- What challenges are there for collaboration and how is the management?
- Define Lean and agile in practise, does the organization emphasize quality, cost, flexibility, and timeliness?
- How single organization of the respective states focuses on lean and agile factors, before and during flood occurrence?
- Describe the pre-positioning, postponement, de-coupling point (if any), for the lean-to agile movement process of the supplies.
- Identify and justify, if the organization practise is lean or/and agile as well as from lean to agile, or leagile.
- Describe whether the collaboration using FA challenges and is there any regulation changes being made to support it.
- What are other challenges and the managerial aspect of FA and disaster reliefs?
- Describe the rival explanation based on alternative case study.

**Table 2: Five levels of Questions of the study**

Question	Focus	Importance	Source of Evidence
Level 1	Interviewee and Observations	Individual opinion to draw the operational perspective of the disaster relief procurement and supplies.	DWS, NADMA, suppliers, field observation
Level 2	Single case studies with an embedded unit of analysis, part of more extensive case study.	The first case study with embedded units of analysis of pattern matching provide analytical generalisation that corroborates/modify/rejects the theoretical concepts	DWS.
Level 3	Cross case analysis	Drawing from the results of case 1 compared to case 2 to identify a pattern of findings as well as offers rival explanation	DWS vs. NADMA
Level 4	In the entire study	Expands the body of knowledge and theoretical implications	In discussion and conclusion chapters
Level 5	Policy recommendation	The practical implication of the study	Conclusion chapter.

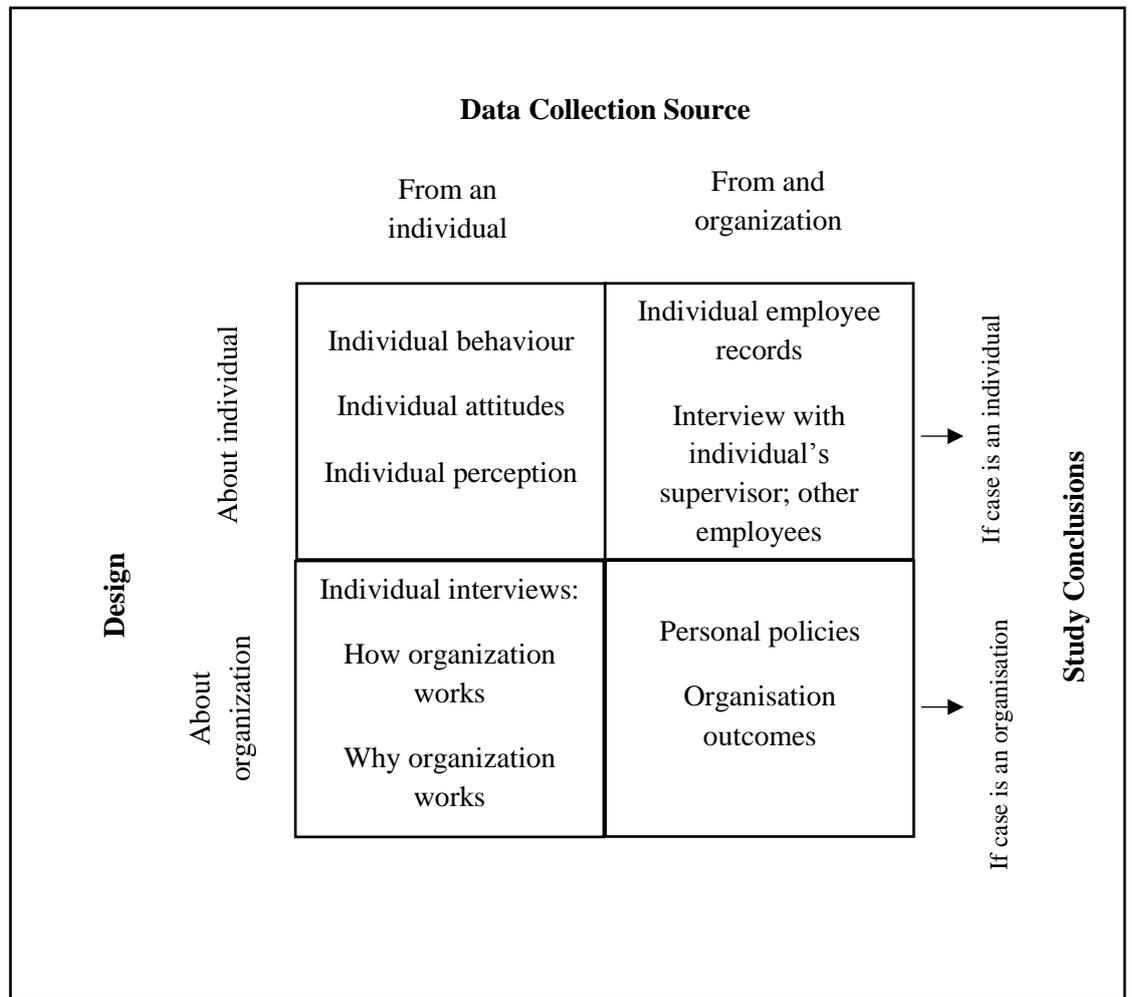
**B. Level 1 Questions**

- Refer to appendix for interview question and the interview guide
- Refer to the appendix of field observation guide.

**C. Potential Source of Evidence for Addressing Each Question**

The source of evidence is described explicitly in Table 1 and Table 2 of this protocol documents. Source of evidence for primary data includes an interview of operational and procurement staffs from two government agency dealing in disaster relief, the Department of Social Welfare and National Disaster Management agency. The interview will also include Suppliers dealing with each agency. Also, the study will also conduct field observation as well as the secondary documents, which provides a convergent of evidence for the study. Reference will be made explicitly from Figure 2.

**Figure 2: Design versus Data Collection: Different Unit of Analysis**



## **D. Guide for the Case Study Report**

### **1.0 Outline**

The report follows a dissertation format as required by Curtin University. Below is the brief outline:

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Methodology

Chapter 4: Data Collection, Analysis, and Results

Chapter 5: Discussions

Chapter 6: Conclusion

## **2.0 The Format of the Data**

Data presentation will be in numeric, written, tables and figures.

## **3.0 Use and presentation of documents**

A thesis document prepared for Curtin University will be submitted for examination by two external examiners.

## **4.0 Bibliographical information**

The referencing formatting is as prescribed by Curtin University follows the style of Chicago\_16<sup>th</sup>\_B\_Curtin.



30<sup>th</sup> November 2015

### **To whom this may concern**

Mr. Perumal Ponnusamy is undertaking Doctor of Philosophy (International Logistics) and is required to collect research data for the preparation of a thesis, as a requirement of this course.

This letter is to request your assistance and consent in providing anonymous data for this research. All material collected is covered by the NHRMC National Statement on Ethical Conduct in Human Research, to which Curtin University adheres (you can see a full description of this at the following location:

<https://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research>

In short, your information would be provided under the following conditions, designed to ensure your interest are fully protected:

- No information can be used unless you provide consent;
- Any information collected must be presented in a form that retains your anonymity unless expressly permitted by you;
- The information collected in this study will be kept under secure conditions at Curtin University for seven years after the research has ended and it will be destroyed/kept indefinitely;
- You may withdraw consent at any time without the need to provide a reason.

Attached herewith is the participant information statement describing the research project as well as the roles of the researcher and individual/organization providing the data. For this particular study, data collection includes an examination of the procurement/contract documents, field observation, interview, and focus groups discussion with procurement and operational staffs involve in the supplies of disaster reliefs from various disaster relief agencies of the Malaysian Government.

Should you have any query, please do not hesitate to contact me using the correspondence details as provided below.

Thanking you in advance for your contribution and co-operation.

Yours sincerely,

Curtin University Sarawak Malaysia  
CDT 250, 98009 Miri  
Sarawak, Malaysia

**PARTICIPANT INFORMATION STATEMENT**

<b>HREC Project Number:</b>	5637
<b>Project Title:</b>	<i>A Leagile Framework Arrangement Procurement Model: A contingent response for the Malaysian government disaster relief missions</i>
<b>Principal Investigator:</b>	
<b>Student researcher:</b>	<i>Perumal Ponnusamy</i>
<b>Version Number:</b>	2
<b>Version Date:</b>	<i>7<sup>th</sup> October 2015</i>

**Purpose of the Research**

This research aims to investigate an improvement prospect for public procurement in disaster relief, which past researchers and numerous audit findings from International watch dog bodies such as United Nations, Transparency International, and some Government reports have associated with increase purchasing cost, slow in reaching affected victims, inadequate and often redundant. Based on previous research, procurement for disaster related activity is usually made on an ad hoc basis, and this led to an increase of purchasing cost and results in poor flexibility to the buyer-supplier relationship. There is an essential gap in understanding a flexible procurement method for disaster relief to address the uncertainty of the disaster. By investigating the improvement prospect, this research focuses on creating new knowledge by extending leagile supply chain strategy, which includes lean (low cost, low wastage) and agile (quantity flexibility, delivery flexibility). A combination of both is coined as leagile, which suggest a more flexible method that could lead to efficiency and effectiveness of procurement in the disaster relief supply chain in particular over a civil context. This study will include the use of a framework arrangement (FA) procurement method in pre and post disaster response, also known as a contingent response. A model will be presented as an outcome of the study. This research will contribute in providing valuable input to the academic understanding of the connectivity and more in-depth understanding of government procurement regarding purchasing cost, delivery flexibility, quality assurance and redundancy, which could benefit disaster relief policy makers, in particular, the Agencies and Government bodies directly related to disaster activities. The study involves obtaining information from personnel directly related to disaster relief procurement or procurement related function.

**Researcher's Role**

This research will be conducted by Perumal Ponnusamy, a student researcher from this University. The researcher is sponsor by the Public Service Department of Malaysia to obtain

a Doctor of Philosophy at Curtin University Sarawak, Malaysia. As a principle to note, there will be no costs and thus involves no payment to the participants of this study for participating in this research.

### **Participants' Role**

You have been asked to take part as the representative of your agency to give credible and professional opinion related to the function and operation of disaster relief procurement. The opinion is translated through individual interviews and focus group discussions. Permission will be sought from individual participants for the interviewer to use a voice recorder in addition to transcribing the responses to the questions. After the interview/focus group, a written copy of the outcomes of the interview will be forwarded. The interview should take between 30 minutes to an hour, while the focus group would be for a minimum of two hours. The study will take place at a mutually convenient location.

#### **Structure of the interview:**

There will be two parts of the interview:

Part 1: This part is to understand your role and your department's contribution to disaster relief procurement and supplies.

Part 2: This section in question about the scope of the study comprises disaster response, elements of procurement, information sharing and collaboration.

### **Benefits of Participating in this Research**

This study may not provide direct benefit to the participation. However, this session will provide an opportunity to discuss and provide valuable feedback to the disaster relief area in particular over procurement. Although not immediate, this study will allow the researcher to add knowledge on public procurement, and disaster relief approaches. Further to this, this study may contribute to policy changes in disaster relief activities.

### **Risk, Side-Effects, Discomforts or Inconveniences from being in this Research**

There are no foreseeable risks from this study. The researchers have been careful to make sure that the questions in the interview/focus group discussions do not cause the participants any distress. In the event of the anxiety of the questions, participants may choose not to answer them. Apart from giving up time, the researchers expect that there will not be any risks or inconveniences associated with taking part in this study. The student researcher will prepare for a suitable location and reimburse parking (if any) while attending a research appointment outside the participant's premise.

### **Access to Information**

The information collected in this research will be re-identifiable (coded). In another word, this means that the stored information on any data will be replaced with a code. Only the researcher team will have access to the code. Any information collected will be treated as confidential and used only in this study unless otherwise specified. The following people will have access to the information collected in this study: the research team and the Curtin University Ethics Committee.

Regarding information storage, electronic data will be a password-protected, and hard copy of the data (including documents and audio tapes) will be locked in place in storage.

The information collected in this study will be kept under secure conditions at Curtin University for seven years after the research has ended and it will be destroyed/kept indefinitely.

Participants' have the right to access, and request correction of information by relevant privacy laws.

The results of this research may be presented at conferences or published in professional journals. Participants will not be identified in any results that are published or presented.

While all care will be taken to maintain privacy and confidentiality of any information shared at focus groups discussions, participants should be aware and may feel embarrassed or upset if one of the group members repeats things said in a confidential group meeting.

### **Results of the Research**

- A summary of the overall results will be sent to the participant's organisation at the end of the research (in May 2017) and future publication will be notified for organisational records for participating.

- **Participants Obligation to this Research**

Participation in the interview or focus group discussion is entirely voluntary: you are not obliged to participate, and if you do participate you can request the interview to be stopped at any time. Participants have the right to withdraw the statement and unprocessed or processed data without prejudice at any stage and time. If you choose not to take part or start and then stop the study, it will not affect your relationship with the University. If you choose to leave the study, we will use any information collected unless you tell us not to.

### **Contact Person**

If you decide to take part in this research, we will ask the relevant authority in your organisation or you to sign the consent form. By signing it is telling us that you understand what you have read and what has been discussed. Signing the consent indicate that you agree to be in this research study. Your organisation will be given a copy of this information and the

For additional information, kindly contact <b>Perumal Ponnusamy</b> by email: <a href="mailto:perumal.ponnusamv@postgrad.curtin.edu.au">perumal.ponnusamv@postgrad.curtin.edu.au</a> . or the <b>supervisor. Associate Professor Rd.</b>
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Curtin University Human Research Ethics Committee (HREC) has approved this study ( <b>approval number RSDE-71/15</b> ). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email <a href="mailto:hrec@curtin.edu.au">hrec@curtin.edu.au</a> .
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## Interview Guide

### Essential elements of the interview guide:

1. Create a particular order of topic areas, so that the question flows reasonably well, but prepared to alter the order of the question during the actual interview;
2. The interview is formulated in the way of answering the research question;
3. The language used is comprehensible and relevant to the interviewee;
4. Do not ask leading questions;
5. Ask to record information of general kind for contextualizing purpose.

### Practical details before the interview:

1. Familiar with the interviewee settings in which he/she engages in the behaviour that interest you;
2. Prepare a sound recorder and microphone;
3. As far as possible, the interview takes place in a setting that is quiet; and
4. Prepare yourself for the interview tips [refer Kvale (1996)].

### Criteria of a successful interviewer (Kvale 1996) and (Bryman & Bell 2011):

1. *Knowledgeable*: thoroughly familiar with the focus of the interview.
2. *Structuring*: gives the purpose for the interview; round it off; ask whether interviewee has questions
3. *Clear*: ask simple, easy, short questions: no jargon.
4. *Gentle*: let people finish; give time to think; tolerate pauses.
5. *Sensitive*: listen attentively and be empathetic with the interviewee;
6. *Open*: respond to what is essential to the interviewee and is flexible.
7. *Steering*: knows what he or she wants to find out.
8. *Critical*: Prepare to challenge what is said when dealing with inconsistencies of the reply
9. *Remembering*: relate what is said to what has previously been said.
10. *Interpreting*: clarifies and extends the meaning of the interviewees' statements, but without meaning on them,
11. *Balanced*: Interview talks too much, then the interviewee might be passives and the opposites for being less talkative.
12. *Ethically sensitive*: is sensitive to the ethical dimension of interviewing and ensuring interviewee understand about the research purpose and that the answers will be treated confidently.

## Observation Guidelines

1. The field report will require the followings:
  - Systematically observe and accurately record the varying aspect of a situation;
  - Continuously analyse your observations;
  - Keep the report's aims in mind while you are observing; and
  - Consciously observe, record, and analyse what you hear and see in the context of the theoretical concept.
  
2. Observation technique for the study:
  - (a) Note taking

Use shorthand, small paragraphs and leave space for ideas, theoretical insights and for further investigation.
  
  - (b) Photography

The use of the camera for high quality photography, avoid flash that could undermine the ability to observe unobtrusively.
  
  - (c) Observable things to document:
    - Physical setting
    - Objects and material culture
    - Use of language
    - Behaviour cycles
    - The order in which events unfold
    - Physical characteristics of subjects
    - Expressive body movements
  
  - (d) Sampling (selection of a portion of the population of study)

The sampling approach adopts *Ad Libitum* sampling technique in which captures the behaviour of interest at the moment and the advantage of such techniques includes the ability to observe relatively rare or unusual behaviour that might be missed by more purposive sampling method.

**INTERVIEW QUESTION FOR GOVERNMENT AGENCIES**

**Scope:**

- i. To assess the type of responses in present disaster relief public procurement
- ii. To assess differences of leagile elements between present procurement practise to FA in cost, quantity flexibility, delivery flexibility, quality assurance & stock redundancy
- iii. To assess the level of information sharing and collaboration between supplier & Government officials
- iv. To assess regulation /policy and operational challenges?

**I. RESPONDENT PERSONAL DETAILS**

Q1	<p>Question relating to the person interviewed:</p> <ul style="list-style-type: none"> <li>a) What is your job title?</li> <li>b) Were you involved in any activity for the Disaster Relief procurement?</li> <li>c) If yes, what were your roles? <ul style="list-style-type: none"> <li>i.</li> <li>ii.</li> </ul> </li> <li>d) How does your role contribute to Disaster Relief Procurement?</li> </ul>
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**II. QUESTION IN RELATION TO SCOPE**

Q2	To assess type of responses in present disaster relief public procurement
	<ul style="list-style-type: none"> <li>(a) How does your agency respond to a Disaster Relief call? <ul style="list-style-type: none"> <li>i. Who is the informant?</li> <li>ii. What type of disaster do your respond to?</li> <li>iii. What type of disaster forms the major call for your agency?</li> <li>iv. What is the procedure for responding to your agency?</li> </ul> </li> <li>(b) Does your agency keep stock as contingency before disaster strike? <ul style="list-style-type: none"> <li>i. If yes, where are the stocks kept?</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>ii. What are the items kept as stock?</li> <li>iii. How are the stocks managed?</li> <li>iv. What is value/stocks for victim's ratio? <i>(Note: Interviewee to provide data on a standard operating circular if any)</i></li> <li>v. What is the minimum/maximum value/stocks for victim's ratio?</li> <li>vi. What are the challenges that your agency face?</li> <li>vii. How are the challenges overcome?</li> <li>viii. Do you have any other suggestions to improve stock management?</li> </ul> <p>(c) Anything else?</p>
Q3	<p>To assess differences of leagile elements between contemporary procurement practise to FA.</p>
	<ul style="list-style-type: none"> <li>(a) What is the role of procurement at this stage?</li> <li>(b) How do you establish the requirement for procurement?</li> <li>(c) What are the items procured?</li> <li>(d) How does your agency perform procurement? <i>(Note: Interviewee to provide data on a standard operating circular if any)</i></li> <li>(e) How do your manage your procurement goals based on: <i>(Note: Interviewee to stand by contract documents as reference)</i> <ul style="list-style-type: none"> <li>i. Cost</li> <li>ii. Quantity flexibility</li> <li>iii. Delivery flexibility</li> <li>iv. Quality assurance</li> <li>v. Redundancy of purchase</li> <li>vi. Between all that you have said, which elements are most important and why?</li> </ul> </li> <li>(f) What are the challenges regarding procurement?</li> </ul>

	<p>(g) How do you agency overcome this problem?</p> <p>(h) Do you have any suggestion to improve the procurement?</p> <ul style="list-style-type: none"> <li>i. If yes, how?</li> <li>ii. Do you have any comparison that you would like to highlight perhaps to other agency or NGO that would like to share?</li> </ul>
<b>Q4</b>	<b>To assess the level of information sharing and collaboration between supplier &amp; Government officials</b>
	<p>(a) What is the process for delivery of goods/services by your supplier? <i>(Note: Interviewee to provide data on a standard operating circular if any)</i></p> <p>(b) What is specified in the contract for delivery? <i>(Note: Interviewee to stand by contract documents as reference)</i></p> <p>(c) How are additional quantity requirement met?</p> <p>(d) Do you encounter any problems in the delivery of the supplies?</p> <ul style="list-style-type: none"> <li>i. If yes, please explain</li> </ul> <p>(e) Do you share information with your supplier on the followings?</p> <ul style="list-style-type: none"> <li>i. Disaster information including disaster stage, affected area, and some victims?</li> <li>ii. If yes, how</li> </ul> <p>(f) Is there any suggestion that you would like to make?</p> <ul style="list-style-type: none"> <li>i. If yes, please explain</li> </ul>

	<b>To assess regulation/policy challenges?</b>
<b>Q5.</b>	
	<p>(a) What is the regulation/policy challenges Framework Arrangement implementation for Disaster Relief?</p> <p>(b) How could this be amended for implementation of the Framework Arrangement?</p>

Q6.	<b>To assess procurement operational challenges?</b>
	<p>(a) What are the challenges for the Framework Arrangement operational challenges regarding?</p> <ul style="list-style-type: none"><li>i. Contract management</li><li>ii. Supplier performance</li><li>iii. Unit price adjustment flexibility</li><li>iv. Delivery flexibility</li><li>v. Performance bond/ default clauses</li><li>vi. Audit</li><li>vii. Sharing of information</li><li>viii. Level of collaboration</li></ul> <p>(b) How the organization manages item i-viii?</p>

## INTERVIEW QUESTIONS FOR SUPPLIER

### Scope:

- i. To assess the type of responses in present disaster relief public procurement
- ii. To assess differences of leagile elements between present procurement practise to FA in cost, quantity flexibility, delivery flexibility, quality assurance & stock redundancy
- iii. To assess the level of information sharing and collaboration between supplier & Government officials
- iv. To assess regulation /policy and operational challenges?

### I. RESPONDENT PERSONAL DETAILS

Q1	<p>Question relating to the person interviewed:</p> <ol style="list-style-type: none"> <li>a) What is your job title?</li> <li>b) How does your company contribute to Disaster Relief Supplies?</li> <li>c) How many years have your company contributed to Disaster Relief Supplies?</li> </ol>
----	--

### II. QUESTION IN RELATION TO SCOPE

Q2	<p>To assess type of responses in present disaster relief public procurement</p>
	<p>(d) Do your company keep stock as contingency before disaster strike?  <i>(Note: Interviewee to standby stocks records)</i></p> <ol style="list-style-type: none"> <li>i. If yes, where are the stocks kept?</li> <li>ii. What are the items kept as stock?</li> <li>iii. How are the stocks managed?</li> <li>iv. What is value/stocks for victim's ratio?</li> <li>v. What is the minimum/maximum value/stocks for victim's ratio?</li> <li>vi. What are the challenges that your company face?</li> <li>vii. How are the challenges overcome?</li> <li>viii. Do you have any other suggestions to improve stock management?</li> </ol> <p>(e) Anything else?</p>

Q3	To assess differences of leagile elements between contemporary procurement practise to FA.
	<p>(a) What are the items procured from your company?  <i>(Note: Interviewee to stand by contract documents as reference)</i></p> <p>(b) How does your agency perform the supply?</p> <p>(c) How do your manage your supply goals based on:</p> <ul style="list-style-type: none"> <li>i. Cost</li> <li>ii. Quantity flexibility</li> <li>iii. Delivery flexibility</li> <li>iv. Quality assurance</li> <li>v. Additional ad hoc purchases</li> </ul> <p>(d) What are the challenges that you encounter for the supply?</p> <p>(e) How do your company overcome this problem?</p> <p>(f) Do you have any suggestion to improve the supply?</p> <ul style="list-style-type: none"> <li>iii. If yes, how?</li> <li>iv. Do you have any comparison that you would like to highlight perhaps to other agency or NGO that would like to share?</li> </ul>
Q4	To assess the level of information sharing and collaboration between supplier & Government officials
	<p>(g) What is the process for delivery of goods/services by the government agencies?</p> <p>(h) What is specified in the contract for delivery?</p> <p>(i) How is the additional quantity requirement met?</p> <p>(j) Do you encounter any problems in the delivery of the supplies?</p> <ul style="list-style-type: none"> <li>i. If yes, please explain</li> </ul> <p>(k) Does your buyer share information with you on?  <i>(Note: Interviewee is to standby any letters, minutes of meeting or contract)</i></p> <ul style="list-style-type: none"> <li>i. Disaster information including disaster stage, affected area, and some victims?</li> <li>ii. If yes, how?</li> </ul> <p>(l) Is there any suggestion that you would like to make?</p> <ul style="list-style-type: none"> <li>i. If yes, please explain</li> </ul>

Q5.	<b>To assess regulation/policy challenges?</b>
	<p>(a) What is the regulation/policy challenges in implementing Framework Arrangements for Disaster Relief?</p> <p>(b) How could this be amended for implementation of the Framework Arrangement?</p>
Q6.	<b>To assess procurement operational challenges?</b>
	<p>(a) What are the challenges for the Framework Arrangement operational challenges regarding?</p> <ul style="list-style-type: none"> <li>i. Contract management</li> <li>ii. Supplier performance</li> <li>iii. Unit price adjustment flexibility</li> <li>iv. Delivery flexibility</li> <li>v. Performance bond/ default clauses</li> <li>vi. Audit</li> <li>vii. Sharing of information</li> <li>viii. Level of collaboration</li> </ul> <p>(b) How the organisation manages item i-viii?</p>

## INTERVIEWEE LIST

GOVERNMENT AGENCY

NO.	RQ	OBJECTIVES	AGENCY (MALAYSIA)	DEPARTMENT	INTERVIEWEE	POST	IMPORTANCE
1.	2-3	v.	National Disaster Management Agency (NADMA)	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
		vi.		Operation	2		May provide operational requirement for procurement
2.		differences of leagile elements between present procurement practise to FA in cost, quantity flexibility, delivery flexibility, quality assurance & stock redundancy;	Department of Social Welfare Selangor	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
				Operation (Disaster Management)	2		May provide operational requirement for procurement
3.		vii.	Department of Social Welfare Sarawak	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
				Operation (Disaster Management)	2		May provide operational requirement for procurement
4.		To assess the level of information sharing and collaboration between supplier & Government officials.	Department of Social Welfare Johor	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
				Operation (Disaster Management)	2		May provide operational requirement for procurement
5.		Department of Social Welfare Pahang	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion	
			Operation (Disaster Management)	2		May provide operational requirement for procurement	

NO.		AGENCY (MALAYSIA)	DEPARTMENT	INTERVIEWEE	POST	IMPORTANCE
6.		Department of Social Welfare Terengganu	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
			Operation (Disaster Management)	2		May provide operational requirement for procurement
7.		Department of Social Welfare Kelantan	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
			Operation (Disaster Management)	2		May provide operational requirement for procurement
8.		Department of Social Welfare Perak	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
			Operation (Disaster Management)	2		May provide operational requirement for procurement
9.		Department of Social Welfare Kedah	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
			Operation (Disaster Management)	2		May provide operational requirement for procurement
10.		Department of Social Welfare Headquarters, Putrajaya	Procurement	2	Director, Deputy Director, Assistant Director	May provide procurement motive, procedure, issues & Suggestion
			Operation (Disaster Management)	2		May provide operational requirement for procurement

## INTERVIEWEE LIST

SUPPLIERS

NO.	RQ	OBJECTIVES	SUPPLIER FOR AGENCY (MALAYSIA)	DEPARTMENT	INTERVIEWEE	POST	IMPORTANCE
1.	2-3	i. To assess the type of responses in present disaster relief public procurement;	NADMA	Procurement	One company Federal Agricultural Marketing Agency (FAMA)	Procurement or Sales (Director/Manager/Executive)	May provide perspective/comments/suggestion on:  i. Government agency procurement tendency; ii. Procurement procedure; iii. Contract obligation: Delivery, price and contingency provision iv. Stock; v. Flexible arrangements (stocks, delivery. Pricing. Quantity adjustment); vi. Disaster information sharing; vii. Collaboration; viii. Challenges & suggestions.
2.		ii. To assess differences of leagile elements between present procurement practise to FA in cost, quantity flexibility, delivery flexibility, quality assurance & stock redundancy;  iii. To assess the level of information sharing and collaboration between supplier & Government officials.					

## The AHP Evaluation Form

### The Fundamental Scale for Pairwise Comparison

Intensity of Importance	Definition	Explanation
1	Equal Importance	Two elements contribute equally to the objective
3	Moderate Importance	Experience and judgement moderately favour one element over another
5	Strong Importance	Experience and judgement strongly favour one element over another
7	Very Strong Importance	One element is favoured very strongly over another, its dominance is demonstrated in practise
9	Extreme Importance	The evidence favouring one element over another is of the highest possible order of affirmation

#### Note for Evaluator:

1. Please rate based on the importance of each criteria for e.g. between leadership and qualification in choosing a leader in an organization, You feel that leadership strongly favours over qualification for choosing a leader, hence you would score a value of 5.
2. Please write your occupation in evaluator column and agency that you representing as well as the date and time.

#### Important Definition

Quality: Conformance to specification and meeting customer's expectation

Durability: Ability to withstand wear, pressure or damage (Important to quality)

Reliability: The quality of being trustworthy or of performing consistent well (Important to Quality)

Innovation: The action or process of innovating (central to competitive advantage & innovation in purchased components is the quickest to improve end product quality)

Flexibility: The ability to be easily modified

Volume: the amount of space that a substance occupies (Prevents stock out when demand surges)

Modification: the action of modifying/altering something (Enables high variety and personalised product)

Technological: Collection of techniques, skills, method and process in the production of goods/services (Principal factors of competition and present opportunities for new product)

Cost: The amount that has to be paid or spent to buy or obtain something

Purchasing Cost: Total cost of acquisition, cost associated with buy goods, services or asset. (Fundamental component of overall cost)

Inventory Cost: The cost of holding goods in stock, expressed in percentage of the inventory value including warehousing, depreciation etc. (important to supply chain management)

Quality cost: The expense an organization incur to improve the quality of its product (high quality component reduces inventory cost & production cost by eliminating rework, scrap and inspection)

Delivery speed: the time at which a buyer has been told that goods will arrive at the place where they are wanted

Delivery reliability: The deliveries done without error compared to the total deliveries made

Development speed: Refers to how fast a developer could develop a product

**Evaluator:**

**Agency:**

**Date & Time:**


### Goal

<b>Criteria vs Goal</b>	<b>Quality</b>	<b>Cost</b>	<b>Flexibility</b>	<b>Time</b>
<b>Quality</b>	1			
<b>Cost</b>		1		
<b>Flexibility</b>			1	
<b>Time</b>				1

## Criteria

<b>Quality</b>	<b>Component Durability</b>	<b>Component Reliability</b>	<b>Component Innovation</b>
<b>Component Durability</b>	1		
<b>Component reliability</b>		1	
<b>Component Innovation</b>			1

<b>Cost</b>	<b>Purchasing cost</b>	<b>Inventory Cost</b>	<b>Quality Cost</b>
<b>Purchasing Cost</b>	1		
<b>Inventory Cost</b>		1	
<b>Quality Cost</b>			1

<b>Flexibility</b>	<b>Volume Flexibility</b>	<b>Modification Flexibility</b>	<b>Technology Capability</b>
<b>Volume Flexibility</b>	1		
<b>Modification Flexibility</b>		1	
<b>Technology Capability</b>			1

<b>Time</b>	<b>Delivery Speed</b>	<b>Delivery Reliability</b>	<b>Development Speed</b>
<b>Delivery speed</b>	1		
<b>Delivery reliability</b>		1	
<b>Development speed</b>			1

## Absolute Ratings

		MODULAR (KMP)
<b>Quality</b>	<b>Component Durability</b>	
	<b>Component Reliability</b>	
	<b>Component Innovation</b>	
<b>Cost</b>	<b>Purchasing Cost</b>	
	<b>Inventory Cost</b>	
	<b>Quality Cost</b>	
<b>Flexibility</b>	<b>Volume Flexibility</b>	
	<b>Modification Flexibility</b>	
	<b>Technological Capability</b>	
<b>Time</b>	<b>Delivery Speed</b>	
	<b>Delivery Reliability</b>	
	<b>Development Speed</b>	

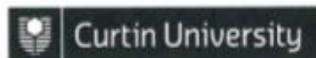
### ABSOLUTE RATING GUIDE

<b>Very High</b>	<b>VH</b>
<b>High</b>	<b>H</b>
<b>Moderate</b>	<b>M</b>
<b>Low</b>	<b>L</b>
<b>Very Low</b>	<b>VL</b>

## Absolute Ratings

Criteria	Sub-Criteria	Modular (Dry Food/Bottled Water)	Packed Food & for Co-operative Cooking	Hygiene Kit	Clothes	Sleeping Aid	Tent/Partition
Quality	Component Durability						
	Component Reliability						
	Component Innovation						
Cost	Purchasing Cost						
	Inventory Cost						
	Quality Cost						
Flexibility	Volume Flexibility						
	Modification Flexibility						
	Technological Capability						
Time	Delivery Speed						
	Delivery Reliability						
	Development Speed						

**MEMORANDUM**



To:		
CC:		
From:		Office of Research and Development Human Research Ethics Office
Subject		TELEPHONE 9266 2784 FACSIMILE 9266 3793 EMAIL hrec@curtin.edu.au
Date:	16-Nov-15	

Thank you for your application submitted to the Human Research Ethics Office for the project: 5637

A Leagile Framework Arrangement Procurement Model: A contingent response for the Malaysian government disaster relief missions

Your application has been approved through the low risk ethics approvals process at Curtin University.

Please note the following conditions of approval:

1. Approval is granted for a period of four years from **17-Nov-15** to **17-Nov-19**
2. Research must be conducted as stated in the approved protocol.
3. Any amendments to the approved protocol must be approved by the Ethics Office.
4. An annual progress report must be submitted to the Ethics Office annually, on the anniversary of approval.
5. All adverse events must be reported to the Ethics Office.
6. A completion report must be submitted to the Ethics Office on completion of the project.
7. Data must be stored in accordance with WAUSDA and Curtin University policy.
8. The Ethics Office may conduct a randomly identified audit of a proportion of research projects approved by the HREC.

Should you have any queries about the consideration of your project please contact the Ethics Support Officer for your faculty, or the Ethics Office at hrec@curtin.edu.au or on 9266 2784. All human research ethics forms and guidelines are available on the ethics website.

Yours sincerely,

T



Tel : 603 - 8323 1000  
Faks (Fax) : 603 - 8323 2045  
Laman Web : www.jkm.gov.my  
(Website)

JKMM 100/12/5/2 : 2016 / 244  
25 Oktober 2016

**PERUMAL PONNUSAMY**  
CDT 250  
MIRI  
98009  
SARAWAK

Tuan/Puan,

**KELULUSAN MENJALANKAN KAJIAN/PENYELIDIKAN DI JABATAN KEBAJIKAN MASYARAKAT**

Dengan hormatnya saya merujuk kepada perkara di atas.

2. Sukacita dimaklumkan permohonan tuan/puan untuk menjalankan kajian/penyelidikan bertajuk **A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission** dan tempat kajian/penyelidikan seperti di Lampiran telah **DILULUSKAN**. Tempoh kelulusan bagi melaksanakan kajian /penyelidikan di tempat yang dipilih adalah selama **ENAM (6) bulan** mulai **25 Oktober 2016** hingga **25 April 2017**.

3. Sehubungan itu, tuan/puan diminta untuk menyerahkan **DUA (2) salinan tesis/laporan/penerbitan** dan berjilid kepada Jabatan ini sebelum atau selewat-lewatnya pada **25 Julai 2017**. Sebarang maklumat lanjut, tuan/puan boleh menghubungi Bahagian Perancangan dan Pembangunan, Jabatan Kebajikan Masyarakat di talian 03-83231935 atau emel [zaitol@jkm.gov.my](mailto:zaitol@jkm.gov.my).

Sekian, terima kasih.

**"BERKHIDMAT UNTUK NEGARA"**  
**"BERKAT BERJASA"**

*Surat ini adalah janaan komputer, tandatangan tidak diperlukan.*



**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**Approval for Research to be conducted in Department of Social Welfare**

2. We are pleased to inform that your application for research with the title of A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission and the suggested place have been duly approved for 6 months from 25<sup>th</sup> October 2017 to 25 April 2017.

## LAMPIRAN

Rujukan Surat : JKMM 100/12/5/2 : 2016 / 244  
Tarikh : 25 Oktober 2016  
Tajuk Kajian : A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission

Alamat Tempat Kajian :

- 1) Bahagian Kebajikan Produktif
- 2) JABATAN KEBAJIKAN MASYARAKAT NEGERI SARAWAK (Kementerian Pembangunan Sosial dan Urbanisasi)
- 3) JABATAN KEBAJIKAN MASYARAKAT NEGERI KELANTAN
- 4) JABATAN KEBAJIKAN MASYARAKAT NEGERI PAHANG
- 5) JABATAN KEBAJIKAN MASYARAKAT NEGERI PERAK
- 6) JABATAN KEBAJIKAN MASYARAKAT NEGERI JOHOR
- 7) JABATAN KEBAJIKAN MASYARAKAT NEGERI MELAKA
- 8) JABATAN KEBAJIKAN MASYARAKAT NEGERI SELANGOR
- 9) JABATAN KEBAJIKAN MASYARAKAT NEGERI KEDAH

### **Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

Address of research location:

1. Productive Welfare Department
2. Department of Social Welfare (DSW) State of Sarawak (Ministry for the Development of Social and Urbanization)
3. DSW State of Kelantan
4. DSW State of Pahang
5. DSW State of Perak
6. DSW State of Johore
7. DSW State of Malacca
8. DSW State of Selangor
9. DSW State of Kedah



tl : 603 - 8323 1000  
aks (Fax) : 603 - 8323 2045  
aman Web : www.jkm.gov.my  
Website)

JK/MM 100/12/5/2 : 2016 / 244  
06 April 2017

**PERUMAL PONNUSAMY**  
730202135881  
CDT 250  
MIRI  
98009  
SARAWAK

Tuan/Puan,

**PERMOHONAN MENAMBAH LOKASI KAJIAN**

Tajuk Kajian/Penyelidikan : **A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission**

Tempat Kajian/Penyelidikan : **JABATAN KEBAJIKAN MASYARAKAT NEGERI TERENGGANU**

Dengan hormatnya saya merujuk surat tuan/puan bertarikh 29 March 2017 berhubung perkara diatas.

2. Sukacita dimaklumkan permohonan tuan/puan untuk menambah lokasi kajian/penyelidikan bertajuk **A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission** dan tempat kajian/penyelidikan baru seperti di Lampiran **DILULUSKAN**.

3. Sebarang maklumat lanjut, tuan/puan boleh menghubungi Bahagian Perancangan dan Pembangunan, Jabatan Kebajikan Masyarakat di talian 03-8323 1924 atau e-mel [timah@jkm.gov.my](mailto:timah@jkm.gov.my).

Sekian, terima kasih.

**"BERKHIDMAT UNTUK NEGARA"**  
**"BERKAT BERJASA"**

Saya yang menurut perintah,

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**Application for Additional Research Location**

2. We are pleased to inform that your application to add research location for the research with the title of **A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission** and the suggested place have been duly approved as per attachment (DSW State of Terengganu).



- 445710/44874

Tarikh : 23 Disember 2015

**UNIVERSITI CURTIN SARAWAK**  
Fakulti Perniagaan & Kemanusiaan  
CDT 250, 98009 Miri  
Sarawak

Tuan/Puan,

**KELULUSAN PERMOHONAN UNTUK MENJALANKAN KUTIPAN DATA**

Dengan segala hormatnya merujuk kepada surat tuan/puan ruj : Per.: PhD/FOBH/PP-3 yang bertarikh 14 Disember 2015 berhubung perkara di atas.

2. Sukacita dimaklumkan bahawa Jabatan Kebajikan Masyarakat Negeri Sarawak telah memberi **kelulusan** kepada **Perumal Ponnusamy**, pelajar Ijazah Kedoktoran(PhD) dalam Bidang Logistik Antarabangsa, Universiti Curtin Sarawak bagi menjalankan kutipan data dari agensi kerajaan terlibat dalam perolehan bekalan untuk bencana mulai bulan Februari 2015.

3. Pelajar tersebut adalah dimohon untuk mematuhi semua syarat-syarat bagi menjalankan penyelidikan tersebut dengan menandatangani borang pada **Lampiran A** dan mengembalikan borang tersebut ke Jabatan ini seminggu selepas pelajar melaporkan diri. Di samping Jabatan **TIDAK** akan memberi apa-apa elaun atau bayaran kepada pelajar yang menjalankan kutipan data berdasarkan persetujuan yang telah ditetapkan.

4. Untuk mendapatkan data berkenaan, tuan boleh berhubung dengan Encik Zainal Bin Taram, Timbalan Pengarah Bahagian Bahagian Sosio Ekonomi dan Puan Mordiah Binti Haji Sulaiman, Ketua Cawangan Kebajikan Produktif di talian 082-449577.

5. Kerjasama dan perhatian daripada pihak tuan dalam perkara ini amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian.

"BERSATU BERUSAHA BERBAKTI"  
"AN HONOUR TO SERVE"  
"PENGINSANAN PERKHIDMATAN KEBAJIKAN"

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**Approval for the Application for Data Collection**

We refer to you letter dated 14<sup>th</sup> February 2015.

2. We are pleased to inform that DSW State of Sarawak have given approval to Perumal Ponnusamy, PhD student in the field of International Logistics from Curtin University Sarawak for data collection in the agency for the procurement and supply for disaster relief beginning February 2015.

3. Student are required to adhere to the regulation for the research and formalities. The Department shall not be obliged to pay any allowance/payment to the student based on this approval.

Per.: PhD/FOBH/PP-4

15<sup>th</sup> September 2016

**PERMOHONAN KELULUSAN UNTUK MELAKSANAKAN KUTIPAN DATA DARI AGENSI KERAJAAN YANG TERLIBAT DALAM PEROLEHAN BEKALAN UNTUK BENCANA**

Dengan segala hormatnya saya merujuk kepada perkara di atas.

2. Untuk makluman YBhg. Dato', saya adalah seorang pelajar Ijazah Kedoktoran (PhD) dalam bidang Logistik Antarabangsa di Curtin Universiti Sarawak dan di bawah tajaan Jabatan Perkhidmatan Awam melalui Hadiah Latihan Persekutuan (HLP) tahun 2014. Fokus pengajian saya ialah dalam bidang perolehan Kerajaan untuk bencana dan tajuk kajian secara khusus ialah *A Leagile Framework Arrangement Procurement Model: A Contingent Response of the Malaysian Government Disaster Relief Missions*. Kajian ini bermatlamat untuk membangunkan suatu kerangka konseptual perolehan Kerajaan untuk bencana dengan menggunakan *Framework Arrangement* (kaedah perolehan strategik pra-bencana) yang dinilai kepenggunaannya sewaktu tindakan pra dan pasca bencana atau secara *contingent response approach*, untuk membekal bekalan kit makanan mangsa banjir. Disamping itu, kajian ini juga akan mendalami bagaimana pengkongsian maklumat diantara pembekal dan agensi-agensi Kerajaan yang terlibat dilaksanakan terutama berhubung aspek tahap intensiti bencana dan jumlah keperluan bekalan yang diperlukan. Proses seterusnya melibatkan kerja-kerja menganalisa elemen *lean* (meminimakan kos) dan *agile* (fleksibiti dan memendekkan tempoh penghantaran) dalam usaha membangunkan teori sedia ada yang menjadi tunjang kepada penyelidikan ini. Hasil dari kajian ini dijangka dapat memberi sumbangan terutamanya kepada penggubal polisi dalam menilai pencapaian semasa proses perolehan dan bekalan kit makanan mangsa banjir. Selain itu, bagi agensi-agensi pelaksana yang terlibat (pengamal), kajian ini dapat menyumbangkan suatu kerangka perolehan bekalan bencana yang lebih kos efektif, efisien dan fleksibel. Ianya juga selaras dengan usaha Kerajaan untuk meningkatkan keupayaan agensi-agensi Kerajaan menangani krisis bekalan sewaktu menghadapi bencana.

3. Sebagaimana YBhg. Dato' sedia maklum, proses kajian ini melibatkan kutipan data yang merupakan sebahagian proses utama dalam penyediaan tesis pasca siswazah. Bagi kajian yang dimaksudkan, kutipan data melibatkan proses semakan kontrak bekalan bencana

di agensi bagi memahami komponen fleksibiliti harga dan kuantiti serta proses penghantaran, temuduga bersama pegawai perolehan/operasi agensi serta pembekal dan diskusi Kumpulan Fokus melibatkan agensi pusat dan agensi-agensi pelaksana dalam perolehan Kerajaan sewaktu bencana. Agensi yang terlibat dalam kutipan data ini adalah Agensi Pengurusan Bencana Negara (NADMA), Jabatan Kebajikan Masyarakat (Ibu Pejabat dan Pejabat JKM negeri-negeri seperti Sarawak, Johor, Pahang, Kelantan, Selangor dan Kedah) dan Kementerian Kewangan Malaysia.

4. Sukacita dimaklumkan juga bahawa kutipan data ini tidak melibatkan sebarang maklumat sensitif Kerajaan dan pengkaji sebagai penjawat awam adalah tertakluk kepada peraturan semasa Kerajaan serta dipantau oleh Jawatankuasa Etika Curtin Universiti. Disertakan surat sokongan dari penyelia kajian, Associate Professor Dr. Anbalagan Krishnan dan *Participant Information Statement* untuk perhatian YBhg. Dato' selanjutnya.

4. Untuk tujuan ini, saya dengan rasa rendah diri memohon kelulusan dari pejabat YBhg. Dato' bagi menjalankan kutipan data di NADMA. Segala jasa dan budi baik YBhg. Dato' dalam mempertimbangkan perkara ini amat saya sanjungi dan hargai.

Sekian, terima kasih.

Yang benar,

PERUMAL PONNUSAMY  
Fakulti Perniagaan  
Curtin Universiti Sarawak Malaysia  
CDT 250, 98009 Miri  
Sarawak, Malaysia

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**Director General, National Disaster Management Agency (NADMA)**

**Application for Data Collection**

2. For your kind information, I am a PhD student in the field of International Logistics from Curtin University Sarawak, conducting a research on the title of *A Leagile Framework Arrangement Procurement Model: a contingent response for the Malaysian Government disaster relief mission*. This research will benefit the practitioners in recommending policy considerations for the preparation of future humanitarian aid.

3. This research requires data collection which includes interviews with agency officers, suppliers, observation (if necessary) and documentation involving contracts of procurement and supply.

4. As a research student, due care will be taken of the sensitivity of the information given by agency as per the research ethics approval.

**(APPROVAL WAS GIVEN BY AGENCY AND FOR SUPPLIER – FAMA VIA TELEPHONE CALLS)**



Faculty of Business and Humanities  
Curtin University Sarawak Campus  
CDT 250, 98009 Miri  
Sarawak, Malaysia

**A Leagile Framework Arrangement Procurement Model: *A contingent response for the Malaysian government disaster relief missions***

**PARTICIPANT CONSENT FORM**

I,.....[name]  
.....  
.....[organisation and address]

hereby acknowledge that:

- a) The interview is for the purpose of research;
- b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
- c) My name will not be mentioned anywhere, or referred to, to any individuals or groups or in any publications arising from the research;
- d) I agree to allow the interviewer to use a digital voice recorder to assist in the provision of a true and accurate record of the interview;
- e) I have been informed that the confidentiality of the information I provide will be safeguarded, subject to any legal requirements; and
- f) I agree to participate in this research study.

Signature: .....

Name: .....

Designation: .....

Date: .....

**PILOT STUDY – DSW SARAWAK**  
(APPENDIX 2.0)

## **Pilot Study: Lesson-learnt for the Case Study**

Yin (2014) suggest that pilot case study is performed with goals of refining data collection plans in terms of the content of data and the procedures to be followed. Pilot case study also possibly could provide some conceptual clarification. In general, convenience, access and geographical proximity can be the main criteria for selecting pilot case. The pilot case data are often used in parallel with ongoing literature, so that the final research design was informed by both prevailing theories and fresh empirical observation. In addition, methodologically, pilot case also provides information on field questions and the field logistics.

### **Purpose**

The purpose of this pilot study is with goals of refining methodological section of this study comprising data collection plans, procedures and to understand field logistics. The study provides an opportunity to evaluate the feasibility of conducting a much bigger dimension of study on government procurement and supply in disaster relief. Direct attention was given to find possible answers for the three research questions of this study.

### **Methods**

#### *Design and Sample*

The design of the study taps the larger case study's intended design, however funnelled to partial of the embedded one unit of analysis of the much larger study. A purposeful sampling technique was used concentrating on East Malaysia's State DSW agency. The agency was picked due to the convenience of geography proximity nearing researcher's University.

#### *Procedure*

Ethics approval were granted on 17 November 2015 in accordance to Australian Code for the Responsible Conduct of Research, National Health and Medical Research Council (NHMRC) the Curtin University policy. The nature of study is classified as low risk. Shortly after receiving the Ethics approval, researcher has written in for approval from agency with relevant supporting documents including supervisor

support letters and the participant information statement on 14 December 2015 and had obtained approval on 23 December 2015. The study was to commence from February 2016.

Researcher meet with the operation's key personnel of the DSW in March 2016. In discussing the relevant research procedures which includes observation at disaster relief centre, sighting relevant documentation of operations, procurement and supply, conducting interview with key informants, and, overseeing the AHP assessment with key informants. Researcher were advised that observation was not possible to be conducted less occurrence of flood incident for the year and with the end of the monsoon season. In addition to this, documentation of procurement and supply were also in process, hence will be require time to access it. However, participant did provide and the Standard Operating Procedure (SOP) of the DSW for disaster relief operations. In addition to this, interview session was conducted with the presence of the operations and procurement officer on a joint interview. A separate session was organized in the fourth day where all key accessors were present. The overall duration took 10 days and this includes availability of the participants as well as Researcher's considerations of accommodation and transport arrangements.

### ***Instruments***

The instrument was a researcher generated AHP assessment form and interview questions with no prior reliability or validity. One of the reasons for this pilot study was to assess if both the instruments were reliable for future research. The pre-invention AHP form were designed in three pages and contains the fundamental scale for pairwise comparison and note for the evaluators in the first page. On the second page is the absolute rating to be completed by the evaluators based on components in the x-axis and sub-criteria for the y-axis. There are all together five components with labels: A for modular (food kit and drinking water); B for cooked food; C- Medical Kit; D for cloths; and, E for sleeping aid. As for the Y-axis, the four criteria namely quality, cost, flexibility and time were presented along with the prevailing factors or sub-criteria for each of the criteria. For instance, factors the cost criteria were purchasing cost, inventory cost and quality cost. Next, is the evaluation of the sub-criteria pair-wise comparison followed by the goal's evaluation in the last page of the AHP's form.

The next instrument was the semi-structured interview form, which consisted of questions for agency with three scopes: firstly, to assess the type of response for disaster relief; to understand about the use of framework arrangement and, lean and agile practices; and, thirdly: to assess the level of information sharing and the collaboration between the agency and suppliers. There were altogether four main questions with the accompanying sub-questions, arranged in sequence beginning from the respondent detail and roles in disaster relief activity up to the information and collaboration sharing assessment. The question was phrased in open-ended style as to encourage more informal and informed responses.

## **Findings and Discussions**

### ***Instrument: AHP***

Of the AHP session conducted, two assessors from the operations and procurement/finance were agreeable that they should be the key informants due to their direct involvement in disaster reliefs operations, procurement and supply as well to their direct contact with suppliers and other relevant agency operating in collaborations. Hence, this pilot study could conclude that it met the target purposeful sampling. Next in assessing the four component elements and factors for each component for pair comparison, the participant was also agreeable, hence ensuring the reliability of the instrument. However, when conducting the session of assessment were in progress, participants were confused on scoring between food components (originally involves two separate items i.e. dry food for forward location and wet food for disaster relief centre) and as well as description other components such as medicine and bedding item. In addition, Researcher also notice that although forms were given earlier, a special session need to be conducted with the presence of Researcher to avoid misinterpretation of the description and scoring.

### ***Instrument: Interview***

Next, on assessing the interview, it is noted that engaging the session using a semi structured open ended procedure were difficult to conduct. The participants whom are well experienced are very keen to communicate in their own pace and such this required adjustment of the flow of the question by the Researcher. Hence, adaptation

and allowing flexibility seems to be much preferred by the interviewee and this in turn allows better flow of the interview session, better rapport building as well as enhancing the quality of the information obtained.

Meanwhile, Researcher also were able to ascertain some flaws in the interview question while reading the interviewee's body language as well as comment made by the participants. For instance, some of the question were not relevant to DSW agency that did not keep stocks and some were too technical, for example questions with reference to appendix 1 of the Interview questions, in particular question 2 B, in relation to stock management and question 3 H, on comparison between DSW and NGOs. As such, the list of questions would require some adjustment to better suit the interviewee for the next session.

In addition to this, from the comments made by the participants on a new mode in the form kit food supplies or modular based, Researcher acknowledges the initial set of the interview question lacks questions in relations to NADMA/FAMA intervention on food supplies during the disaster relief. Despite the ongoing literature findings on this new set of Federal Government (NADMA) intervention by utilising its agricultural marketing arm (FAMA) to support food supplies during disaster relief activity. This new input has prompted Researcher to consider adjusting organization and supplier interview set in order to gain better perspective from both agencies.

Apart from this, the participants also highlighted of the difficulties in engaging with suppliers whom may not be comfortable with interviewing without prior consent from the relevant DSW's dealing. According to the participants, the consent is in relations to the third-party information release clause, which is a standard practise between government agencies and its suppliers. As such, Researcher needed to obtain approval from the relevant DSW prior to engaging with the suggested suppliers and the boundary of the interview questions are confined to element that is not detrimental to the agencies. Hence, special care from the Researcher is needed when conducting the interview with the suppliers.

Another relevant comment pointed by the participants was on the need to engage with on-set disaster victims for clarity especially concerning the service provided by DSW. In the case of DSW and within the scope of this study, such service confirmation includes ascertaining the quality and the timeliness of the food items in the relief

centres. Researcher view this as a progressive comment on the part of DSW and thus the upcoming observation session to be conducted will include a brief interview with victims, subject to the consent given by DSW and the respective victims, themselves.

### ***Confirmation on Concepts***

A significant finding from the interview includes participants' understanding of the concepts of the study namely: synonym use of "framework arrangement" concepts such supplier arrangement and Memorandum of Understanding with suppliers; "contingency response" approach frequently termed as "pre and post" preparation and implementation of disaster relief; and, lean and agile concepts, by mentioning the importance of containing cost, reducing redundancy of stocks, ensuring quality of food either dry stocks kept and wet food items supplied to relief centres, flexibility requirement and delivery dateline. Hence, the study provided an initial conceptual clarification for an empirical evidence from a much larger study.

### ***Data Source Structure***

Researcher also understood that from the brief explanation provided by the DSW representative before the interview session that data provider for the study will be both from State DSW office and DSW district offices. The State DSW office provides the input for AHP, explanation on overall involvement of state and district offices which includes statistics of relief centres and approval to approach district offices which includes examining relevant documents, to conduct observation at relief centres, site visits of, suppliers and victims. Whilst, the DSW district office provides the actual field operations inputs which include dealing with suppliers for pre-purchasing arrangement, strategic stocks to be held at the forward location of the identified disaster-prone areas and relief centres managements. Hence, Researcher need to follow this hierarchy to obtain relevant information. More importantly, Researcher needs to be work on early establishing rapport and on-going communication after consent was given as to ensure timely participation to maximize data generation.

### ***Case Study Scope***

One specific concern which arise from this pilot study is on the boundary for the large case study. At the point of the pilot study, occurrence of monsoon related flood was lesser in the country. This could possibly hamper chances of conducting observation and as well as limited empirical evidence on gauging the improvement since the "2014

big flood” occurrence. However, relevant data will still be sufficient as disaster preparation and management of food supplies will be on-going despite the risk of lesser occurrence of flood incident. Hence, all these risks need to be considered when planning for the larger case study.

### ***Field Logistics***

Based on the pilot study, Researcher was able to assess the importance of prior planning for a feasible logistics arrangement. Factors need to be considered includes: firstly, the larger case study would comprise almost the entire country from north to south, west to east of Peninsular Malaysia and east Malaysia; secondly, consideration need to be given during observation activity about the accessibility and alternative routing of mode of transportation to the field; and, thirdly, regarding the cost incurred which includes highest on accommodation and transportation. As such, Researcher needs to stay connected with all DSW for notice of observation and best time to do the visit for the rest of data collection procedure. Also, visits should be carefully planned during monsoon off-seasons to ensure key informants are available and documentations could be assessed. Such visit should also be based on best routing options so that the journey incurs less expenses in transportation and accommodation made prior to the visit which includes remotely located districts areas.

### **Conclusions**

The purpose of this study was initial to assess the methodological section and field logistics for a larger case study. However, the findings also include other key purpose of a pilot project such as confirmation of the concept used and to re-look at case study boundary, both which are an important aspect in strengthening the future larger body of work. Of the original purpose of this study, the finding confirmed that the both the pre-invented instruments namely the AHP and interview questions, needed to suited for better reliability and validity. These includes changing the labels of the commodities and providing clear explanation of the scoring method in the AHP. Next is on the interview questions, the findings suggest that Researcher needs to employ flexibility when conducting the interview session as to suit each DSW or agencies activity, which are largely based on the incident of monsoon season floods and its relief activity. In addition to the instrument’s alteration findings, Researcher was able to

identify possible cost incurrence due to the field logistics arrangement. As a conclusion, the finding of this pilot study reveals that future research on concepts associating the use of framework arrangement and, lean and agile in disaster relief, is worth the scrutiny.

Neuman (2006) asserts that qualitative research data are usually in words, including quotes, images or description of the particular event. On the contrary, quantitative data are in the form of a number from the precise measurement. For the present study, the data collection summary is presented in Table 9. There are five methods of data collection identified, which will be done in three phases. The first phase consists of three mixed data collection method, which will perform using the concurrent procedure. The method uses aspect of triangulation of data (Creswell 2000) in which biasness of one method could be neutralised using another.

The present study adopts the concurrent procedure, in which the researcher converges quantitative and qualitative data to provide a comprehensive analysis. In determining what procedures fits best to the study, the remaining descriptive of the approach section which includes a method, data collection, and reciprocal analysis will be described in three phases, in accordance with the objectives of this study.

**DATA COLLECTED**  
(APPENDIX 3.0)

**CASE STUDY DATA BASE**  
(APPENDIX 3.1)

**Appendix 3.1**

<b>Organization</b>	<b>Region</b>	<b>States</b>	<b>Respondent Title</b>	<b>No. of AHP Respondent</b>	<b>No. of Secondary Documents</b>	<b>Observation Conducted</b>	<b>No. of Interviewees</b>
DSW	Northern WM	Perak,  Kedah	Director Senior Assistant Director Productive Welfare Officer (District) Productive Welfare Officer (HQ)	1	5	-	4
	Central WM	Selangor	Director Deputy Director Procurement officer (HQ) Productive Welfare Officer (HQ) Productive Welfare Officer (District) Procurement Officer (District)	2	4	1	7
	Southern WM	Johor	Senior Assistant Director Productive Welfare Officer (District) Procurement Officer (District)	1	1	1	4

*Table 1: Profile of responding organizations*

<b>Organization</b>	<b>Region</b>	<b>States</b>	<b>Respondent Title</b>	<b>No. of AHP Respondent</b>	<b>No. of Secondary Documents</b>	<b>Observation Conducted</b>	<b>No. of Interviewees</b>
DSW	East coast WM	Kelantan Terengganu Pahang	Director Senior Assistant Director Procurement officer (HQ) Productive Welfare Officer (HQ) Productive Welfare Officer (District) Procurement Officer (District)	6	6	1	15
	East Malaysia	Sarawak	Senior Assistant Director Procurement officer (HQ) Productive Welfare Officer (HQ) Productive Welfare Officer (District) Procurement Officer (District)	1	5	-	8
Supplier (small trading)		Kelantan Pahang Terengganu Sarawak	Director Sole-proprietor Partner	-	-	-	7
Supplier (Large trading)		Johore	Director	-	-	-	1

<b>Total for Case Study 1</b>				<b>11</b>	<b>21</b>	<b>3</b>	<b>46</b>
<b>Organization</b>	<b>Region</b>	<b>States</b>	<b>Respondent Title</b>	<b>No. of AHP Respondent</b>	<b>No. of Secondary Documents</b>	<b>Observation Conducted</b>	<b>No. of Interviewees</b>
NADMA	Malaysia	Headquarters	Director	1	2	-	1
Supplier with Manufacturing capability (FAMA)	Malaysia	Headquarters	Industrial Control Officer Infrastructure Control Officer Procurement Officer	-	2	-	3
<b>Total for Case Study 2</b>				<b>1</b>	<b>4</b>	<b>-</b>	<b>4</b>
<b>Overall total</b>				<b>12</b>	<b>25</b>	<b>3</b>	<b>50</b>
<b>Concerning:</b>				<b>RQ1</b>	<b>RQ2</b>		<b>RQ1, RQ2 &amp; RQ3</b>

## Database Records for Case Study

<b>Primary Interview No.</b>	<b>Region of Malaysia</b>	<b>Agency/Division</b>	<b>Position</b>	<b>dd/mm/yy</b>
1.	East Malaysia		Operations Officer	20/9/16
2.			Assistant Director	23/9/16
3.			Assistant Welfare Officer	21/9/16
4.			Finance officer	21/9/16
5.			Disaster relief coordinator	21/9/16
6.			District Assistant Welfare Office (Operations)	27/9/16
7.			District Assistant Welfare Officer (Operations)	28/9/16
8.			Finance officer	28/9/16
9.	Northern (West Malaysia)		Operations Officer	2/5/17
10.			Principal Assistant Director	25/4/17
11.			District Welfare Officer (Operations)	27/4/17
12.	Central (West Malaysia)		Deputy Director	16/2/17
13.			Principal Assistant Director	16/2/17
14.			Procurement Officer	16/2/17
15.			District Welfare Officer (Operations)	1/2/17
16.			Operations Officer	17/3/17
17.			Finance Officer	17/3/17
18.	Southern (West Malaysia)		Principal Assistant Director	22/3/17
19.			District Welfare Officer (Operations)	21/3/17
20.			Finance Officer	21/3/17
21.			Principal Assistant Director	14/3/17

22.	East Coast (West Malaysia)	Operations Officer	14/3/17
23.		Procurement Officer	14/3/17
24.		District Welfare Officer (Operations)	15/3/17
25.		Finance Officer	15/3/17
26.		Principal Assistant Director (operations)	21/3/17
27.		Assistant Director (Procurement)	21/3/17
28.		Assistant Welfare Officer (operations)	16/3/17
29.		Assistant Welfare Officer (operations)	17/3/17
30.		Principal Assistant Director	19/4/17
31.		Finance Officer	19/4/17
32.	Operations Officer	19/4/17	
33.	Assistant Operations Officer	19/4/17	
34.	Central (HQ) West Malaysia	Director	19/10/16
35.	East Malaysia	Enterprise owner	7/3/17
36.		Enterprise owner	6/3/17
37.	Southern (West Malaysia)	Director	21/3/17
38.	East Coast (West Malaysia)	Enterprise owner	17/4/17
39.		Director	18/4/17
40.		Enterprise owner	18/4/17
41.		Director	19/4/17
42.		Director	19/4/17
43.	Central (HQ)	Operations officer (consumer)	29/03/17

44.	West Malaysia	FAMA	29/03/17
45.		FAMA	24/10/17
46.	Central (West Malaysia)	DRC Selangor (District: Dengkil)	1/2/17
47.		DRC Selangor (District: Dengkil)	1/2/17

<b>Primary Observation No.</b>	<b>Objective</b>	<b>Region of Malaysia</b>	<b>Location</b>	<b>dd/mm/yy</b>
1.	Observe procurement, supply and distribution of food to victims	Central (West Malaysia)		1/2/17
2	Observe procurement, supply and distribution of food to victims at DRC from Supplier and flood situation.	Southern (West Malaysia)		2/2/17
3.	Observe forward location for food prepositioning	East Coast (West Malaysia)		17/3/17

**Secondary:**

A	DSW (2015), Standard Operating Procedure for Disaster Relief Management, DSW Sarawak, East Malaysia, 23 September 2016
B	DSW (2015), Standard Operating Procedure for Disaster Relief Management, DSW HQ, Central West Malaysia, 27 April 2017
C	FAMA (2017), IMP Kit Brief, 24 October 2017
D	DSW (2017), Email and attachment from KPDNKK to DSW on Flood Price Control, 15 March 2017
E	DSW (2017), District Disaster Relief Reference Booklet, DSW District Dengkil, Selangor, Central West Malaysia, 16 February 2017
F	DSW (2017), District Disaster Relief Reference Booklet, DSW District Sabak Bernam, Selangor, Central West Malaysia, 16 February 2017
G	DSW (2016), District Disaster Relief Reference Booklet, DSW District Kota Samarahan, Sarawak, East Malaysia, 28 September 2016
H	DSW (2016), District Flood Relief Expenses 2015/2016, DSW District Kota Samarahan, Sarawak, East Malaysia, 28 September 2016
I	DSW (2016), Sample Letter of Appointment of Supplier of Dry Food and Fresh Ration for Disaster Relief, DSW District Kota Samarahan, Sarawak, East Malaysia, 28 September 2016
J	DSW (2017), Report of Flood Relief at DRC, State of Pahang, East Coast West Malaysia, 14 March 2017
K	DSW (2017), Sample Government Local Purchase Order, State of Selangor, Central West Malaysia, 16 February 2017
L	DSW (2017), List of Disaster Relief Items Requirement in Main Warehouse, State of Selangor, Central West Malaysia, 16 February 2017
M	DSW (2017), Report of General Relief Expenses, State of Selangor, Central West Malaysia, 16 February 2017
N	DSW (2016), List of Forward Location, State of Pahang, East Coast West Malaysia, 14 March 2017
O	DSW (2017), Report for Briefs of DSW Responsibility in Disaster Relief, State of Johore, Southern West Malaysia, 22 March 2017
P	DSW (2016), Flood Statistics, Serian District, Sarawak, East Malaysia, 27 September 2016.
Q	DSW (2017), DRC Flood Statistics, State of Perak, Northern West Malaysia, 28 April 2017
R	DSW (2017), DRC Flood Statistics, State of Kelantan, East Coast West Malaysia, 13 March 2017
S	DSW (2017), Report for Briefs of DSW Responsibility in Disaster Relief, State of Terengganu, East Coast West Malaysia, 19 April 2017

# **INTERVIEW TRANSCRIPTS**

(APPENDIX 3.2)

- Randomly Selected Samples

**TRANSCRIPT - DSW STATE**

*(Case Study 1)*

<b>Primary Interview No.</b>	<b>Agency/Division</b>	<b>Position</b>	<b>dd/mm/yy</b>
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23/9/16

PP: The idea of MoU between buyer and supplier for disaster relief was mooted by S state, why such idea was actually promoted?

Int.: The idea... as we are aware the food disaster occurrence is unpredictable and even at night, even during weekend and during celebration, where the supplier is not open for business. If we have approach them earlier, they would consider to supply during the disaster relief occurrence. But for the MoU, for the period that I am holding this position as Head of this operational division, I have not seen this in writing. That is an understanding of our officers at the respective Division to meet the suppliers and request them to prepare the supplies even in their off-business hours.

PP: Other than that, in term of its benefit, if such MoU was a policy for all division to adhere to, what would be the benefits in your opinion?

Int.: If it's in writing, I am afraid there would be risk that some Suppliers would not commit to supply because if the MoU is just by verbally, a lot of them would want to have the business, by if it's in written, I think the supplier would be worried about the bond that tie them to this especially cannot give the service. For example, in some cases if we wanted it urgently and in high volume, some suppliers might not have the manpower to work during midnights. This is why if there enter into such written MoU, they might have to call their works and so on and the items will have to in prepack form for example like Maggie and so on. So, I feel they might not be Interested through this way but if it's through volunteering to perform this, they have not let us down so far.

PP: I see... meaning the current preparations are able to fulfil such demand during the disaster relief?

Int.: Hmm... And another thing is that if the MoU is in written form, our Department bonded to the reserve stocks of the suppliers. If this is done in written formality, they suppliers will have to reserve their stocks either at their premise or warehouse in large quantity because of the existence of such MoU, and if they do not comply to stock the items, then why they enter in such MoU. In such case, we are obliged to pay for the large stocks that are tied to such arrangement in case there no occurrence of big floods. If the MoU do not tie us to their stocks, so we are not obliged to pay. If they say they can sell the stocks if there is no flood, then it's much better. Apart from this, the benefit of having the availability of such suppliers that understand what we require that we have approached, this will reduce our stocks at the forward operating base. If we know they are available... previously we had large stocks at forward operating base but since the availability of many suppliers that could provide the service, we reduced it further. Because the forward operating based has its pro and cons as well. If flood occurs near to the forward operating base location, then it would really be helpful but if flood did not occur and there are large stocks that were hold, then this must be disposed. Having said that, the disposal of this stocks is also beneficial as we would give it away for our aid recipient, the needy whom stays in the area. But for every year... previously We formed more than 100 forward operating base comprising small villages, this is the reason the idea to have more suppliers, it will be more prudent. Now we only have 25 forward operating bases.

PP: So previously it was more than 100 forward operating bases and now just 25.

Int.: Even for this there were more than 100 forward operating bases, we spent more than half a million in expenses. That is why we have to follow the capacity of how many families at these places. The food could last for a week. Even then, the rate during such time was RM40... now, for two persons, the rate is RM75, it's the maximum and the price if for *Belaga*. For here, we could get it at RM68 or RM65, it depends. Sometimes, the thing that forms the price is more on the rice and canned food.

PP: For this forward operating base, the procurement is made using competition bid and contract?

Int.: The one that we have using competitive bid is only Miri Division and the value is approximately RM14, 000. This is a normal competitive bid because for state, it's RM10, 000 and above. For the rest of it, because the disaster is not only flood, it includes fire like in the case of Kuching, they have a supplier. Do they have when they told you yesterday?

Int. 2: No.

Int. 1: Because it involves other disasters as well, and the fact that the procurement is counted as RM10, 000 in a year, it will have to do that. But for flood, we did not predict. Since your study is regarding flood, then it's not tied to competitive bid. But for food items for other related disasters, the Accounting Department will calculate the expenses at RM10, 000 for a year. But sometimes there is flexibility in this because we did not predict in the beginning of the year that we will only take only from this one particular shop but once the disaster happened and it's far from this shop, and we want the supplies urgently, so we will have to the supplies from here. So that is the reason sometimes the practise is not too strict on procurement involving other disasters.

PP: Meaning for most of the procurement for forward operating base is made through direct purchasing except for the Miri Division?

Int.: Yes

PP: In the case that the flood occurrence prolongs and the number of victims were increasing, what would be the next process?

Int.: For that, once we have intervened, the food aid will be added through that way. This is the reason we have the Division Disaster Management Committee, where the task will be distributed for example for logistics, it will be handled by the Fire and Rescue Department, CDF, the Armed Forces, Marine Department and so on. So, we will send supply through the normal means, this is already the emergency season.

PP: In terms of emergency purchase...

Int.: I know if you follow the Treasury Instruction, one must wait of the higher management to declare emergency but for all that happens there onwards, we will only send reports. For emergency purchase exception, a report must be sent that informs that in such month that DSW conducted emergency purchases without competitive bid or tender.

PP: Is there instances that the emergency purchases that were made resulted in overstocks then what is needed?

Int.: Yes, there were instances. Because the victims will enter and exit the relief centres, and there some that newly entered. If We use the relief centres that many places that were concentrated there because the facility is big, it could have flooded in A or B although We have had five places gazetted for aid, if for such relief centres, the numbers could change easily, so that is the reason We will receive the latest data every four hour ones, this will indicate to us how much We would have to spend. Usually We will refer as a team, if for 10 head and the rate is RM220 for one team, so if its 220 people then cooking as well as the purchases will be for 10 team or 220 victims. If they say that if the number were about 45

people, we have to give in 5 times because now S also take into considerations the officer at work because they are working voluntarily.

PP: Ok... with regards to the stocks of forward operating bases which declines as the victim's number arises, so at the relief centres.

Int.: It's like this, the ones using the forward operating base, usually we are not present there. They cook on their own whether they go to relief centres or they divide amongst those involved, there are given because they are not reachable and inaccessible. If they want to add, it will be how it's added like in the relief centres. If the forward operating bases is close to the relief centres and for these bases, we could add based on the rate for relief centres. There is two, relief centres and forward operating base.

PP: In the case of forward operating base, once the stocks is depleting, will the same supplier be used to replenish the stocks?

Int.: No

PP: So, during this, the purchases were made using the emergency purchase processes?

Int.: Yes, this can be used.

PP: Is there any differences in prices?

Int.: There is but within the range because our officers using the so call MoU discussion was inclusive if the prices because in the guide book there is price range but they usually do not reach the maximum.

PP: Meaning the supplier is aware of the maximum price even though in the situation of emergency, they will compromise in the pricing?

Int.: Yes, usually our officers during the purchases will also look at the supplies and the current price situation. Sometimes we too during our meeting in the Disaster Management Committee, we were informed of the prices of vegetables, fish...the raw food but for the early stage, we were also invited by KPDNKK to see the price control. Usually the price will not affect it, is usually on stocks that affect this such as lack of cooking oil and We will remind KPDNKK for cooking oil, usually the small bottles.

PP: From KPDNKK... they are not supplying, right?

Int.: They are not supplying, they will ensure the supplies are in the market so that the supplier has it.

PP: This appears to be a collaboration with other Ministries?

Int.: Hmm... The last two years, we had this. Now, we told them. It's just that during the discussion, they asked us, "What is your usual problems in terms of supplying the disaster items". Usually for the supply of forward operating bases in large quantity, it involves cooking oil, we do not want the cooking oil in plastic bags as its easy broken, so we need it in small bottle. The cooking oil is usually the problematic one because they said that the oil usually goes out. Because our forward operating base is inclusive of oil as there will use it for frying which includes frying of raw food given as donation by public as well as other raw food.

PP: Based on your experience handling large scale floods, during such time how was the support by suppliers to forward operating base and relief centres?

Int.: It's difficult to predict...that is quite difficult to answer. I cannot imagine like how it happened in Kelantan, at that moment, DSW were not involved anymore as MKN took over. Meanwhile for here, the supply... I am not sure because to count on forward operating base, we believe the current supplier could supply but they too do not keep stock as that much. If for Kuching, not that bad. As you seen in the paper as the supply were less, it is very difficult to say, I think the State Disaster Committee will ask suggestion from agency like KPDNKK, the Agricultural Department to pump in its the food items. Even now FAMA has already play its role but it's just that FAMA at this moment is using us to distribute so that is the problem

If they give their stocks earlier to us, that could be said as food because they refer this as First Meal Kit (KMP) and they allocate it by family. So, if I give it out earlier, I do not know who is the head of the family. That is the reason... it is as if we order to them first by informing the number of family heads that exist, only then they deliver to us. But the purpose is for early meal.

PP: Is this the same as the forward operating base stocks?

Int.: No. It's not like the forward operating base, but may be for their own level, their own forward operating base. If it's in S, they did not yet pack into their container it's in the form of Carton, then they fill in. In S, they do not store this with us. I think they might keep in *Mukah* because there is no FAMA office there. Like for other Division, the stocks are kept at their respective division office. If we order, they will send directly. However, it would not be long, its fast delivery. So, to say that this takes over forward operating base role, not really. Rather it takes over the function of... We during flood, for us to calm down the victims, we will give early meal. We will bread and sometimes if we are in time, we have prepared the early meal kit per head, each individual gets one. The value is about RM5... mineral water, box drinks, crackers or bun. This is what is difficult to be prepared as early as possible because bun could be expired. But based on our experience, we prepare hot water and gives 3-in-1 coffee or mix drinks in large container for sharing and give crackers or bun, this will calm the victims down. And if it's closer to lunch, we cannot make it in time, so we will buy packed food.

PP: So, you feel the kit by FAMA could replace the kit by DSW?

Int.: The early meal kit. The function is to calm down the victims. But if they put as for per family, I am not too sure some might enter later, some a bit later and some might still be at home, so if the new batch comes, we do not know whether the family have taken the kit or not. The kit is a bit expensive, RM75. The one that we give through before, it depends what we have, it might crackers or through some donations and top-up with our coffee, usually we will use the powder coffee, something like that. If for the one that we have prepared, the one that we prepare for RM5, crackers with coffee in individual packets, usually it would not be enough. The one that enters, sometime are not victims, some are sending their relatives, which is why it is difficult. It is also difficult for us to distribute the FAMA kit at the beginning, the one that are not involved too feel that they also the family head, then the real ones that will stay only are left with very few of this kit.

PP: So far do you have any collaboration with FAMA for the supply of the KMP?

Int.: It's not collaboration with DSW but rather with NADMA, it's considered their kit and they give to DSW to distribute it.

PP: DSW will then distribute it?

Int.: Yes... In Peninsular I observe its send to DSW office and that is the reason lately they were busy with the disposal of the kit. S do not have problem disposing these FAMA kits because we do not receive the one that need to store at our office, instead if there is flood, we will bring it straight. Because they are also new in S and S was the last to use it the other day because the FAMA S office needed to wait for the container as the items were from Kuala Lumpur and they had to wait for filling part of it. This is the reasons, if there is flood occurrence, they will pack and will send based on our request. This is the reason for those who have come out from the relief centres, we do not give them... there are some not given because they have left the relief centres.

PP: So, these items are considered centralised and not manufactured locally by the farmers here?

Int.: No... It's like instant Maggie, biscuits... packed which includes mineral water, 3-in-1, cup noodles, fork, spoon and plate.

PP: Do you think it's redundant with DSW items?

Int.: Perhaps...but we cannot forsake the items that we give out because if suddenly they items are not there then we are the one complained that the first meal is not there. Usually the first meal is to cater for the empty stomach. The items can be there as well not required because we already have the first meal. If coincidentally it's in the afternoon, sometimes we do provide it because after that we will provide lunch.

PP: With regards to the suppliers especially at the Divisional level supplies, what information including forecast that will be used by the suppliers to supply the raw food and other food items during the occurrence of flood?

Int.: The supply based on our trend of orders.

Int.: In terms of quality, usually this is less mentioned and more to quantity. For quantity... it's about the supply was not enough, there were too many people... this is especially the suppliers need to take stocks from example from *Limbang*, they need to take stocks from the Sabah State, from far sources. But for Kuching, if there were no stocks, if it's regarding food, usually there is no problem. There ones that were problematic like the recent incident were blankets and pillows because We did not expect there were that many victims that were in the relief centres because for the aid that we refer to... in S there are many Divisions. We have distributed allocations based on the respective divisions, which is why for blankets for instance, you cannot like buy it when the victims are just about to enter the relief centres. So that is why we instructed them to purchase it earlier. But for this, we will use the allocation given from our HQ in Peninsular.

PP: Blankets are considered from the federal allocation?

Int.: From here there is as well. But for early preparation, Peninsular also allocates the fund, for this year, for all disaster relief operations, we were allocated approximately RM500, 000.

PP: This all for the relief centres?

Int.: It's for S. At the early stages, we purchase food items because it was allocated during the month of January, so it's still on time for the use the flood victims and also for blankets and pillows. For the rest of it, it is also possible with states as well, disaster relief is 'baby' of the state.

PP: In terms of food items classification... We have the first meal kit, there is procurement for fresh rations for forward operating base

Int.: For relief centres we did not give on preparedness... because in forward operating base the items are wet rations, so there is no readiness, like for rice, it's available in the market. These are the one that are not placed in the relief centres but are with the suppliers, because it's easily spoilt.

PP: How about for the ones on preparedness, is it just for stocks for forward operating base?

Int.: No more... blankets for instance are not stored at the forward operating base because for these forward operating bases, we had to acquire the compassionate from other agencies like stores these at pre-school buildings, hall at churches like in *Bau*, the blankets are stored at the Division's office.

PP: Meaning blankets are considered items that were made available during the pre-disaster period?

Int.: Yes... it must ready... blankets, mats, and pillow.

PP: Is there anything else.

Int.: The basic ones.

PP: How about medical kits.

Int.: No... for that under the Disaster Management Committee, once disaster occurs, all the team know their functional role and that they must be stationed at the relief centres, say the

occupants were about 200 to 300 individuals, they must be stationed there to look at the medical of the victims. The same is with logistics, they are also present there earlier especially now other than the suppliers delivers, we also require assistant from agencies with assets like Fire and Rescue Department, Armed Forces and even the local councils. Last year, we did not encounter any problems, even the NGOs provided a lorry for us pick up and deliver the disaster items. Last year too for instances we received 1,500 foam bed and the agencies helped us to deliver to these places. The one that there were stocked on small quantity were hygiene kits. These hygiene kits, usually we will utilise the federal fund for this. There 5 or 7 items under this kit like tooth brush, shampoo, soap, tooth paste, face towels.

PP: This is also the responsibility of DSW to provide them?

Int.: Yes... in Peninsular it was given and for us, if we get the funding from Federal, then we will divide it amongst our 12 Divisions here in S. But the problem is, for these items, it is to be distributed as items in preparation for floods. However, there are so many places that sometimes are not flooded. We have to see first... If its flood seasons, then it must be distributed. If the flood seasons is over, the items could also be used for longhouse fire incidents for instance, something like that. They have their own SOP for the store management because these items need to be disposed. Items like shampoo and so on have an expiry date, we fee pity to dispose it. Usually the federal fund is used for these items and not for food items. If during flood, it could be bought but to put it as stocks for forward operating base, it is not permitted because if it's used during flood to buy food items then it's beneficial and if there is no flood, the money will be wasted because it's not used. So, the rational is to buy the items that could last, like in Peninsular, they will purchase, batik, t-shirts, big towels, diapers, lady's towel, even milk. The money is adequate enough to buy milk but if not flooded, then it would also be a waste.

PP: Is milk considered as food item category?

Int.: There is...it's an option. Milk and mineral water, it's based on request especially the mineral water is required because the water source is disrupted.

PP: The response in terms of food items for disaster relief, is it more too pre-disaster, during or post-disaster?

Int.: We are involved in all three phases. For the pre-disaster preparations, it involves the preparation of forward operating bases, for places there were identified as inaccessible during flood, would require forward operating base. Secondly, for general stocks for example blankets, mat, pillows and the hygiene kit, it must be available physically. Meanwhile, for the relief centres, we must equip them with the cooking utensils.

PP: Meaning all the relief centres have already been equipped with cooking utensils?

Int.: There are some that we left it there, there are some if it's using the school's premise, then it's using their utensils.

PP: Is the relief centres are usually on permanent basis meaning if it's used for flood relief this year, it will be continued the next year?

Int.: Hmm... Still, permanent.

PP: So, there is three elements for pre-disaster preparations, forward operating base, general stocks and relief centre preparations?

Int.: Preparing the cooking utensils for relief centres because for example last year We purchased for this centre, hopefully this could be used if its flood this year. But places that do not have these utensils, we will have to purchase them. But it is not possible for us to equip all of our 500 relief centres with kitchen utensils. Sometimes NGOs as Red Crescent and the Armed Forces, they have the cooking utensils, and if its school or mosque, both will have their own cooking utensils.

PP: So not necessarily it's purchased, it could be borrowed and brought in by other agencies?

Int.: Yes, that was the reason when we had the Disaster Management Committee, all the agencies know their roles.

PP: Do other agencies also declare about their assets that could be utilised for the flood relief?

Int.: See...it's like this remember there are presentation by the agencies in the meeting, so they will declare this during such time.

Int.: There were instances that the victims as many as 1000 in the relief centres, and we had to source out packed food. But while waiting for the food to arrive, suddenly there is a massive drop the victims to 400 only. This is sometime that create an impression of illogical spending. But for the remaining victims they will get the compassionate money not so much for the packed food, it only cost RM6 per pack. That too they have to wait as we source from various places as we do not have the raw or fresh food to be used for cooking when it suddenly happens. There is a lot of issues if it's regarding food, it's always not enough, if it's fast then they complain not enough (laughs). Even for these early victims, it's not possible to give them the FAMA kits because we are not sure of the authenticity of the registration at first. In Welfare, the definition if a family represents the house.

Int.: But the Interpretation by the families is that, the immediate parents is one family, the son or daughter in law as another... the least it will become three family from a house. So, if it's for compassionate money, it's RM500 for a family. DSW helps on providing for the food aid.

PP: The compassionate money is from DSW?

Int.: No, it's from NADMA. So, this is what interest the people. Even in some cases, there were non-victims but also registers to get the money. This caused difficulty for us in distributing the FAMA kit as well, because we really do not whether their house was flooded or not because we do not go to their sites as we work in the green zone, the rescue agency is the one that will be out of the green zones. This is also reasons that for our first meal, the numbers will usually be different that those who have stayed overnight at the centres. Sometimes those that registers are so many, but not present at the centre. The most difficult time was when We had to carry foam beds to cater for 1000 victims but once arrived less people were utilising it, you imagine the trouble that We had to go through plus the logistics difficulty. In addition, CDF now have the IM4U, collapsible tent for large places. But it looks a bit unpractical. It's for a family and usually for privacy like for breastfeeding mothers or for babies, the elderly and so on. The one that we supply is partitions, which we bring and it's collapsible for privacy purpose for mothers and so on. For the IM4U tents, it's not suitable for small places, it's also lower than our partitions. Our partitions are also suitable to perform prayers.

Int.: So, this for the preparation for pre-disaster. Then, our officers' functional works which includes identifying the need for relief centres such as toilets, place for cooking for instance and the Disaster Management Committee will alert all the agency to be on standby, even the headmaster needs to stay on so that the keys for the premises are available, and the Department of Health with their ambulances also will be on alert. Each know their roles. Meanwhile for us the task involves discussing with the suppliers, if possible, for the supplier to reserve capacity but that does not mean that we will purchase the stocks if there is no flood.

Int.: Next the preparation during flood, we will work in full force. Our Counsellors will be on the ground, our officers whom will be doing the registrations. There are two tasks at the during flood phase, at the relief centres and for inaccessible places. At the relief centres, there will be many agencies that will participate. Once at the centre, all will know their roles, from rescue activity until the victims are in the relief centres. Other agency will take over, the RELA too will be assigned the duties of ensuring the security of the premise, if it's in large scale, and the

health Department will be stationed their medical staffs there. For the rescue agencies like fire and rescue Department, the Police Department will be on surveillance because rescue work is not only about saving human lives but even the trees, even toilets are provided by the local councils.

Int.: DSW also conducts simulation although it's not compulsory, it depends on the budget. Other agency such as CDF also conducts simulations but it depends on their role for example for the Fire and Rescue Department for rescue mission and how they need to be fast. For us, our simulation goal is for organising the relief centres, the speed of the food delivery, how to handle the elderly, handicapped as well as children in the premise. Secondly, the preparation for those who did not evacuate, the forward operating base, the general items that we must have like the blanket and mat. If during disaster, the food items for the relief centres and the dry food for inaccessible places, usually it's for the long house or community. We will send it to one spot and the village head will take over for distribution. During response stage, the task is heavy but it's manageable with the involvement of many agencies and this also includes counselling activity, which include volunteer works.

PP: In terms of suppliers, is there any activity together with them?

Int.: During phase there is no activity, it's just placing orders. But this using the emergency purchases. For post-disaster activity, if the houses were ruined by the flood, the building material will be provided, this not for squatters but for real house owners. In addition to this, counselling follow ups concerning deaths case perhaps. The post activities also involve the payment office. There will be some cleaning activity as well by joint ventures with volunteers.

PP: This do not involve procurement?

Int.: No.

PP: So, the during disaster phase, the procurement are most on emergency purchases.

Int.: Yes. This is the reason I say even using the federal fund, it's usually direct purchases. Once divided, it still would not involve competitive bidding as the value is still below RM20, 000. Like for this, once we distributed the balance were less than RM10, 000, so they could do direct purchases. Although they perform direct purchases but they will still conduct the comparative market surveys and compare three quotations, if the time permits and the warrant is timely. The competitive bid may take longer time, but most of the purchases are of direct purchase procedures.

PP: Thank you

Int.: You're welcome.

**TRANSCRIPT - DSW (BRANCH)**

*(Case Study 1)*

<b>Primary Interview No.</b>	<b>Agency/Division</b>	<b>Position</b>	<b>dd/mm/yy</b>
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Int. 1: The District officer instruct us to open the relief centres, which was already gazetted.

PP: When did the flood occurred this year?

Int. 1: The flood occurred on 23 of January, before the Chinese New Year till 1 February 2017.

PP: Did the flood occurred last year?

Int. 1: Last year, it was great high tide here in the month of September, this is the sea phenomenon. The existing blockage could not support their unusual high level of water, the moon was closer to earth.

PP: How was the preparation then?

Int. 1: The preparation was done much earlier because we could predict when it was about to occur. Once the information was informed by the Meteorological Department and the District Office, we had prepared much earlier. The District Officer had instructed to open the relief centres and so we opened earlier because we knew it will hit. So, we already obtained the data of which villages that will be involved, the place and the capacity.

PP: What was the estimation of families?

Int.: About 40 families that were involved from Sg Air Tawas.

PP: How about for flood preparation?

Int.; for flood, we prepared too. We have the group WhatsApp and they will frequently report the present status which includes the weather report, the rainfall... so we could estimate the requirement.

PP: Which agencies are in the WhatsApp group?

Int. 2: The fire and Rescue Department, the Health Department but it was led by the District officer.

Int. 1: It was complete... the drainage and Irrigation Department, Fire and Rescue Department, RELA, Police Department and plus from the State. Meaning we could predict although it's not accurate but at least for early measures.

PP: In terms of DSW role in district?

Int. 1: Our duties are in green zone for registration of victims and for the channelling of relief aids, and for the preparation of food after 3 days, we will take over.

PP: So, your role for the early days is to inform the district office?

Int. 1: Yes, the district office will open an operations room and they will channel the information to the state.

PP: If we look at the role of DSW at the third day, how is the transfer of responsibility process between the District Office and DSW?

Int. 2: Ok, once enter the third day, we will be ready with supplier with the approval from the State office for us to proceed, this follows the SOP. Sometimes we also welcome contribution by NGOs, sometimes even the Armed Forces lend us their mobile kitchen. We are open,

PP: So, regarding the contact with supplier, was it done prior to the flood or during the flood occurrence?

Int. 2: We have already appointed because the payment is using the local purchase order, meaning they are already registered.

PP: As disaster is unpredictable, what sort of preparation is made with the suppliers?

Int. 1: To good thing here is, district office handles the first three day, so come the third day we already sure of the number of victims involved.

Int. 2: So, we have the quantity

Int. 1: But this will change too because some people would have left the centre earlier, but at least we know the figure. Somethings are outside of our control as some victims may be worried about their homes and leaves early. However, the figure does not run far.

PP: So, for the supplier, do you take your own supplier or utilise the supplier of district office?

Int. 1: Actually, that is decided by our administration as we are from the operational side and we only handle the relief centres, assessing the items that is unpredictable.

PP: How many relief centres was opened this year?

Int.; for the first day, it was four relief centres and for the second day it's already five. The good thing here, because they have predicted, we opened the relief centres much earlier. For example, if say 90% percent that the water will rise at this spot, so will open first so that the victims do not wait. Then we will see, whether there were victims coming in for the first two days. If No, then we will close it. Like for this year, we close two centres because the victim still feels safe not to evacuate. That will be determined by CDF. So, in total there were three centres that opened, it was in *Parit Baru* Hall.

PP: Could you repeat that please?

Int.; The one that we predicted was *Simpang Lima* Hall and *Tun Razak* Hall. But the one that was active *Seri Bernam* Hall, *Nakhoda Omar* Hall and *Parit Baru* Hall. The other two was predicted but there was no evacuation. In this case, we waiting for the victims.

Int. 3: ((Enter the room, from the procurement department)

PP: We were discussing about the flood preparation and there is some procurement question that I need to Interview. So, usually does DSW continues with the supplier from District Office or using DSW's supplier?

Int. 1: As I am new, I referred to our state HQ and was informed that there is no problem to continue with the existing supplier as when we took over, we were informed quite late. Supposedly it was supposed to be in the third day morning but I was only informed in the meeting during the meeting with District Office. So, I just continued with the existing supplier, plus there is no problem or complaints against the existing supplier.

PP: So, it's only packed food here?

Int. 1: Well, it's not only packed food. Following our SOP, it's true that the first 3 days, we will use packed and after the third day, once DSW takes over, it's usually on cooperative cooking base.

PP: What do you mean by cooperative cooking?

Int. 1: Cooking.

Int. 3: We will supply the raw food item. But in this situation, after the meeting, the Health Department advise us just to supply packed food as it's safer because they are worried about food poisoning.

Int. 1: You see the Health Department takes sample of the morning, lunch and dinner meals for testing whether safer or not.

PP: That is Interesting as I was just about to ask about the quality of the food items.

Int. 1: Yes, that is how it is done, it's tested before the victims consumes it.

PP: So, in terms of response from the victims?

Int. 3: There were no problem at all in term of foods.

Int. 1: In fact, their relief centres is fully air-conditioned.

PP: How about the rate for the food item?

Int. 3: This is determined by Government, its 4-8-8?

PP: This is used for the packed food?

Int. 3: Yes

PP: How about the delivery?'

Int. 3: The delivery was by supplier directly to the centre.

PP: Is there issue on delivery?'

Int. 3: No.

PP: So, this is the response from the victims?

Int. 3: Yes, it's on time.

PP: How do you ensure it's on time?

Int. 3: I will communicate with the officers at the relief centres. If there is any problem, I will directly inform the supplier.

PP: Is there any fluctuation in the quantity of food items after the third day?

Int. 1: Sometimes there is incremental as the rain is unpredictable and our local statement are also quite active here.

PP: In terms of your communication with your supplier, is there any cut off time to inform them?

Int. 1: It's like this, every 4 hours once we will forward the progress report, so from there we will already know the rate.

PP: How about for night?

Int. 1: I will inform the supplier at 10 pm instead of 12 at midnight because usually there will be no changes from the report at 8 pm. Also, the victims will not go back at night, so from that we could make quite accurate predictions.

PP: So far have experience of victims after 10 pm that you need to inform your supplier?

Int. 1: So far none, but usually too We will order slightly more like 5 or 10 packs, just in case there is an additional incoming of victims.

PP: So, this estimation also includes the officers of duty?

Int. 3: Yes, every relief centre has fixed numbers of officers or staffs working, so there is no problem. The problem is in the fluctuation of victims. But so far, thank God, there is no complaints.

PP: Based on your experience, in the event of drastic fluctuations of victims, what is opinion of the willingness of supplier to add quantities?

Int. 3: No problem... they are flexible.

PP: Based on your experience handling big scale floods, there were shortage of food and so on, could you give your opinion on this?

Int. 1: What kind of problem?

PP: For example, food delivered late or never arrived?

Int. 1: It depends on the volume, like in the case of 2014 flood. Although we could make predictions but there are problems of inaccessibility, problems of getting the dry and raw food, transportation problem. When we deal with the public, it's difficult to satisfy all but we will do our best. For any limitation, we will take note and try to improve further.

Int. 3: So far there is no issues with victims.

Int. 1: In fact, the cooperation with other assisting agencies was very good and they will only get instructions from one source... the district officer.

PP: In terms of reducing unpredictability, what is the preparation that were made with suppliers to reduce this?

Int. 3: For me, this thing should be informed much earlier to the supplier, so there are no shortages of supply issues. We would also reduce the problems of the risk of lateness in getting supply and so on.

PP: Is there any discussion with suppliers for them to reserve stocks or other than this?

Int. 1: Here, it under the responsibility of the district officers for the first three days, so better we just continued with it. In addition, we have all the data in placed. If we were to take other supplier, there could be delay in delivery. Also, to take over in one day, there are some suppliers whom are unwilling.

PP: How is the structure here, are the relief centres far apart?

Int. 1: (laughs)... some places, there house is a single unit and it's far apart. In *Sg Besar* is where the density is high.

PP: How many suppliers support these five relief centres?

Int. 3: Usually it's a single supplier because here it's very rare for an extreme flood, this is for the last 40 years and people are quite traumatised.

PP: Why do thing it occurred?

Int. 1: Based on observation its due to high rainfalls and high tides of the sea... so the water could not recede and meets at the river outfall.

PP: This involves the nearing villages?

Int. 1: As I said earlier, we predicted first once the information is obtained especially on low grounds and the level of water rises, we will open first the relief centres and wait for the victims, if there is none then we will close. It means their house is safe and this is based on DO.

PP: Based on the registration, which villages that were involved?

Int. 1: Some were housing estates near the river as well as some villages, as I said earlier, it's been 40 years since the last incident so it's really difficult to say about the frequent hit places.

PP: How far is the sea from here?

Int. 1: It's so near, and if the water blockage could not support then it's a sure flood. But recently we had a meeting and that there will be special fund to improve the blockage and to avoid bigger disaster.

PP: Is there any complaints from the supplier that would want an earlier information for their preparations?

Int. 3: So far there is none. I will inform from 8 pm onward with the latest disaster.

PP: Usually during disaster it is known that there will be some hikes of prices on raw food, have your experienced any hikes here?

Int. 3: As far I know, there is no increase. In terms of meeting the specification based on the rate, the supplier's area is not affected by the flood, so they have no problems in the meeting the specifications.

PP: I am almost at the end; would you like to add anything further?

Int. 1: So far, I think all appears to be fine, there were no complaints and the cooperation within the agency is very good too as well. In fact, we were impressed with the Army, there provided the mobile kitchen and they even cooked. We also have good support from the Department of Irrigation and Drainage, they informed all on time.

Int. 1: If at the relief centres, the CDF, the district office even the land office cooperated, as well the fire and rescue department, everyone knew their part. So, I really respect the response and cooperation of all the agencies. For big floods that occurred, the department deployed staffs from less affected places. So, in addition to assisting, they are also expose for future relief activities.

Int. 1: In addition, there is also conduct simulation to prepare us to run relief activities, like for this year it's in Perlis. We acknowledge there is a problem of manpower, but it's manageable with this sort of simulation. However, we would suggest that more simulation is done at state level, so that more staffs could attend and be exposed.

**TRANSCRIPT- SUPPLIER**

*(Case Study 1)*

<b>Primary Interview No.</b>	<b>Agency/Division</b>	<b>Position</b>	<b>dd/mm/yy</b>
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21/3/17

PP: I just want to brief you first regarding what is the study is about. This study is a research how procurement is done and the supply to victim

Int.: So, from supplier to the victim?

PP: Yes

Int.: OK

PP: There are some study in abroad but however it's yet to be done here.

Int.: OH

PP: So, what I am trying to do with this study hopefully the finding will improve the current process.

Int.: Yes, if you find anything on SOP or whatever, you inform us, we will improve as we follow procedures.

PP: Ok, Madam

Int.: That would be more efficient but not wise also, if not it's a waste of time to do the research (laughs)

PP: Yes, amongst the objective of the study is the findings is hoped to provide policy changes and improvements.

Int.: Yes, we can always communication, our Company and DSW has very good relations, so we can discuss anything and improve as long as we have both communication and understanding.

PP: Ok, Madam. Let me begin by asking how many years have your company supported DSW for disaster relief?

Int.: To be honest, our business is five generation in *Segamat*. We at first, only sell fish in the old market Int. he *Segamat* town. Up to my generation here, in the year 2000 we moved to this place call *Taman Yayasan* and this is the only wholesale market in *Segamat*, officially. Many people put wholesaler in front of their name, but they are not official. Our name is gazetted in *Segamat* City Council (MBS) as "*Pasar Borong Segamat*" *Segamat* Wholesale Market. Ok, the structure is like this, originally in the year 2000, we are inside the wet market and this place was just developed, nobody wanted to come here. MBS first allocated this place as Wholesale market and wet market, nobody wants to come. So, MBS discussed with us whether we want to take up this place after all there have due date. So, they have 12 standard small units there, so we say OK. We take it up. At first, there is less than 100,000 occupants there. So, we take it up. At that time was mainly fish, river and sea fish, all the while we are the biggest wholesaler in *Segamat*. We concentrated in fish. But because we moved here, we have to survive. So, we started selling vegetables grocery to attract customer. So, please start coming. We bring up this place. So, in year 2005, I started a supermarket there, there is three section, wet market and supermarket. And this year either in January 2016 or February start, that is our first stage, the wet market and grocery, all these.

Second stage, we opened an air-conditioned super market. Next stage, in January or February 2016, we start to construct this place. By June. All these was done (pointing the erected building). So, this is the third place. In the meantime, the wet market which is already 26 years

is all broken already. We use our own money to build and renovate it. So, you see, it's very new (pointing to the erected place). This one also we used our money to build.

PP: Oh, I see.

Int.: In the old time, in the year 2000 in which we started, we do not have. Based on my memory, if mistaken, all the while we have been supporting. Since I involved in this business in year 2000. Since then, whenever there is flooding, we help and its 24/7. Once it starts flooding, it's under my control. At first, it's small flooding, normally flood in the *kampong* (village), small version, relaxed, and two or three days it's gone. And then, since the year 2000, there are two or three serious flooding. I think the DSW officer mentioned about the flooding.

PP: He mentioned about 2006 and 2011.

Int.: Yes, all three was serious. I even slept in the market because my house was in town. I came here and managed the business. All my staff, 80 percent of them had gone back and could not come to work. I was left with 10 people to manage the supermarket and the wet market. I worked 24/7 and did not sleep at night to help them until I was too tired. During that time, it was very serious in *Kampung Abdullah* as there were blocked up there for 3 days and could not come out. On the third day once they came out, I am the only market here at that time was opened with all the supplies. No problem. They come they cannot finish my stock (laughs).

PP: Oh, ok.

Int.: Not only DSW came but also the residence started to come out because it was the only place, they could buy fresh items. My place is the only place they could shop. So, we just work and co-operate, and then every time the flood occurs, we will work hand in hand with DSW. The thing is I have a big refrigerator.

PP: OH... you have big refrigerators.

Int.: Big, big refrigerator. There are two big refrigerators to keep frozen fish, chicken and meat. As well as last time I had one refrigerator for vegetables.

PP: I see

Int.: And now I have additional one shop lot with refrigerator to keep vegetables and the standard one, is about this size (pointing to the refrigerator). And now I have one additional to freeze fish, small one. Once there is fresh fish, we will put in, and within 1 hour it will come out nicely. Freeze it. So, in our supply there is no problem. Even if it's for one or two month (laughs)

PP: You could support?

Int.: No problem. You see I have brought in my stocks yet, they did not clear much of my stocks.

PP: Madam, since We are talking about stock, I might have known about the pattern of the disasters that happens here usually end of the year and beginning of the next year, how do forecast the need for DSW let say for weeks and so on?

Int.: Actually, my normal stock is as much as this. This is my normal stock, so normally in the past years, the Government have statistics and will inform all the department which was involved, saying that "We are expecting flooding end of the year". Then, DSW will come out with a letter to inform us.

PP: So, there is a letter by DSW to inform you?

Int.: Yes.

PP: I see.

Int.: They have a letter to inform us and we know what they want because I have experience already. So, I will stock up extra, for example biscuits minimum I will have 1,000 cartons for

them. So, this is the minimum. Large onion, small onions and so on. Rice, rice normally I already keep 10 tonnes.

PP: OH...10 tonne.

Int.: More than that. I have the stock, afterwards I will show you my stock.

PP: Ok.

Int.: Then, when it's... you know the way we see the rain, we know it's going to flood. This is based on previous experience. We know it's going to flood. So, we check, whatever is not enough, we quickly call the supplier ask them to come in one big trailer to come in. We keep. Because we are not scared, we can sell afterwards. Many small shops, they dare not keep because they have experienced in previous years as they keep and no flooding, then gone! They cannot sell. But for us, no problem. We keep we can sell.

PP: So, it is not an issue for you. As well as you have extra source...if the flood did not happen...

Int.: No problem. I keep how much roughly the extra is, no problem I can sell because all they need is the basic that everybody wants, not the luxury one such as biscuit, large onion, small onion, rice, cooking oil...for all these, we are the main supplier. Actually, we have so much oil, the whole *Segamat* will keep the most oil, so when there is issue of not enough, the consumer affairs will come and ask us, "do you have oil" and I answer "yes" then they will be relaxing. If I said "No" (laugh), they will go everywhere, "You try to get the oil from there" and we will them "Yes" then they be relaxed. Then they will tell whoever who do not have oil to go to wholesale market and buy. Last few months we had some issue with oils.

PP: Yes, I recalled the price was about to go up.

Int.: Yes, oil was about to go up. Then they had issues and called me. "No problem, call me, you want how money, I have", so they relaxed. Whoever in groceries and villagers, they will be asked to go to *Pasar Borong* and buy. So, I have all that, new customer just come to buy oil. We must give because we have the service. Some small shop, "you are not my regular customer", they do not give. But, we give, it's not unlimited, it's limited. This is advised by the consumer affairs, it's limited. So that everybody can get something. I mean, whatever issues, they will come and look for me, first and I settle for the, (laughs).

PP: Perhaps you are very reliable to them.

PP: Where do keep your stocks?

Int.: The frozen one...meat, fish in the big refrigerator. The only problem is on fresh vegetables. It's a big difficult because all the roads are stuck. So, for fresh vegetables, they cannot from Kuala Lumpur as well as from Cameron Highlands and other places. Local is already flood, "where got vegetables", but because I have big fridge to keep vegetables, my stock also no problem.

PP: So, you could still support?

Int.: No problem, but as they say "cabbages"! Many cabbages and the quality may be a bit lower not as fresh as it is supposed (showing how a fresh cabbage) "This is a new supply". For example, the stuck lorry can already move. We have new supplies and we give them the new supply. My idea is this, as long as I could eat, they could too. I also will have inspected the date, if really very bad condition, I will throw away. If it's little bit, just tear of a few layers. The inside is very nice. For example, you see here, you just have to do like this (peel off the cabbage outer layer and showed).

PP: It's just at the outer part, it's still nice.

Int.: Yes, the outer part. This is normal. Imagine they cut, they keep and they transport it here, at least one week. Isn't it? So, the vegetable is fresh and how you can keep 100 percent fresh?

PP: Yes

Int.: And we will have to consider their budget. Yes, DSW did not tell me that they want RM1 worth vegetables, but we as business man, we also need to consider, "How can I give him the most expensive one?" In the fridge, I have a lot of the China vegetable, one packet is RM3.50. But I cannot supply to him. How can I change him RM25 per kg vegetable to give him (laughs)? I cannot. So, I have to search whatever I have and I give whatever that I can eat. That is my theory.

PP: OH, which is good.

Int.: Some, I do not want to give, "oh this is expensive, give them first". Cannot! Government also have audit as well as the budget. We want long term relationship with them. We also supply to a lot of school canteens and the contractor say their budget is RM15 per day, so DSW cannot tell me "I want RM3 worth vegetable only". In fact, they also cannot tell me they want RM4 vegetables too because we do not what we have. During disaster, we give whatever we have and we do not increase extra money. Some people say "OH its disaster come, this want RM2, we sell RM4 today"...No, no, we still sell RM2. Normal RM2, we sell RM2. That is our business.

PP: Although the market price is high because of flood...

Int.: No, no... I have stocks. If my stock is RM2, I will sell it RM2. If my new stock is RM3, I will sell it RM3. I follow market merit, market value, because I have sufficient stock, no worry, I could still sell old price.

PP: Say the flood prolongs for 10 days, based on your experience, is there any fluctuation of price of your supplier of Day 1 as compared to the last day of supply?

Int.: Possible, once the road is accessible, we will have to re-check the price, may be.... but we keep to the minimum. We try to keep the standard.

PP: So, they price may increase, as you have the stock, so you could still offer the old price.

Int.: Yes.

PP: Did DSW give you a letter before the disaster?

Int.: They will advise, so does consumer affairs.

PP: Do they list things that are perhaps required?

Int.: No need. They give to different for example for the supply of gas cylinder. They just say "We expect, it please keeps extra stock for flooding". As a business man, you must know how to manage and you do not have wait for people to tell you what to do. Because we have experienced, we know how much... Well, definitely can say we know how much, but we keep certain. At least within one week, they have enough (laugh), they do not tell us.

PP: So, could I say usually you stock up one week of flood relief supplies?

Int.: Actually, I cannot calculate, I just said roughly because as the stock coming in, I will also sell. So, by that time I will check for example this session, I do not expect flood this time. Nobody expected the flood because our *Segamat* River has been widened up. Last year everyone was scared of many flood occurrences. Ok, no problem as our river was widened up. So, this year, I did not expect, until it really flooded..."oh, oh it really flooded", that is why the first was a bit messy. A bit messy... then I checked my stock, "I do not have this, I do not have that", I just one lorry to come and next day morning they arrived. Because when you are early, the road is not blocked yet. Like during 2006, it was serious and the road was blocked. My lorry had to go in rounds and only arrive the next day. Whatever they need I must get, it's my duty to get it... it's not their problem, it's my problem.

PP: In you case Madam, you manage your warehouse and so on, how do you communicate with your own supplier if you are expecting flood?

Int.: Yes, I call.... "This is for flooding, please help!"

PP: You give them early notice?

Int.: No, no... For emergency. For example, say this time I do not expect flood, then I see my stock level is low, I will call them..."please help, this one is for flood, you give me one lorry". The other side is also relaxing, they will give me first because they know my style already.

PP: Another thing that I would to ask is through the country, DSW maintains forward operating base where they keep dry rations and once the flood happens, they could immediately give it to the victims.

Int.: Yes, I heard, last time they keep biscuits and so on, but this is also difficult because biscuits have expiry date, but I know they keep pillow and mattress. To be reasonable, how can they keep food? Mattress and all these, you could keep for years, never mind. As I said, last year we expected flood... yes, flood in the villages for two to three days involving to two or three centres and they came and take from us the fresh ones. Food you cannot keep, it's unreasonable to ask them to keep.

PP: So, the arrangement at your end, is once DSW informs you, you will have your own stocks for your own market and for DSW?

Int.: If they expect flood, I think this year they did not expect, that is why this year do not have letter (laughs)

PP: Really?

Int.: But no problem, but no problem (laughs).

PP: How about previously?

Int.: Previously is before the river is widened, the expect flood so seriously, everybody was scared.

PP: I see

Int.: But this time it's serious in the other side like last time for my mother in law side was flooded for 4 feet. This time the water did not come in. In my sister case for this year, the water came in and receded quickly, so there is no water mark. Last time, the flood was in the centre *Kampong Abdullah* and once they change the river flow, it caused flood in other places. The usual flood prone area does not have flood and those not affected DSW did not believe this and thought it was a prank.

PP: This is because of the river.

Int.: Because they change the direction. So, they must re-investigate and redo the research.

PP: Interesting choice of words...re-investigate (laughs). But, quite frankly flood mostly are caused river flow.

Int.: and the draining system. My place was due to drainage system, I complained so many times but no improvement yet. May be later. May after this time, they will do something.

PP: But then, it was working sort of working, right, when they widened the river?

Int.: Better, if not it might be six or 7 feet.

PP: 7 feet?

Int.: Yes...Things not yet, we can only say, we never know. Must help. But logically, you must when it will flood. If it is high time, water cannot recede, that would cause serious flood. When there is no high tide, the water can go out. So, it would not flood or just a bit of flood, only at the village. Now, the water is stagnant and the water could not go out. That is why, there still have ration there, if not ok already.

PP: Quite different this year.

Int.: Different style

PP: Different style (laugh) as well as different place.

Int.: (laugh)

PP: Ok Interesting. I like to ask, in terms of your dealing with DSW, for the purchasing process, is there an area that needs to be improved? Do your ideas or suggestion that you want to tell us?

Int.: Purchase part? What do you mean...who purchase?

PP: I mean, the current arrangement between your office and DSW, is all ok or there are room to be improved?

Int.: You see, during emergency, it's not normal business, you could not plan. "You cannot say what time I come and what time I go?", If its flood, its flood. 50 to 100 centres have flood. Then, boom! Come in front of my shop and as I said, during flood, half or most of my staffs are not around. So, even if I have the stock, I have to arrange for them. For DSW, they have extra helpers for example the Army or other volunteers, as long we take the leader. Like how you saw me, I take the list. We take sugar 3 packs, Rice 5 packs and ask the Army to help, we could settle it, however it would it would be slow. And, that is on first and second day. We have no preparation and the village gave the list "I want this", weak get stress but no problem, they are also very nice, very patience and they do not shout at us. They know...they themselves already know us. They themselves see us with no leader, so he become the leader and ask the staffs or soldier to help and take the things. I let them do.

PP: They support you in that sense?

Int.: They support me, I let them do. I also tell me staff to inform that for that came earlier to do something. I sometimes ask "Would you like to help", then they will say "OK, definitely", then they do. Of course, they do slow. Bit at least they the get experience how we work. So, we just be creative and get whatever help. So, after that we settle down quite well, like for this year the knowledge better via "WhatsApp", last time it was fax... at night they fax and early morning we prepare. So now, we have one WhatsApp group, they WhatsApp to me about 10, 11 or 12 at night, I prepare the list in writing... if a bit, I write, if many, I print. From the computer. So, I standby by. I know how much vegetables I need, fish how much I need, early morning I come and everything there and I weight them one by one. If I do not have the statistics so it's slow. If I have the statistics, I do not need them to tell me how many kg? These four or five days, I already expect ...how much, I want 100 kg and tomorrow, I will see...ya, 100 kg or 120 kg. Like yesterday about this time, I told my staff to keep 80 kg vegetable for me. So, when they come, yes around that figure, we know!... because you know the centre going down as the water recedes, if the water level rises then the centre is going up. You know how many you need already, retail is no problem, and we just put them one night here, so we just give them, no need to walk up and down. All these is what they want.

PP: So, you have arranged it so that it is easier for you to take it out?

Int.: You see my market so big, go there for oil, and come here for the sugar... wasting all the time and they walk and down also very tired. We have the management, have to do this.

PP: Yes, that is right. So, they will text you at night and you will get it prepared early in the morning.

Int.: Early morning I come, I have one extra team for flood because my normal staffs they also will have to work. During flooding, its busier, people want to buy things. So, my normal staffs also have to entertain my normal customer. Then I have composed one team for flooding, so once I compose these teams, they have experience so they work fast.

PP: I see, that is good. Have DSW asked you to do the delivery?

Int.: No, we cannot do delivery, its flooding, only big lorry can go. They must come and take. Government things, you cannot deliver.

PP: You cannot deliver?

Int.: You can ask them the procedure.

PP: I see, so all the collection is done, here?

Int.: All the while it's like this...they have the list, they take, and they go on the lorry. We cannot deliver, we cannot go in. Sometimes from the boat, the complained, "why the goods have not come?" We sent already, they Lorries are stuck there, they have to wait for the boat to transport, so all these. That is their responsibility, not mine. As long as my things, go out from mine, I am ok.

PP: Sometime the use helicopters and I presume the volume would be a lot, so during such time, how do you support?

Int.: I just support normally, I do not know how they transport it. I never ask how they transport it, it's not my authority, and it's not my territory. My priority is this.

PP: When they are many relief centres opened and there are many agencies who volunteers, how do you ensure you are giving to the right agency?

Int.: I only give it to DSW, DSW will give me the list. We follow the list and DSW may also have people here. For example, I ask DSW to helped, so they will help.

PP: So, that means there will be one person on stand-by here?

Int.: Sure... emergency, first two three days...two or three, after that when a bit relaxes, then it's just one.... but sure, there will be someone here to help.

PP: So many agencies helping?

Int.: I do not know the agency to be honest, I only know DSW's letter and their people.

PP: I see, so just deal directly with them?

Int.: Yes, and then, they give to who it's their authority, I have no say, everything I must go through DSW. You cannot deal directly with them, then they have no control, then "who ask you to give this", you pay for it (laughs)

PP: Yea, its true (laughs)

Int.: When they take to the lorry, they keep the list. Even if this person takes, they are directed to the right place, When load to lorry, must DSW hand. They have one lorry going here and they planned to 4 to 5 places. They load everything go to the centre and unload. There is three pages of orders, one for me, two for them. I must keep my own one.

PP: Is there any information that needed to be improved when DSW passed to you for future supply for relief centre?

Int.: Information...as I said, this year improved already through WhatsApp to us, so we try to improve. But the problem is when they do the statistics and tell us how much need is, it's very late. It's not that they are not doing work, by the time they compose the data if the water rises, the will be incremental in victims, they cannot do it before 6 o'clock. If they could do it in 6 o'clock, then it's ok to me as I have more time and more staffs arrange. As I said, we are also tired during emergency, so we just try...the earlier they give the information the better. But they also have their problem, they told me...at first, I ask for early, they told me the reasons, so I accept. They only know very late. Because last time, they give the list and I prepared, morning they came and informed that these three-centre closed in the middle of the night or early morning. So, no problem, just cancelled, no problem.

PP: So, you are quite flexibility on that. Sometimes, they ordered lower unit but because few centres opened at night, that happened as well?

Int.: Yes

PP: The other way around.

Int.: It happened, by 2 o'clock, no more order coming in, so I thought I could go and sleep. By the time I arrived home, the telephone rang..."centre opened, you must come and open", so must come and open.

PP: So, it's anytime, 24/7, Madam.

Int.: Yes.

PP: Quite Interesting. About payment because it's flooding, I am not sure whether it's according to its time or slightly late?

Int.: Hmm...Now the payment is ok, reasonable.

PP: Ok. Usually, when you get your payments?

Int.: About two to three months, but I am not tight on that because I know there will be no problems as long as our documents ready, they are also helpful, they will check in the office, then they send to state DSW to approve, once approved, the state DSW will bank in directly.

PP: I see, so they payment is lump sum or based on separate bills per day?

Int.: Last time, it was based on from this period to this period and this period to the other period, they will split, two or three payments. This year may be different because its starts January, but last time was somewhere November, December and January, so because end of year so there may be dragged for that, but this time, its January, it will be ok. Actually, I am not very worried, it's not an issue at all. It's up to them, once they are ready, they will give us the payment.

PP: I think I am at my end; do you have anything you like to add?

Int.: Not at the moment (laughs), I just do my part.

PP: Thank you, Madam.

Int.: You're welcome.

**TRANSCRIPT – VICTIMS**

*(Case Study 1)*

**Primary**                      **Agency/Division**                      **Position**                      **dd/mm/yy**  
**Interview No.**

1/2/17

PP: Thank you for your consent and for allowing this interview to be conducted. I wish your family well in this relief centre. May I ask the victims here are from which locality?

Int. 1: We are both from the same village. Victims here are from nearby residents and includes two villages. We were here for the past two days and expected to go home today.

PP: What is the common cause of flooding in this district?

Int. 2: Mostly because of over flow of the nearest river when it continuously rains for a couple of days. Other reason could be because of the drainage system from a new development could not accommodate the water flow, I notice in some cases, nature creates a small stream to accommodate such flow but when development took place, they built the drain too small. The small stream, I mention earlier could grow to quite a big stream of river and overtime will subside or even dry.

PP: How was your experience when first arriving at this centre?

Int. 1: We arrived at midnight here. After brief registration by each family head, we were given blankets, pillow and a sleeping place— Collapsible tent. Shortly then, the officers here provided us some biscuits and coffee, we were hungry because it was chilling.

PP: How was the service here?

Int. 2: Overall, we don't have any complaint. The Government have been providing well for disaster victims and even give us some allocations (funds) for the house repair although the repair cost is more than five times than what was given. But praise the lord for even getting that. And also, we give food kit box from DSW— from FAMA and from the local representative of the State assembly.

Int. 1: The food that we get here is reasonable too. Except that sometimes there is a delay of delivery from suppliers by one to one and half hours especially for cooked food.

PP: How do the DSW officer respond to the delay?

Int. 1: They will apologise about the delay and we understand sometime the number of evacuees could not be determined especially when the rain is continuous.

PP: Do you have any suggestion to improve this?

Int. 1: OH... the best is DSW and the victims here could cook it here... it's cheaper this way.

Int. 2: Yes... plus this will nurture better relationship amongst victims. I also want to add that perhaps DSW could locate us to a bigger hall, it tends to be overcrowded here and sometimes quite uncomfortable.

PP: Anything else?

Int. 1: No

PP: Ok, thank you so much for your time.

Int. 2: You're welcome

**TRANSCRIPT - SUPPLIER**

(Case Study 2)

<b>Primary Interview No.</b>	<b>Agency/Division</b>	<b>Position</b>	<b>dd/mm/yy</b>
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24/10/17

PP: This is an additional interview just to confirm on few things. For a start, may I know the statistics for delivery of item for 2015 to 2017?

Int.: We take these statistics, 2015 to 2016 (end of 2015 till 2016 beginning), we have demanded payment for 28,000 kits. For 2016 to 2017, we will demand for payment for around 26,000 kits. For 2017, the kits were requested more for Kelantan, Pahang and Terengganu and Perak as well.

PP: Could I request for distribution list by state?

Int.: Yes sure.

Int.: In terms of the product list, 15 SKU or stock kit unit, meaning there is 15 products in the list not inclusive of additional items for example spoon, cup as well as sticker to complete the start-up kit.

PP: Can I clarify on the price?

Int.: Yea, the price for 2015 to 2016, the stated price was RM70. But starting 2016, the GST (Government Sales Tax) was already in place, so the price of all items had increased. But after discussion with NADMA, NADMA had advised us to maintain the price at RM70 but we reduce the items, for example some SKUs, we put up to 3 items per SKU, then we reduce it to only one. But most of the item, we still maintain because most of the product had been endorsed previously.

Int.: Sometimes in big flood scene, due to some supply shortage, we will exchange for example fish porridge to chicken porridge to make up for the shortage.

PP: Price remains at RM70?

Int.: Yes, this was maintained as agreed for reduced items.

PP: In the case of Sabah and Sarawak, is the price is also RM70?

Int.: oh Yes, because for these two states, we have sent it there on standby but involves problem will arise when the flood did not occur. one more thing, our product most expires from 1 year and above, I cannot imagine if it is less than that, very difficult.

PP: How has the process has improved now, 2016-2017, as compared the year before, 2015-2016?

Int.: Yes, first in delivery, in terms of quantity-like before we prepared so much and nothing happened, so improved by producing minimum and maximum. For example, for Kelantan, we prepare first for 2,000 kits, and when it's not enough we will first source out from the nearest state store.

PP: If for example, the stocks for the kits are finished, how do you get from your supplier?

Int.: Well, we do not have any problem because our supplier is Agromas, a company under FAMA itself. So, we will contact them. Agromas has a depot centre in *Port Klang* and have FAMACO in all states, so it's easy. Like last time, there were not enough mineral water in Kelantan, so we requested from Negeri Sembilan, from *Port Klang* and from states that have the stocks.

PP: So, you cover using other stocks first before requesting additional from your supplier then. How has the trend for quantity, will it around 20,000 units?

In: So far since launch, the trend for 2015-2016 and 2016-2017 period has been approximately 25,000 to 28,000 kits. Well, it has been only two year.

PP: And, from the figure, how many percent has been used only for flood?

Int.: Actually, in 2015-2016, it's only for flood. But now the use has been extended to cover most disasters.

PP: So, for the 2016-2017, for clarification, what is the percentage use on for flood?

Int.: More than 90%. And the balance of may be 10% was used for fire mishap, in Sarawak-at the long house and a religious school in Kelantan. So, we got instruction from NADMA to supply to victims. But actually, the kit is only given to family head- one family, one kit.

PP: So, in terms of supply, could elaborate on Agromas?

Int.: The process is not that complex with Agromas. Like for now, since the rainy season is going to start soon, we have start order and preparing the kits for few thousands and we will start to distribute to all states.

PP: In terms of distribution, does it begin with the *Port Klang* Depot?

Int.: *Port Klang* is the Depot centre, and all the Famaco from states will collect the items from there. There are also instances where for example in Terengganu, the sardine supplier is from there, for the state use it will take from supplier directly but for other states they will have to issue the purchase order to *Port Klang* and collect from there. Same as in Kedah, the biscuit supplier is from there, so the Kedah state Famaco need not take from *Port Klang*, but other state does.

PP: Is there one depot?

Int.: There are some states not under Famaco and uses *Port Klang* as the depot centre, but most states have Famaco, like the one in *Dengkil*.

PP: How is the order placed?

Int.: Yes, for example we obtained information about the possible flood, so ordered around 6,000 kits. For 2015, the state FAMA and state DSW have discussed and decided on the required kit, and state FAMA will purchase directly from Famaco. In 2016, for example in Pahang, DSW predicted approximately 5,000 family head will be evacuating to relief centre, so we at the headquarters will collect the data, for example the total for all states we require 20,000 kit, so we will prepare the purchasing including the storage box and will distribute to all states DSW. Also, the process is centralised now in HQ because we are the one consolidating the data, perform purchasing from our supplier, FAMACO, the distribution to DSW and states Famaco and perform claims from NADMA. In 2015, but because at the end of that year, there were less incident of flood, so we had many left overs but we brought forward to the year 2016. There was also a change of ownership of Famaco, because of this there were some movement of staffs and process including purchasing were more centralised in the *Port Klang* DC. There are two depots there, one for kit distribution and the other the food arched.

PP: How about the stock for the upcoming flood occurrence?

Int.: We have standby the stocks.

PP: How do you view the success of this kit?

Int.: For the past two years since supplying these kits, we did not get any negative comment from the victims, or on expiry, there were no issues. But the issue of the item being tasty is a subjective one. We also conducted a triparty workshop comprising FAMA-NADMA-DSW to improve the process, and we want to the district officers to involve as well.

Int.: In terms of capacity, because we are suppliers of the various food items, it is really advantage for us as compared to other suppliers. Because our subsidiary company is Famaco,

we do not mind advancing our money for purchases and claim from NADMA later. Even NADMA has confidence in us and they are not sure if other agencies could handle this.

Int.: Because, even in terms of production, logistics, warehouses, we have them in all the states. We also use our own transport for all. Even the warehouses could possible store more than 2,000 kits. In the event, some of the states had lower storage like Malacca for instance say about 500 kits only, so if there is big flood, we obtained the additional kits from the nearest state say Johor and some even from Kelantan and Terengganu. That is the reason I like to emphasize that in terms of depot, logistics and distribution, we are ok.

PP: I was also told that some of the transportation was made straight to relief centre?

Int.: OH yes, because during flood, a lot communication will be done in WhatsApp as each state or district disaster committee will a WhatsApp group with various agencies as members such the district officers, DSW, the civil defence forces will communicate. So, say if it happens, we will communicate and we will deliver straight.

PP: In term of process, could you explain in a cycle, when the purchase order was made, the distribution and the claim for payment from NADMA?

Int.: In terms of claim, we gather all the delivery order from all states with full documentation and will claim. In terms of Famaco, if there were emergencies and required by the states, we will call them and they will prepare for us even till late midnight, no problem. Once order was done, they will invoice us and we will pay.

Int.: For preparation of kit stocks to be stored at all states, usually when does this happen?

PP: Usually this will be prepared nearing the end of the year for the year end flood and for the upcoming flood thereafter.

PP: So, before the flood occurs, the stocks are at the states?

Int.: Yes, but in minimum quantity. Like for example, we do not standby 10,000 for Kelantan, we will standby the minimum of 2,000 and will observe the rise and communicate with NADMA, and once NADMA agrees for additional, we will pack the items and send to the state that require the urgent kit.

PP: Is this conveyed through meetings?

Int.: We have frequent meetings with NADMA, but for urgent ones, we will use the group WhatsApp with NADMA and DSW. As NADMA updates us on the situation of the rising flood, we will prepare the kits. There were some instances that we knew first of the opening of relief centre and NADMA is not aware of this and they cannot commit on the delivery arrangement. Sometimes, we also get information from DSW on the opening of the relief centre. We have incidence where we sent 200 kits at the centre and as soon as we got back, the same centre now asking for additional 50 kits, then, another 30 kits. In some instance, they requested for 250 kits but uses less than that, the kits that were not distributed, that could be quite dangerous. Because in 2015, we claim based on the details of family head but it become problematic as we could not obtain the name list from DSW. Now, we will send in it to NADMA based on our documentation and the list of names, DSW will pass it to NADMA.

Int.: There were also cases were claim from NADMA but the supporting names from DSW is not enough, so it's not tally. In this case, we will ask DSW for the justifications. So that was in 2015 where we claim based on the family head that evacuates, but because of some problems, we decided that we claim payment from NADMA based on what was delivered.

PP: In term of acceptance, who will do the acceptance?

Int.: At states, it's no NADMA because there is no state office for the agency, I think so. So DSW could do the acceptance, and it was also extended to civil defence forces in 2016. Because there are incidents that NADMA wants us to send but the DSW declines, so it was sent to civil defence forces instead.

PP: In terms forecasting of kits needed, how accurate was it?

Int.: For 2015, the forecast was done much earlier by the states. But for 2016, the states were quite concern of over quoting because of reduced flood occurrence in the year before. So, we still prepared for the critical states like Kelantan, Terengganu but in a lower quantity like 1500 to 2,000 kits but less critical states, we give lesser quantity for standby, around 500 kits.

PP: Very Interesting.

Int.: Usually for working day no issues, but I see the trend flood always occurs during off days [laughs]- this involves staffs whom had gone back to their hometown and so on, so this could also be a problem. But so far it has been beautiful.... we have no problem in delivering, we delivered. One more concern is on getting the information of victims involves, some there some problems in this-yes, I understand DSW's position too, because they have to wait for the evacuates to come, to register and so on, sometimes victims were moving in and out from the disaster relief, so this could be a problem. During delivery, usually the relief officers from various agencies would help us to unload and store them for distribution. But sometimes, there is shortage of manpower in the relief centres- only one or two officers, so we would unload on our own.

Int.: You see, the process of handing over to victims, the kits would still be given for victims whom has evacuated to the centre, and after moving out, if he moves in back to the centre because of recurring floods, the person will still get a kit. Sometimes if we get the information late, they will ask "where is FAMA's kit?" This is also a concern because it should be the agency's kit now [Laughs].

PP: How frequent is the meeting with NADMA?

Int.: Usually at year end it's more frequent, we also participate in states meeting and give explanation. Also, as I mention earlier, we also initiated a workshop.

PP: So, during the meeting, other information on weather forecast and flood prone area were also given?

Int.: For weather forecast and so on, its only during the meeting but it's on going even in the group WhatsApp, for example "this place is forecasted to have flood occurrence, the also give statistics for the place and relief centres", they also have an apps called 'flood info 'by DSW. We also rely on this apps as sometimes the relief centres are open but the information is yet to be sent to us. We also receive instructions from our management to deliver but sometimes the receiving agency is not aware. So, we are in dilemma too. And, we have set the procedure that for distribution, NADMA and DSW have to give the confirmation, first. We understand also the kits are also required for states or parliamentary representative of the area, but we will get confirmation from these two agencies first before delivering and they will be endorsed.

Int.: [Handovers a slide and briefs of process and some other information]. The kits also have to be in such an order to optimise its usage of space. In addition to this, we also explained that the use of storage box for the kit is useful as the victims could use the box for other useful things like keeping their important documents, clothes and the box is also chosen because of its quality. And the items in the box could be instantly consumed like mineral water, oats to increase the body energy and so on. The kit would last for two days for a family of five until the next relief support comes, for example the cooked food by DSW. Nowadays, the supports come very fast.

PP: Thank you so much, this has been very informative.

**OBSERVATION FIELD NOTES**

(APPENDIX 3.3)

## Journal (Descriptive Content)

Perumal Ponnusamy

2017

Dewan Orang Ramai Taman Gemilang, Sepang, Selangor, Malaysia

<u>Date</u>	<u>Description</u>
1 <sup>st</sup> February	<p>I arrived at the disaster relief centre approximately at 1230 in the afternoon. This after being informed of the approval by the State Office to its district branch officers. Upon arrival, I parked my car near a parking spot at a nearby hall, about 1-minute walking range to the disaster relief centre. The disaster relief centre (DRC) in picture 1, is a community hall for residence of Taman Gemilang (Gemilang Garden Residential) which comprises lot houses and terrace house in the district of Dengkil. The physical setting includes two mobile toilets fitted behind the DRC. This is a fully air-conditioned facility.</p> <div style="text-align: center;">   </div>

<u>Date</u>	<u>Description</u>
1 <sup>st</sup> February	<p>The social environment includes collaboration between staffs from the Department of Social Welfare (DSW), the District Office, Civil Defence Department, the Royal Police Department and the Department of Health. As can be seen in picture 2, at the front of the DRC, two tables were placed and an officer from the district DSW manned the registration process of the disaster victims and handing over of the items. There were four main books and documents which are the Disaster Book for all visitors, the log book to register daily operations according to time, the registration book for victims (the family head will perform the registration) and statistic documents which are records of the fluctuation or records of total number of victim's for the day for every four hours beginning 8 am, 12 pm, 4 pm. 8 pm and 12 am (midnight). On the day of the observation at the recorded time, there were 96 victims and the DRC could accommodate up to 200 victims. The DSW officer informed that at peak of the disaster, the victims total 196 from three nearby villages and residential garden. Upon registration, the family head will be given sleeping aid which includes mat, blankets, hygiene kit (tooth paste, soap, towels), start-up kit from FAMA (container filled with canned food, biscuits, tea etc.), donation container from NGOs (container filled with various canned product and dry food) and partition or collapsible will erected for the family (for privacy).</p> <div> </div>

<u>Date</u>	<u>Description</u>
1 <sup>st</sup> February	 <p>The various agency interaction includes the overall management of disaster management and transportation arrangement by the district office, the DRC centre management by the Civil Defence Department, The Police Department handles the security of the DRC, general medical and counselling consultation for the traumatised victims by the Health Department, search and rescue by the Fire and Rescue Department, and, the district DSW handles identifying DRC, the supply of food, bottled drinks and disaster relief items, registration of victims, providing daily statistics and provide counselling services for the victims. As the various agencies have had prior meetings, the interaction appears to be smooth. The district office regularly connects with all agencies and researcher was informed that communication is also updated regularly in a group <i>WhatsApp</i> application.</p>

## Species Account

<u>Date</u>	<u>Description</u>
1 <sup>st</sup> February	<p>I was able to witness to the supply of packed food for the victims at DRC. Approximately at 2 pm, a van with its two workers came and stop in front of the DRC premise. The men started to bring in trays of cooked meals. One tray of cooked chicken, cooked vegetables, few plastic bags with white containers containing packed for rice. This was arranged outside underneath an erected tent filled with few tables and mostly chairs.</p> <div></div> <div></div>

<u>Date</u>	<u>Description</u>
1 February	<p>I was informed that the men are from the suppliers appointed by the District DSW as the DRC operations has exceeded three days and that, the role of district office supplies are taken by district DSW. After all the trays and rice container has been served (arranged), victims started coming out from the hall gradually and seated freely usually among family and known friends. The disaster relief officers gave priority for the victims before sitting on the table. After the meal, observer was able to interview some of the victims and DSW officer concerned.</p> <p>During the supply of food, the food was packed neatly and the workers displayed concern on hygiene. There were only little left overs and two packed of rice. After the meal, the victims went inside to the hall whilst the workers collected the trays and left the premise approximately at 330 pm. The situation was quite idle and DRC officers mingled among each other. The district DSW remained on the registration office. In addition to this, during the supply, it was noted the representative from DSW were also around to oversee the order of the supply and of its arrangement. Observer managed to perform an interview with the DSW officers and two of the victims. The interview lasted about an hour. As the situation appears to be idle with the victims were staying inside and the relief officers was sitting and waiting, Observer thanked the DSW officers and left the premise at 5.15 pm.</p>

## Reflective Content

### Information sharing and timeliness

The disaster relief operation witness at the relief centre was observer after few days since its DRC was opened. This means that this has past the disaster intensity period and the situation was subtle. The victims stayed on the facility as it is not convenient to go back as the water it still subsiding at their residential. Hence, the general impression is that the supplier would have known of the time of supply. However, the supply was delayed an approximately 1 to 1.5 hours late. One possibility this would be perhaps on the fluctuation of victims in the morning, whereby the period of reporting of statistics were at 8 am and the next at 12 pm. During such time, the DSW officer would have ask either to increase or decrease some of the order to avoid wastages. Despite on this occasion, it was observed that there were fewer left overs probably due to near accurate forecasting, however the information the changes in the information itself, when considered as untimely could have led to the delay.

### Quality

The quality of the food was given priority by the suppliers and there were accompanying officers to ensure all were in place for the victims. The interview of the a few victims also suggested that there were no thriving issues on this and there were regular advised given by Health Department.

### Quantity

Based on the **minimal wastages, the forecasting made by the DSW officers were accurate** as this comes with experience and from fact that there less reports of heavy rain and river overflow in the area. The forecasted quantity also includes the relief officers.

### Price

The relief centre was supported for the first 3 days by the district office and CWD role on food supply was on the 4<sup>th</sup> day on wards. CWD used the formula of RM 4-8-4-8 rule, RM 4 for breakfast as well as for evening tea, and, RM8 for lunch and the same amount for dinner. This means a total of RM24 is spent per person. The price is fixed

for the packed food and according to the officers, this is a continued perhaps till day 7<sup>th</sup> or so, as the trend is the flood do not last in the state.

### **Contingency Response vs *Post Ante* response**

In addition, to this the situation of the disaster at the time supports of the understanding of post ante response where agility is the main concern. However, with the preparation of the suppliers was done much earlier, this suggest a contingency response was adopted by the relief centre.

## Journal (Descriptive Content)

Perumal Ponnusamy  
2017

CWD Segamat, Johor, Malaysia

<u>Date</u>	<u>Description</u>
2nd February	<p>I arrived at the CWD Segamat approximately at 8.00 in the morning. This after being informed of the approval by the State Office to its district branch officers. Upon arrival, I parked my car near a parking spot at CWD premise. CWD Segamat is located Jalan Awang of Segamat District. Upon arrival, I met the officer concern and was guided to a waiting post to join in the delivery party for all the relief centres under designated zone. After waiting for about 10 minutes, I was ferried using CWD van along with 7 of their staffs to the supplier's premise.</p> <p>The social environment of the supplier's premise was shop lot areas. The Supplier has large supermarket with large volume of grocery items, a large wet market with huge refrigerator to store vegetables and fruits, and a cold storage to store frozen fish, chicken, squids and prawns. Also, at the site is where loading and unloading activities were conducted by the supplier's staffs. A large staff strength could be observed at the supermarket and the wet market operations.</p> <div> </div>



	<b><u>Description</u></b>
2nd February	<p>Segamat is a flood prone area, where flood is reported to be every year, as of the period of the study, 2017 is considered a big scale disaster, and more than 70 centres were opened. During the peak of large disaster as in 2014, 132 relief centres and more than 60,000 victims were evacuated.</p> 

The major contribution to the flood is due to heavy rainfall which causes Segamat river overflow. As can be seen, the large-scale flood causing several roads, shops to be flooded and at the rural site, a house appears to be 90 percent submerged.



However, on the day of the visit, the rain has stopped. There were still four flood relief centres that were still opened mainly due to the slow receding of the water due to the nature of the soil at the villages. The villages were mainly farmers and water retention could be seen at the palm tree plantations.



## Species Account

<u>Date</u>	<u>Description</u>
2 <sup>nd</sup> February	<p>Upon arrival at the supplier's premise at 830 am, I was introduced to the Supplier. There were already trucks from the military and a van type vehicle provided by the Works Department. Supplier had already standby the food items consisting dry food such rice, light noodles, spices and raw food such chicken, fish and vegetables. These items were already arrange based on the vehicle routes. Military personnel and CWD were seen arranging the items on the trucks, and earlier this the items were checked by a CWD staff that were in-charge of purchasing. Once loading is made, two military staffs, two CWD staffs were assigned to deliver the items to four relief centres, Kampong Shang Lang, Kampong Tandong, Kampong Kuala Paya and Kampong Simpang Pulai.</p> <div style="text-align: center;"></div> <p>At approximately 9 am, the vehicle started to move, the observer was present in the vehicle to witness the delivery. The routes taken were mainly designed to reach each place within 15 minutes each following the shortest and rural roads. The first destination was Kampong Sang Lang, reached approximately at 920 am. Food items were unloaded. There were 19 occupants at the relief centres. Items</p>

were received and checked by the staffs at the centres and were passed to the victims. Next the movement was to Kampong Tandong, where the relief centre was a village hall. Fairly a large quantity was delivered at this centre at approximately 940 am. There were approximately 200 victims at the centre.



At the centre, Observer had the opportunity to talk to the victims. In general, they were happy with the quality of the food and the delivery time. Cooking area was shown, where cooking utensil and some dry food were arranged on the table. Cooking will commence at approximately 10 am, to be served at 1 pm. In addition to the food items given by CWD, the centre also received contribution from other NGOs in the form of modular, as can be seen next.



Next movement was to Kampong Kuala Paya, reached within 15 minutes. It was relatively a small centre with 20 occupants during the time of visit. The same process of delivery and receiving was performed. After the brief stop, the next movement was to Kampong Spang Loi. Time at the centre was approximately 10 am. This was a school and the registered victims were 220 at the time of visit.



HEMPATAN MANGSA BANJIR SK SPANG L

	DEWASA		ANAK - ANAK		BAYI		W/FMS		OKU		Jumlah mangsa	Jumlah Keluarga
	L	P	L	P	L	P	L	P	L	P		
017 AS	50	62	14	25	2	3	22	20	2	3	203	61
7 09	-	1	-	-	-	-	1	1	-	-	206	63
0 pm	2	3	-	-	-	-	-	-	-	-	211	64



Items were checked and were received by the staff at the centre. The victims were asked about quality and timeliness of the deliver. The verbal responds by that the quality and timeliness was ok. Next, the vehicles headed back to the supplier's premise and reached at 10.35 am.

Once arrived at the supplier's premise, Observer had the chance to speak with the CWD office in charge of the procurement. Brief of the input by the officer is as below (the discussion was approximately 25 minutes):

1. The supplier was a registered supplier under District Disaster Committee;

	<ol style="list-style-type: none"><li>2. The supply selection was performed by the committee;</li><li>3. Selection was premised on the supplier's ability for large supplies and the Supplier was also equipped with 4 big stores for dry food and a large refrigerator for frozen food;</li><li>4. The purchase made is with a ceiling price of RM10 per victims per day;</li><li>5. In terms Quality, as the items were checked and receiving at the centre also involved the village heads, hence quality of the food items were of priority;</li><li>6. In terms of supplier meeting flexibility, supplier's has long track record, the large stocks would allow them to meet most of the quantity requirement and the use of smartphone technology such as WhatsApp provided a clear follow of information from CWD on the actual need of food items and the timeliness readiness of the supplier to prepare the food. Communication cut off time were late at midnight, supplier starts to prepare as early as 6 am the next morning; and</li><li>7. Delivery to relief centres were by CWD with the help of Works Department (provided vehicle and driver) and the Armed Forces (provided vehicle and manpower).</li></ol> <p>The observation session ended by 12 pm, with the observer thanking the Supplier and CWD staffs for the facilitating and providing the valuable input.</p>
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## **Reflective Content**

### **Cost**

Cost was contained as the expenditure for each victim was capped at a fix price of RM10. The price also allows the flexibility to change the items to suits the needs of the victims, hence avoiding any wastages of similar purchasing. Secondly, the fact that the supplier was selected in advance and that there were no back end and red tape procurement process, there is minimal administration cost incurred by CWD.

### **Quality**

The quality of the food was given priority by the suppliers and there were accompanying officers to ensure all were in place for the victims. The interview of the a few victims also suggests that in principle there were minimal quality issues for the victims due to checks by few receiving parties, the CWD as well as village heads.

### **Flexibility**

Supplier was able to meet the fluctuating demand as the supplier has longstanding records and understand the trends of flood intensity versus demand volatility. As they are the largest supplier of dry and raw food in the district, their ability to reserve stocks as well as receive goods timely from their supplier, allows better flexibility for the relief. This is supported by the use of smartphone technology to share information for order process and supply management.

### **Timeliness**

With good coordination of victim records, order process with supplier and the support of agency for delivery and route calculation, it would appear that the agency's performance to meet to delivery time is commendable. However, the observation was done on subtle time where demand fluctuation was low, hence it's more predictable. The early period during flood occurrence, where it's more chaotic, would provide better description of supplier's and the CWD ability to meet the timeliness.

### **Information sharing**

During observation, the supplier communicated frequently with CWD including with the use of mobile phones. There is good sense of mutual trust between CWD and

supplier. CWD trusting their sourcing activity and supplier's track record, whilst supplier's confidence of CWD payment's ability. Information sharing is made frequently especially during disaster occurrence.

### **Contingency Response vs *Post Ante* response**

In addition, to this the situation of the disaster at the time supports of the understanding of post ante response where agility is the main concern. However, with the preparation of the suppliers was done much earlier, this suggest a contingency response was adopted by the relief centre.

**Journal (Descriptive Content)***Perumal Ponnusamy*

2017

Penjara Penor, Kuantan, Malaysia

<u>Date</u>	<u>Description</u>
17 March	<p>I used the Jalan Kuantan road heading to Pekan, about 40 minutes' drive from Kuantan and arrived at the forward operating base of Penjara Penor Kuantan at 10 am. Penjara Penor is a prison, however the hall was used as flood relief centre and its gymnasium hall and a store was utilised as a forward operating base. Upon arrival to the Penjara Penor, I was greeted by a prison office and was asked to follow a vehicle to the site. After parking the care, the officer wasted no time to show me of the forward operating base. There were no occupants at the hall (gazetted as a relief centre) as it was after the flooding period. As per the communication by Kuantan CWD, the centre occupied approximately 15 families during flood from nearby village, Kampung Semangat.</p> <div> </div> <p>The above is the picture of the entrance of Penjara Penor. Next picture, shows the forward operating base location, which is the store and the gymnasium hall converted for the use of stocking dry food items. The physical setting of the place is very spacious, with large</p>

car park and the hall is located at a distance from the actual prison. It is an air-conditioned room and there were racks to store not only food items but also some basic items such as mats and towel. However, the base is fill with food items.



### Species Account

<u>Date</u>	<u>Description</u>
17 <sup>th</sup> March	<p>Inside the air-conditioned gymnasium hall converted as the forward operating based, dry food items were stocked and organised separately. Pallets and racks were used as base for the items. The food items comprise or stacks of 50 pack of 10 kg rice placed on pallets. At the racks, there were 4 boxes of canned sardines, a box of cooking oil, 6 boxes of tea, 4 boxes of coffee, a large plastic bag consisting about 10 packs of 1 kg sugar packs and another large plastic bag consisting flours. On another pallet, there was a stack of biscuits.</p> <div style="text-align: center;"> </div>



## **Reflective Content**

### **Cost**

Minimal stock holding to support a fairly small number of evacuees. As the food items are purchased earlier using direct purchase procedures premise of 'best value for money' principles, it is believed that the cost is contained. Minimal stock holding also reflects minimal redundancy in the event flood did not occur. However, rice packs purchased would be the first to spoil, hence possible wastages may occur as there is no return policy by the suppliers.

### **Quality**

The quality of the food is reasonably good. Product used were of household brands and the expiry of most of the items was 1 to 2 years, meaning it could still be stored for 2 cycles of floods provided the room conditioned were monitored.

### **Flexibility**

The stored food items provided a high degree of flexibility for CWD in responding to fluctuating demand of the flood relief evacuees. However, this will be subject to non-prolonged stay of the victims.

### **Timeliness**

To meet the immediate need of small group of victims, the stocks could be utilised immediately. There will be no waiting period unless the number of victims had risen up more than the available stocks.

### **Information sharing**

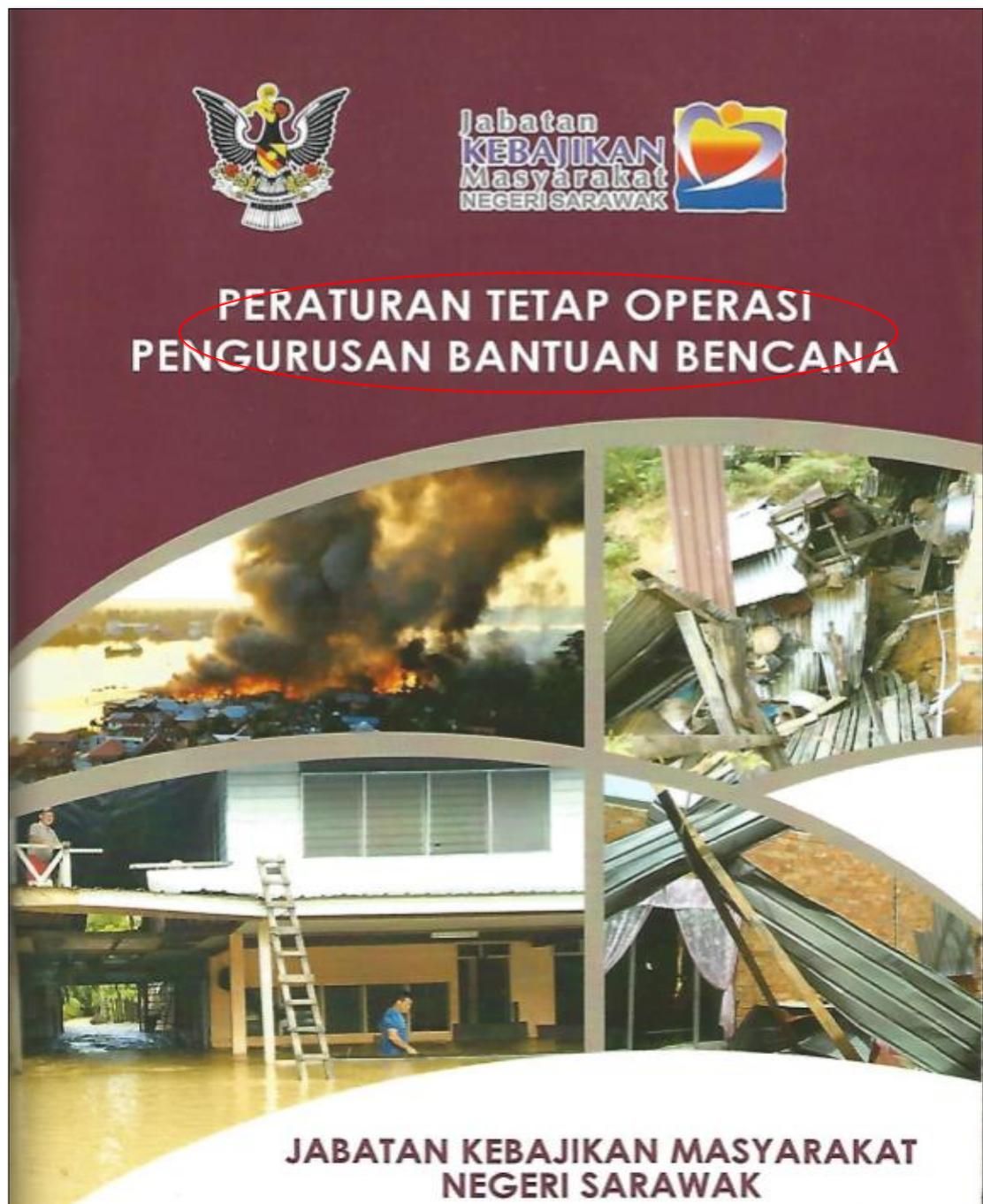
The information sharing and collaboration between buyer and supplier occurred as preparation stage. These merely involved ordering process, however other aspects with respect to the quality and timeliness was valued by both parties.

### **Ex-ante or contingency or post-ante response**

The centre holds a fairly small stocks as it is also a relief centres that supports the need of 15 to 20 families, although the hall is fairly spacious. The reserve capacity is an ex ante response, at first, and will be used once the victims had evacuated to the place. This will then reflect movement or adoption of contingency response.

**SECONDARY DATA EVIDENCE**  
**(SAMPLE)**  
(APPENDIX 3.4)

Document Ref.	Details
A	DSW (2015), Standard Operating Procedure for Disaster Relief Management, DSW Sarawak, East Malaysia, 23 September 2016



**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**FIXED OPERATING PROCEDURE FOR DISASTER RELIEF MANAGEMENT**

Bantuan Makanan Item 2 Perkara 24.1 adalah seperti di bawah:

JENIS MAKANAN	KADAR SEORANG	KADAR MAKSIMUM SEKELUARGA
Beras	4 kg	28 kg
Gula	250 g	1.75 kg
Garam	50 g	350 g
Kopi/ Teh	200 g	1.4 kg
Minyak Masak	200 g	1.4 kg
Biskut	500 g	4 kg
Sardin	2 tin	14 tin
Ikan Kering	400 g	2.8 kg
Optional: Susu Tepung untuk kanak-kanak 4 tahun ke bawah.	250 g	1.75 kg
Optional: Minyak Tanah (Kerosene) - jika perlu	1 liter	7 liter

Bagaimanapun jika mangsa berpindah ke Pusat Pemindahan maka bantuan makanan di Pangkalan Hadapan dalam Perkara 25 jika ada dan makanan di Pusat Pemindahan seperti Perkara 26 adalah digunapakai.

**PERKARA 25: BANTUAN MAKANAN DI PANGKALAN HADAPAN DAN KAWASAN MANGSA TIDAK BERPINDAH**

25.1 Bantuan Makanan bencana banjir di Pangkalan Hadapan dan Kawasan Mangsa Tidak Berpindah adalah **1 pek untuk kegunaan 1-2 orang bagi 5 hari** dengan anggaran harga maksimum **RM75.00 untuk 1 pek** tidak termasuk barang tambahan.

25.2 Kadar bantuan makanan berkenaan adalah seperti berikut:

BIL.	JENIS MAKANAN	KUANTITI
1.	Beras	5 kg
2.	Gula	1 kg
3.	Garam	1 paket
4.	Mi Segera	10 paket
5.	Kopi dan Teh	Kopi 1 paket dan Teh 1 paket
6.	Biskut Kering	2 paket (350 g-500 g)
7.	Makanan Dalam Tin	5 tin saiz kecil (beberapa jenis)
8.	Minyak Masak	1 botol (500 ml)
Tambahan: Susu Tepung (optional) untuk kanak-kanak 4 tahun ke bawah.		1 paket/ tin
Tambahan: Air Minuman (optional) untuk sekeluarga.		1 kotak (24 botol 500 ml)

**PERKARA 26: BANTUAN MAKANAN DI PUSAT PEMINDAHAN**

26.1 Bekalan Peringkat Awal (Refreshment Kit) Makan-minum peringkat awal "refreshment kit" (roti bun/ roti bantal/ biskut kraker/ minuman kotak/ air minuman 3 in 1) perlu disediakan mengikut kuantiti yang bersesuaian bagi mengalasi perut mangsa-mangsa bencana.

26.2 **Bantuan Makanan Untuk dimasak di Pusat Pemindahan**

26.2.1 Bantuan makanan untuk dimasak di Pusat Pemindahan untuk **10 orang** sehari dengan anggaran harga maksimum **RM220.00** adalah seperti berikut tidak termasuk barang tambahan.

BIL.	JENIS MAKANAN	KUANTITI
1	Beras	5 kg
2	Gula	1 kg
3	Garam dan Kicap	1 paket 1 botol (kecil)
4	Ayam/ Daging/Ikan (segar/sejuk beku)	2 kg
	Nota: a. Makanan dalam tin (sardin/ ayam/ daging) boleh dibekalkan jika bekalan makanan mentah sukar diperolehi.	6 tin besar
	b. Ikan kering boleh dibekalkan jika bekalan makanan mentah dan makanan dalam tin sukar diperolehi.	2 kg
5	Telur Ayam	1 tray
6	Sayur Segar	3 kg
7	Mi Segera, Biskut Kraker (500 g) Roti Bantal dan Kaya	10 paket 3 paket 3 bantal 2 tin

8	Kopi dan teh	300 g 250 g
9	Minyal Masak	1 kg
10	Perencah/Bahan keperluan/ Makanan Lain (jika perlu)	mengikut keperluan
11	Air Minuman (10 orang)	1 kotak (500)
12	Tambahan: Susu Tepung (optional) untuk kanak-kanak 4 tahun ke bawah.	1 paket/ 1

26.2.2 Penyediaan makanan menggunakan khidmat ka boleh digunakan jika ada keperluan.

26.2.3 Makanan bermasak untuk petugas di Pusat Pemindahan boleh disediakan setelah memberi keutamaan kepada mangsa-mangsa bencana.

26.2.4 Penyediaan makanan boleh dibuat oleh komuniti setempat secara bersama dengan agensi-agensi seperti JPAM, agensi lain dan Sukarelawan.

26.2.5 Baki catuan makanan jika ada boleh diagihkan kepada mangsa bencana apabila Pusat Pemindahan ditutup.

26.2.6 Jika tiada lagi baki catuan makanan, sedangkan keperluan untuk membekalkan makanan kepada mangsa yang akan pulang ke rumah masing-masing maka makanan seperti Perkara 24.2 boleh dipertimbangkan.

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

25.1. Food aid for flood disaster for forward operating base and areas in which the population did not evacuate is for 1 pack for the use of 1 to 2 person for 5 days with price estimation of RM 75 per pack excluding any additional.

26.2. Food aid which is to be cooked at the evacuation centre/disaster relief centre is for 10 person per day with price estimation of RM220 as followings excluding additional items:

Document No.	Details
I	DSW (2016), Sample Letter of Appointment of Supplier of Dry Food and Fresh Ration for Disaster Relief, DSW District Kota Samarahan, Sarawak, East Malaysia, 28 September 2016



JABATAN KEBAJIKAN MASYARAKAT BAHAGIAN  
KEMENTERIAAN KEBAJIKAN, WANITA DAN PEMBANGUNAN KELUARGA  
TINGKAT BAWAH, KOMPLEKS PENTADBIRAN



---

Kawat : "WELDEP"                      Tel :                      Faks :

---

Ruj. Kami : JKMB                      ( )  
Ruj. Tuan :  
Tarikh :

Tuan,

**PELANTIKAN SEBAGAI PEMBEKAL MAKANAN BASAH DAN KERING SEMASA BENCANA (BANJIR/RIBUT/TANAH RUNTUH/KEMARAU/KEBAKARAN DAN LAIN-LAIN) DI DAERAH**

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Untuk makluman tuan, pihak Pejabat Kebajikan Masyarakat Bahagian Samarahan telah menyenaraikan Syarikat tuan kepada Pejabat Residen dan Pejabat Daerah Bahagian . Oleh yang demikian Syarikat tuan telah dilantik sebagai Pembekal Makanan Basah dan Kering ketika berlakunya bencana (Banjir/Ribut/Tanah Runtuah/Kemarau/Kebakaran dan Lain-lain) di Daerah

3. Sehubungan dengan itu, mohon kerjasama tuan untuk membekalkan makanan basah dan kering kepada Pusat Pemindahan Bencana (Banjir) Daerah bila diperlukan.

4. Memandangkan bencana (banjir) ini berlaku secara tiba-tiba, maka pihak PKMB tidak dapat mengeluarkan sebut harga bagi keperluan yang diperlukan. Oleh itu, kerjasama tuan adalah dipohon untuk menetapkan harga keperluan barang tersebut dengan nilai yang berpatutan.

Sekian, terima kasih.

**"BERSATU BERUSAHA BERBAKTI"**  
**"AN HONOUR TO SERVE"**

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**APPOINTMENT AS SUPPLIER FOR FRESH AND DRY FOOD SUPPLIES DURING DISASTER IN DISTRICT**

2. Please be informed that the Department of Social Welfare has listed your company to the District Office of ..... Division. Therefore, your company is hereby appointed as the supplier for fresh and dry food supplier during disaster in the said district.

4. Due to the sudden nature of on-set disaster, the Department may not be able to issue competitive bid for the required items. Hence, your co-operation is highly appreciated to fix the price of the items with reasonable value.

Document No.	Details
G	DSW (2016), District Disaster Relief Reference Booklet, DSW District Kota Samarahan, Sarawak, East Malaysia, 28 September 2016

**Appendix 3.4.3**

SENARAI PUSAT PEMINDAHAN MANGSA BANJIR BAHAGIAN SERIAN								
NO	NAMA PUSAT PEMINDAHAN	NAMA KAMPUNG/ KAWASAN TERLIBAT BANJIR	KAPASITI (ORANG)	KEMUDAHAN			KEMUDAHAN ME-MASAK	NAMA PEMBEKAL CATUAN MAKANAN
				TANDAS	ELEKTRIK	AIR PAIP		
1	Dewan Masyarakat Serian	Kpg Ulu Serian	300	/	/	/	/	
2	Stadium Tertutup Serian	Kpg Munggu Lino Kpg Silantan	300	/	/	/	/	
3	SMK Tababang	Kpg Tababang Melayu	300	/	/	/	/	TRADING SON.BHD
		Kpg Tababang Dayak						TRADING
		Kpg Bazar Tababang Kpg Lingga Melayu Tababang						
4	Dewan Masyarakat Godong	Kpg Gedong dan Kawasan sekitar	200	/	/	/	/	SYARIKAT
5	Dewan Serbaguna Salara Kedup no.2	Kpg Mentu Merau Kpg Brawan	300	/	/	/	/	ENTERPRISE
6	SK Krusen	Kpg Krusen	200	/	/	/	/	BUA KIEW ENTERPRISE
7	Tempa Kpg Rieban Manang	Kpg Batah	120	/	/	/	/	
8	Masjid Kpg Lintang	Kpg Lintang	200	/	/	/	/	
9	SK Pengkalan Sorak	Kpg Sorak Melayu	300	/	/	/	/	BUMIPUTERA
10	Balai raya Kpg Sumpung	Kpg Stabi Sumpung	300	/	/	/	/	SAB
		Kpg Stabi Paman						
11	SK St Henry	Kpg Stabi Entukuh	200	/	/	/	/	BN
12	SK Tanah Merah	Kpg Retuh	300	/	/	/	/	
13	Masjid Kpg Rimba Padi	Kpg Rimba Padi	100	/	/	/	/	
14	SK Tanah Putih	Kpg Tanah Putih	300	/	/	/	/	
15	SK Seberban	Kpg Seberban	300	/	/	/	/	
16	Balai Raya Botang Konawit	Kpg Botang Konawit	100	/	/	/	/	
17	Balai Raya Karangan Terusan	Kpg Karangan Terusan	100	/	/	/	/	

**JUMLAH : 17 BUAH**  
**KAPASITI MUATAN : 3,950 ORANG**

SENARAI PEMBEKAL BAGI PKMB SAMARAHAN				
DAERAH	BIL	NAMA PEMBEKAL	ALAMAT	NO.TELEFON
SAMARAHAN	1	CHI	NO. TUANG LIARA	082-
	2	SYARIKAT PERNIAGAAN	MUJAKA LUANG	082- 2
	3	ECONOMI	CHING KU-	082- 7
ASAJAYA	4	MINI MARKET	ASAJAYA	082- 5
SADONG JAYA	5	CHI	JAYA SADONG	082- 10
	6	TE	SADONG	082- 28
SIMUNJAN	7	SU	SIMUNJAN NANAS	019-
	8	DA	SIMUNJAN	019-
	9	ENTERPRISE	SIMUNJAN	082-
	10	ENTERPRISE	SIMUNJAN (pack food )	014-
	11	TRADING	SADONG JAYA	013
	12	CHO	SEBUYAU	083

**Brief Summary (Translated from Bahasa Malaysia -National Language into English Language):**

**LIST OF FLOOD RELIEF CENTRES**

**LIST OF SUPPLIERS FOR SAMARAHAN**

Relief Centre Village/Premise Facilities Supplier

(Name of centre) (2 -5 villages) (Toilets etc.) (Co. Name)

District Supplier Name Address Telephone No.

Samarahan (3) (Within district)

**RESULTS**  
(APPENDIX 4.0)

Figure 1: *PriEsT* graphic view of competitive priority Quality judgements

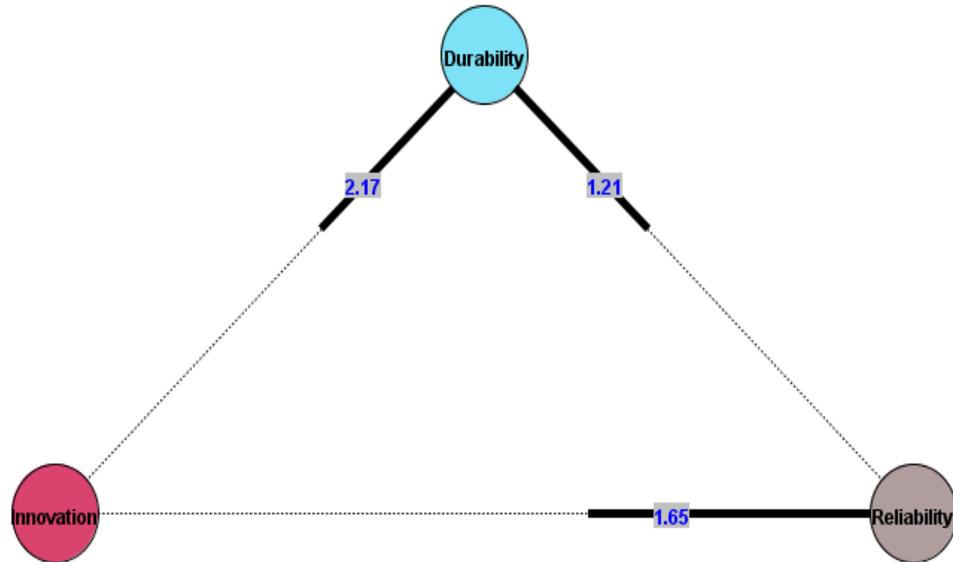
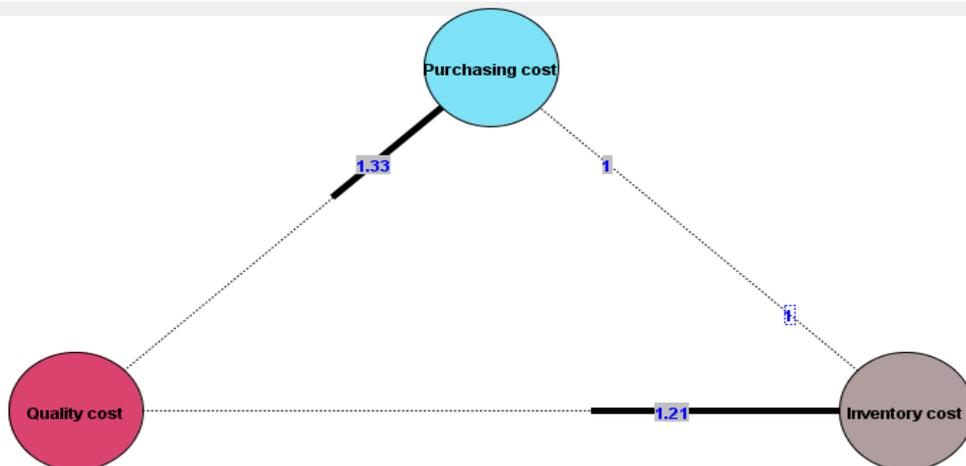
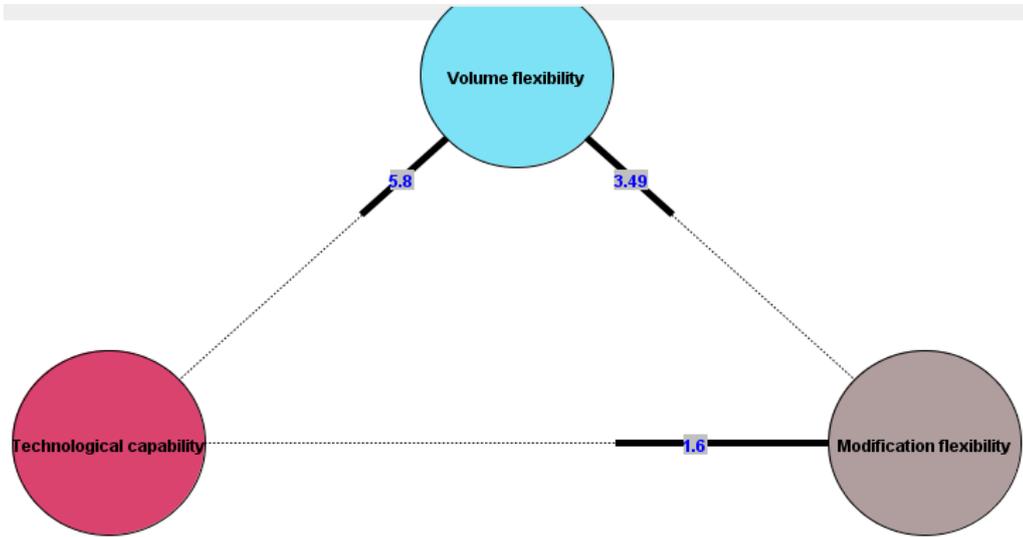


Figure 2: *PriEsT* graphic view of competitive priority Cost judgements



**Figure 3:** *PriEsT* graphic view of competitive priority Flexibility judgements



**Figure 4:** *PriEsT* graphic view of competitive priority Time judgements

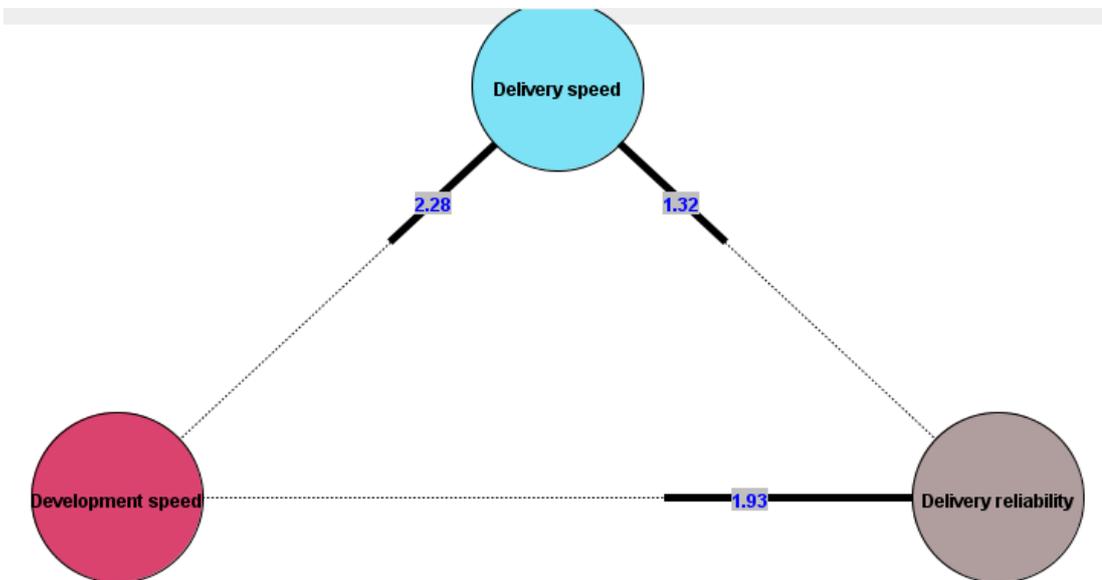


Figure 1: PriEsT graphical view of competitive priority for Quality judgements

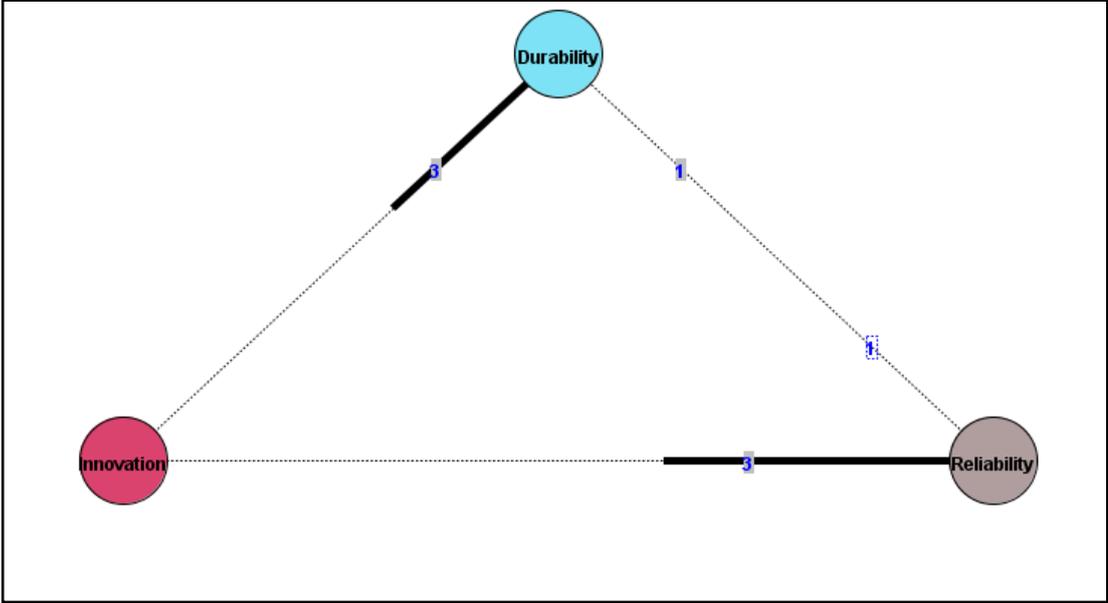
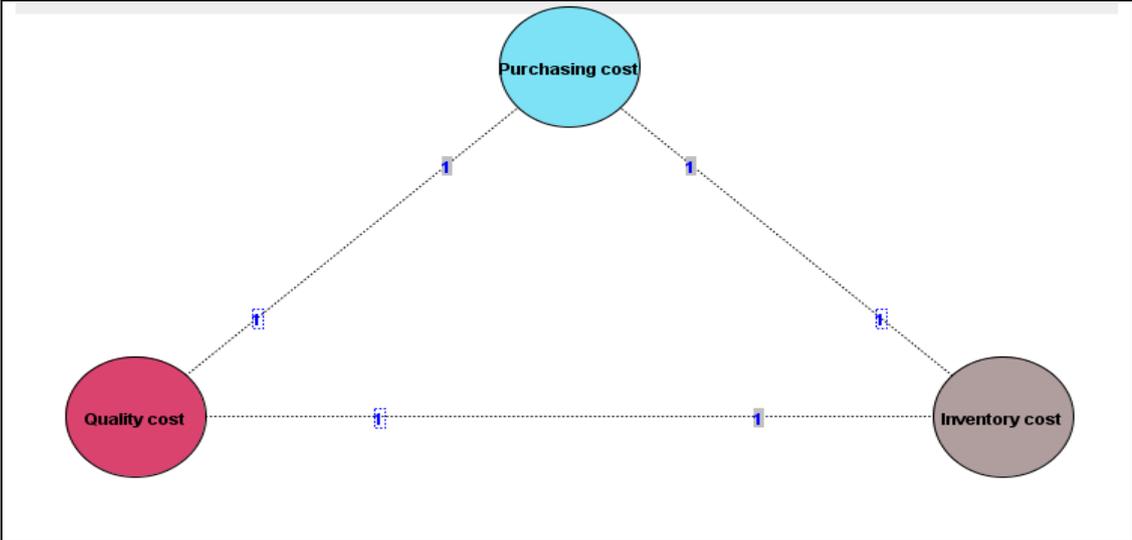
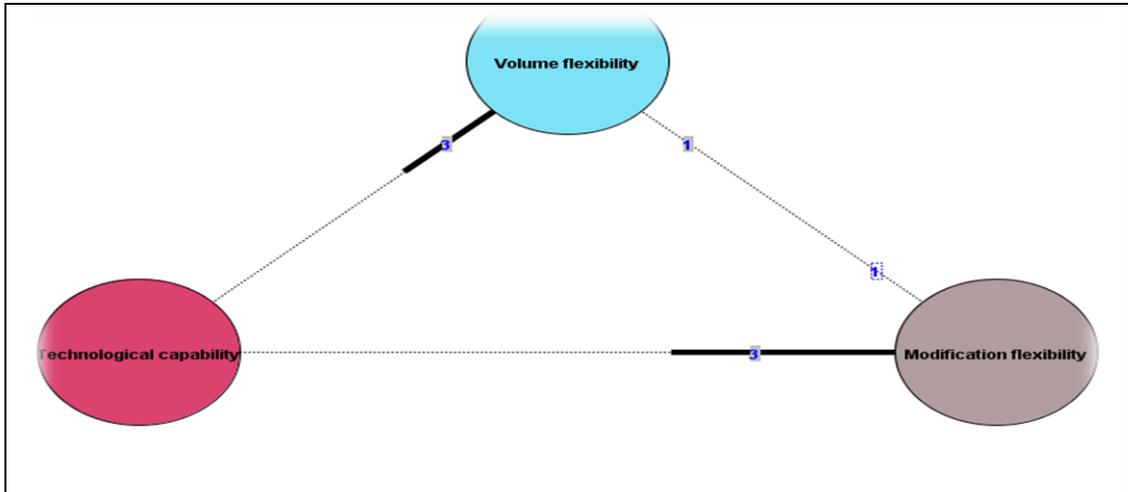


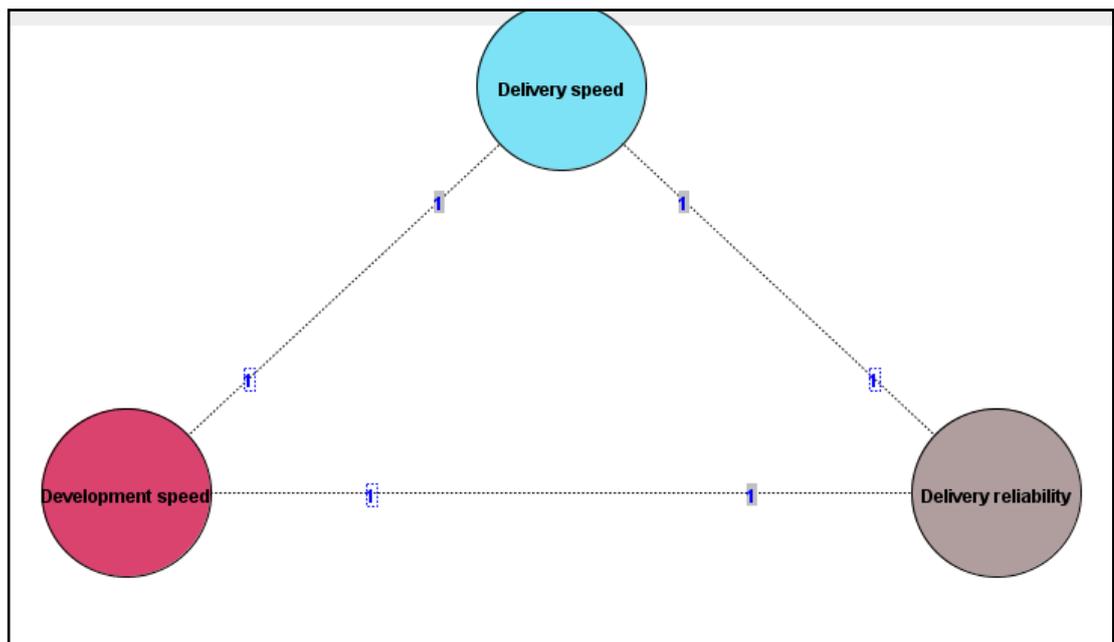
Figure 2: PriEsT graphical view of competitive priority Cost judgements



**Figure 3:** *PriEsT* graphical view of competitive priority Flexibility judgements



**Figure 4:** *PriEsT* graphical view of competitive priority Time judgements



**Table 1:** Absolute rating given by Evaluator 1 for IFK Modular

<b>Competitive priority</b>	<b>Competitive priority measures</b>	<b>Initial Food Kit</b>	<b>Rating Scale Value</b>
Quality	Component durability	VH	0.51
	Component reliability	VH	0.51
	Component innovation	H	0.26
Cost	Purchasing cost	VH	0.51
	Inventory cost	VH	0.51
	Quality cost	VH	0.51
Flexibility	Volume flexibility	VH	0.51
	Modification flexibility	VH	0.51
	Technological capability	M	0.13
Time	Delivery speed	VH	0.51
	Delivery reliability	VH	0.51
	Development speed	VH	0.51

**Notes:** VH = very high; H = high; M = Medium; L = low, VL = very low

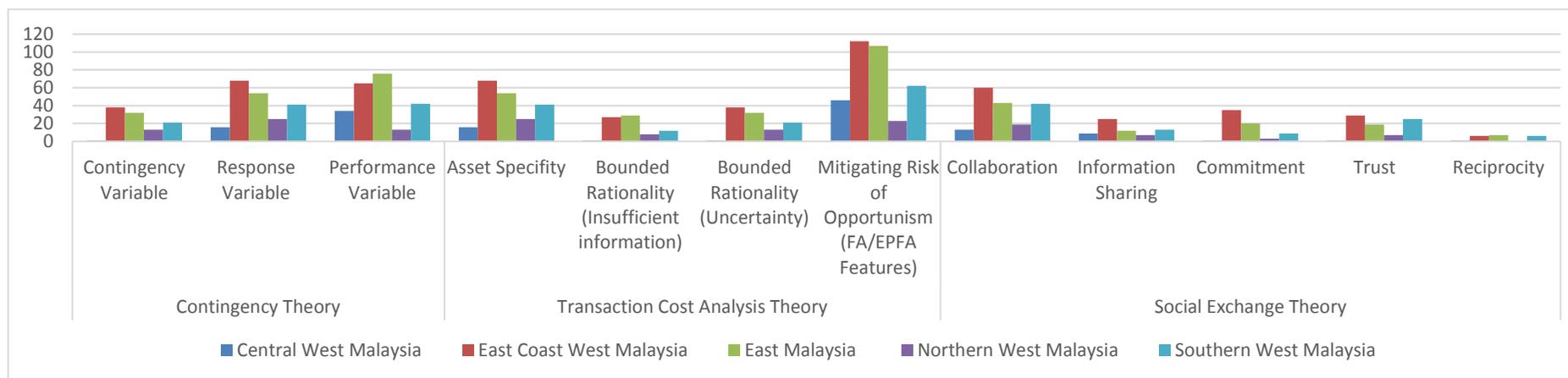
**Table 2:** Calculation of overall lean and agile score for IFK Modular by NADMA evaluator

				<b>Global weight x Rating weight</b>	<b>Highest Possible Score (VH =0.51)</b>	<b>Lowest Possible Score (VL = 0.04)</b>
			<b>Rating weight</b>			
<i>Quality</i>						
Component durability	0.11	VH	0.51	0.0547	0.0547	0.0043
Component reliability	0.11	VH	0.51	0.0547	0.0547	0.0043
Component innovation	0.04	H	0.26	0.093	0.0182	0.0014
<i>Cost</i>						
Purchasing cost	0.08	VH	0.51	0.0425	0.0425	0.0033
Inventory cost	0.08	VH	0.51	0.0425	0.0425	0.0033
Quality cost	0.08	VH	0.51	0.0425	0.0425	0.0033
<i>Flexibility</i>						
Volume flexibility	0.11	VH	0.51	0.0547	0.0547	0.0043
Modification flexibility	0.11	VH	0.51	0.0547	0.0547	0.0043
Technological capability	0.04	M	0.13	0.0046	0.0182	0.0014
<i>Time</i>						
Delivery speed	0.08	VH	0.51	0.0425	0.0425	0.0033
Delivery reliability	0.08	VH	0.51	0.0425	0.0425	0.0033
Development speed	0.08	VH	0.51	0.0425	0.0425	0.0033
Total score				0.4877	0.5102	0.0400
Lean (quality and cost) score				0.2462	0.2551	0.0200
Agile (flexibility and time) score				0.2415	0.2551	0.0200

**Table 1:** Perspective on complementing theories by DSW

Region	Contingency Theory			Transaction Cost Analysis Theory				Social Exchange Theory					Total
	Contingency Variable	Response Variable	Performance Variable	Asset Specificity	Bounded Rationality (Insufficient information)	Bounded Rationality (Uncertainty)	Mitigating Risk of Opportunism (FA/EPFA Features)	Collaboration	Information Sharing	Commitment	Trust	Reciprocity	
Central WM	1	16	34	16	1	1	46	13	9	1	1	1	140
East Coast WM	38	68	65	68	27	38	112	60	25	35	29	6	571
East Malaysia	32	54	76	54	29	32	107	43	12	20	19	7	485
Northern WM	13	25	13	25	8	13	23	19	7	3	7	0	156
Southern WM	21	41	42	41	12	21	62	42	13	9	25	6	335
Total	105	204	230	204	77	105	350	177	66	68	81	20	1687
Percentage	6%	12%	14%	12%	5%	6%	21%	10%	4%	4%	5%	1%	100%

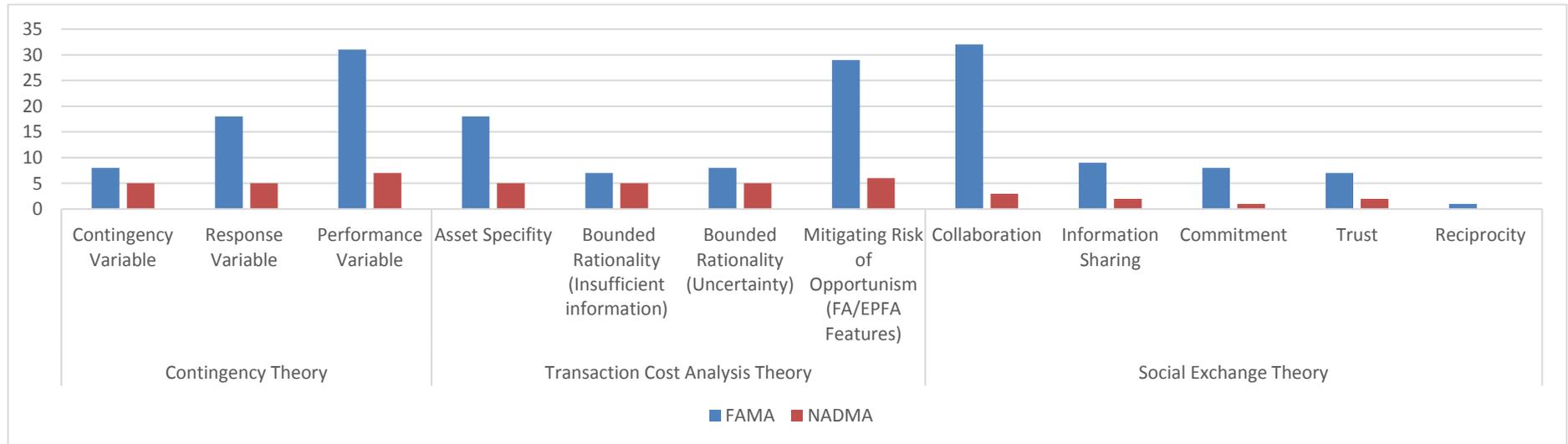
**Figure 1:** Perspective on complementing theories by DSW



**Table 2:** Perspective on complementing theories by NADMA-FAMA collaboration

Agency	Contingency Theory			Transaction Cost Analysis Theory				Social Exchange Theory					Total
	Contingency Variable	Response Variable	Performance Variable	Asset Specificity	Bounded Rationality (Insufficient information)	Bounded Rationality (Uncertainty)	Mitigating Risk of Opportunism (FA/EPFA Features)	Collaboration	Information Sharing	Commitment	Trust	Reciprocity	
FAMA	8	18	31	18	7	8	29	32	9	8	7	1	176
NADMA	5	5	7	5	5	5	6	3	2	1	2	0	46
Total	13	23	38	23	12	13	35	35	11	9	9	1	222
Percentage	6%	10%	17%	10%	5%	6%	16%	16%	5%	4%	4%	0%	100%

**Figure 2:** Perspective on complementing theories by NADMA-FAMA collaboration



**CASE REPORT - DSW**

(APPENDIX 4.5)

**Central Region West Malaysia**

State of Selangor represents the only responding agency for the region of central, WM. This is due to the fact the state Selangor experienced number of floods incidents as compared to its neighbouring state such as Negeri Sembilan and Malacca. Hence, the Selangor state represent a sizeable sample for the study. Moreover, the data collected reflects an in-depth look of the case which includes interviews from state and branch DSWs (Interview 12 to 17, Central WM DSW, 2017), primary observation (Observation 1, Central WM DSW, 2017), field interview with victims (Interview 46 to 47, Central WM DSW, 2017), and, four secondary documents (E, F, L, M, Central WM DSW, 2017).

***Nature of operations***

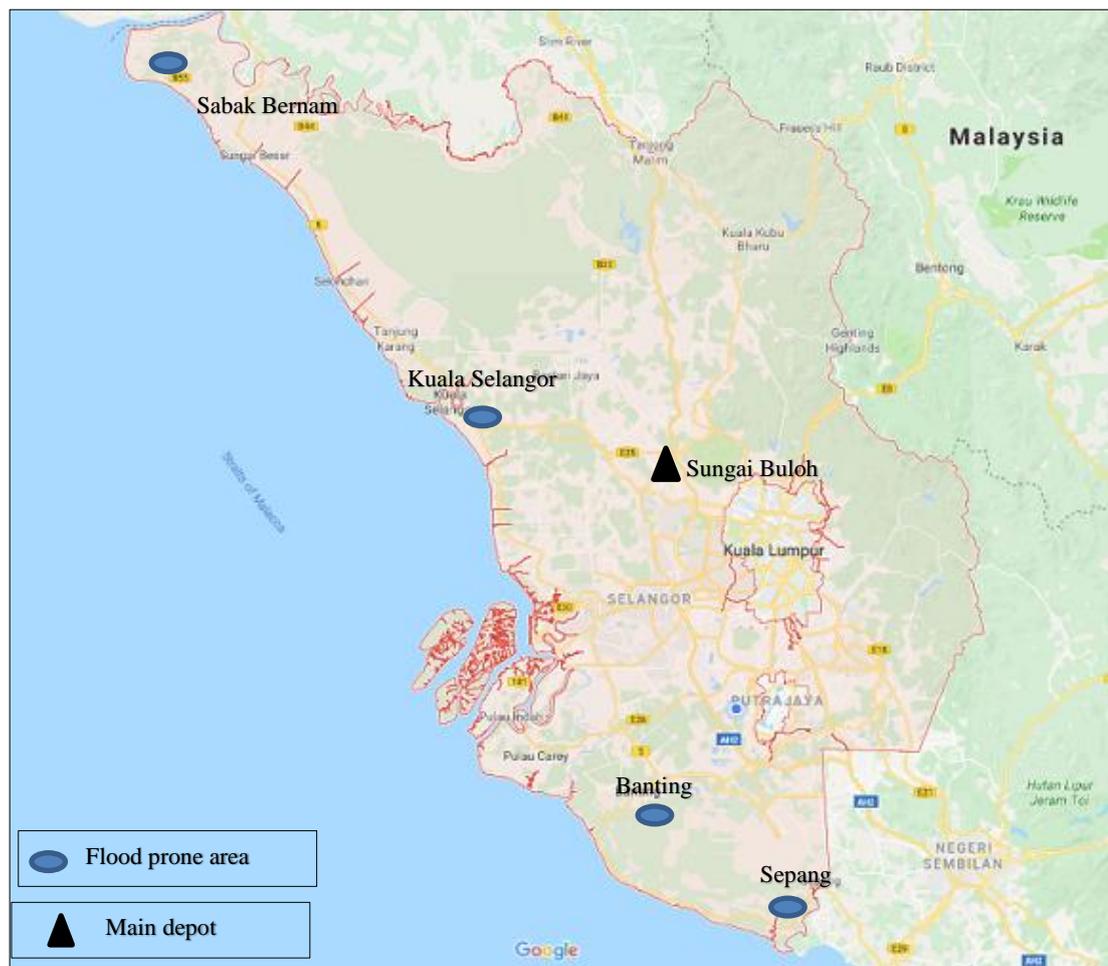
The central region of West Malaysia mostly experiences floods during the monsoon seasons due to river over flow and occasionally flash floods. Total rainfall for 2017 was 2,600 mm for the states of Selangor. It is said that flooding is regarded as an annual phenomenon in Selangor and flooding occurs in hotspot districts such Sepang, Sabak Bernam, Klang, Kuala Selangor and Hulu Langat. However, the flooding usually occurs for only on the individual districts and rarely merges to other districts unless it is a big. In addition, rare high tide phenomena also occur which could cause flooding such as in Klang, Sabak Bernam, Kuala Selangor, Sepang and Kuala Langat as it is in close proximity of the sea. Occasionally, flash flood occurs in more than 180 location is the past years (Menon 2017) . Figure 37 shows the flood prone area in the state of Selangor.

Based on uncertainty of flood conditions and following a command control from the State Secretary Disaster Management Unit as well as the DSW HQ, the Selangor state DSW prepares for flood reliefs by coordinating with the Branch DSW, which reports to the respective DO officer, as the lead of district natural disaster management committee (Interview 12, Central WM DSW, 2017). DWS state level provides basic items, bottled mineral water and supports in purchasing the food supplies for the victims. Source of funding for the basic items is provided by the DSW HQs and

purchase of food supplies, the funding is from the state Government (M, Central WM DSW, 2017). The DSW at state level maintains a large depot in Sungai Buloh as shown in Figure 30.

Here, basic items and bottled mineral water were stored as exhibited in the documents provided (L, Central WM DSW, 2017) apart from the mini-depot on district locations. Hence, bottled water is pre-purchased on *ex-ante* arrangement. In addition to this, Interview 12 and 13, Central WM DSW (2017) revealed that the central region WM do not hold any pre-positioning of food supplies apart from the bottled mineral water in the main depot. According to Interview 12, Central WM DSW (2017), the Selangor state do not have any in accessible areas as outlined in the SOP (B, DSW HQ, 2017) and revelation by the districts DSWs (Interview 15 and 16, Central WM DSW, 2017) that flooding conditions can be rare in some places while the rest is short spanned.

**Figure 1:** Flood prone area in State of Selangor (central region WM)



In addition to this, Selangor State DSW also informed that procurement of basic items was made through competitive bidding based on the replenishment requirement of the main depot (L, Central WM DSW, 2017), usually supplied before October of every year. However, for food supplies at DRC, the supplies were supported by the respective Districts for the first three days and that from the fourth days onwards, branch DSW will take over for the procurement and supplies of this food items based on EPFA procedures (Interview, 14, 15, 17, Central WM DSW, 2017). Interviewees also revealed that the supplies were purchased on actual requirement hence giving an impression of agile SCM approach. Interview 14, Central WM DSW (2017) revealed that a fixed rate of RM20 is used for packed food.

In terms of supplier selection, Interview 14, Central WM DSW (2017) profess of the followings:

“For flood supply, our district branches maintain good relationship with their suppliers. Their suppliers could be single or multiple depending on their capability and locality. We have regular meetings to support and inform them and emphasize the need to be proactive especially with the suppliers and meeting victim’s need. We also exchange information with our branches about the preparedness meeting at both levels so that they are better informed”

FA with suppliers is not based on formal agreement, however the suppliers are selected and pre-approved under the list of approved suppliers. The FA pricing is fixed for packed food, and, for controlled items such as sugar, cooking oil and rice. However, for fresh food for DRC such as fish, chicken and vegetables are based on market price. Based on DSW district’s response, after the DO office’s supplies for food has reached the third day, the branch DSW will seek approval from the State HQ DSW’s approval for continuation with the same supplier (subject to good performance), and the numbers of victims has gradually declined and stable, hence the orders could be fully ascertained. Based on 2017, branch DSW (Interview 15 and 17, Central WM DSW, 2017) indicated that the although they could supply fresh and raw food, but they acted under the advice by the Health Department to supply packed food for hygienic reasons as shown by the sample of local purchase order (LPO) document (K, Central WM DSW, 2017).

### ***FA practices and collaboration pursued***

As indicated earlier, the Central WM DSW practices FA based on emergency purchase (MOF 2015). The geographical location coverage includes particular disaster location and for the district level. The FA are pre-approved and are usually short term in nature exclusive for the disaster purpose, and, with no limit set on the quantity. Once supplied, the bills will be consolidated at the State DSW HQ for payments (Interview 14, Central WM DSW, 2017). The FA that was instituted was based on the flood condition which was primarily uncertain, albeit the fact that flooding occurs yearly at central region. The organisation respond is to ensure the suppliers are on high alert by encouraging branch DSWs to maintain good relationship with these suppliers.

For this reason, the nature of collaboration were focused building commitment and trust through preferred supplier and collaboration on sharing of information. Despite the fact that the collaboration is short in nature with goals of securing supplies, the decision making is made on mutual level between buyers and suppliers. Commitment is high as revealed to suppliers' willingness to reserve minimal capacity in preparation for flood relief with reciprocity of either early or during disaster sharing of information. As pointed out by Interview 15 and 17, Central WM DSW (2017), suppliers will be informed of flood prediction well in advance (high flood incident in Sabak Bernam) so that the suppliers could prepare in advance and reserve minimal capacity.

Next, during disaster occurrence, an on-going communication via WhatsApp application about fluctuation of numbers of victims is shared actively. In terms of trust, the interviewees insisted that prior working relationship as listed approved supplier for disaster and secure payment by a governmental agency is key to establish trust between the parties (Interview 12, 15 and 17, Central WM DSW, 2017).

### ***Lean and agile practices***

This study was able to obtain perspective on lean and agile perspective from DSWs officers and triangulate the claim with field interview and observation at the DRCs. Firstly, with regards to quality, branch DSW indicated that their continuation of suppliers with prior experience of supplying during the first three days is based on the ability on providing quality food for the victims on timely manner (Interview 15 and

17, Central WM DSW, 2017). Investigation based on observation conducted on 1<sup>st</sup> of February 2017 at one of the DRC in the region reveals of the following observation:

“During the supply of food, the food was packed neatly and the workers displayed concern on hygiene. There were only little left overs and two packed of rice. After the meal, the victims went inside to the hall whilst the workers collected the trays and left the premise approximately at 330 pm”

(Observation 1, Central WM DRC, 2017)

Next, based on field interview on two victims, the following response were obtained:

“The food that we get here is reasonable too. Except that sometimes there is a delay of delivery from suppliers by one to one and half hours especially for cooked food”

(Interview 46 and 47, Central DSW Victims, 2017)

Hence, it could be argued that the quality was of a reasonable acceptance level by the victims as indicated by DSWs, in addition to the fact that routine checks were conducted by the Health Department at the DRC.

Secondly, with regards to cost which is based on justifications by DSWs that the cost was contained because a fixed rate of RM20 per victim was exercised coupled with controlled item's existing price control. Interview 15 to 17, Central WM DSW, (2017) indicated that the pricing for fresh and raw food are reasonable within the market price as there were no inaccessibility issues of transport to the region, hence supplies were able to meet the demand volatility to keep the price within a range of an acceptable market price. The justifications assert that cost was a priority of the buyer and supplier were able to support a reasonable pricing scheme for the disaster relief. These views on quality and cost supports SCM leanness concern of the case.

Next, with regards to agility factors relating to flexibility and delivery time. Interviewees (15 and 17, Central WM DSW, 2017) pointed out that the suppliers are able to accommodate the fluctuation of volume of cooked food as reflected by the following:

“Sometimes there is incremental as the rain is unpredictable. It's like this, every 4 hours once we will forward the progress report, so from there we will already know the rate. I will inform the supplier at 10 pm instead of 12 at midnight because usually there will be no changes from the report at 8 pm. Also, the

victims will not go back at night, so from that we could make quite accurate predictions. So far, no problem... the suppliers are flexible”

(Interview 17, Central WM DSW, 2017)

Meanwhile, as for delivery, DSWs respondent informed that the overall delivery to DRC has been on-time or on schedule (Interview 12, 13, 15, 17, Central WM DSW, 2017). The respondents informed that besides the supplier performing the delivery to DRC, strategic partners such as CDF also assist in the delivery especially when if the area is inaccessible. However, occasional delays in delivery do happens, mainly due to late communication between buyer and supplier. For example, based on the above observation and field interview (Observation 1, Central WM DRC, 2017) (Interview 46 and 47, Central DSW Victims, 2017), the followings were able to be learned:

“The food that we get here is reasonable too. Except that sometimes there is a delay of delivery from suppliers by one to one and half hours especially for cooked food. They will apologies about the delay and we understand sometimes the number of evacuates could not be determined especially when the rain is continues”

(Interview 46 and 47, Central DSW Victims, 2017)

“I was able to witness to the supply of packed food for the victims at DRC approximately at 2 pm, a van with its two workers came and stop in front of the DRC premise. The men started to bring in trays of cooked meals. One tray of cooked chicken, cooked vegetables, few plastic bags with white containers containing packed for rice. However, the supply was delayed an approximately 1 hours late. One possibility this would be perhaps on the fluctuation of victims in the morning, whereby the period of reporting of statistics were at 8 am and the next at 12 pm. During such time, the DSW officer would have ask either to increase or decrease some of the order to avoid wastages”.

(Observation 1, Central WM DRC, 2017)

Albeit the remote incident of delay, the overall impression of supplies delivery was nonetheless regarded as lofty. Hence, taking into consideration of these two factors, the perception on the SCM performance on the whole, is high on agility. By the same token, when compared to the Northern WM case, likewise the Central WM case too do not contain de-coupling point as the *post-ante* approach spotlights process of food supplies for DRCs.

## **Southern West Malaysia**

Southern WM case is represented by only one state, the Johore state. The state of Johore is amongst the worst flood hit state in West Malaysia, considering the 2014 big flood phenomena and the yearly monsoon season. Therefore, a study of the state disaster relief could provide profound insights. Notably, for the case of Southern WM state, data that were collected comprises of one interviewee from the state DSW (Interview 18, Southern WM DSW, 2017), two interviewee from branch DSW (Interview 19 and 20, Southern WM DSW, 2017), one interview with supplier (Interview 37, Southern WM Supplier, 2017), primary observation (Observation 2, Southern WM DRC, 2017), and, one secondary documents (O, Southern WM DSW, 2017).

### ***Nature of operations***

Flood occurrence in the Southern WM state of Johore are mostly due to the annual north-east monsoon season in particular in the months of November and December of the year. The continuous rainfall of more than 3 days affects low-lying and flood prone areas. Eight flood prone districts in the Johor state are Batu Pahat, Kluang, Kota Tinggi, Tangkak, Mersing, Muar, with two of the districts identified as frequent large-scale flood occurrence namely Segamat and Johor Bahru (Interview 18, Southern WM, 2017). For the year 2017, data drawn from State DWS report (O, Southern WM DSW, 2017) revealed that six districts were involved in flooding with a total of 77 DRC operated with more than 8,000 victims. From this figure, the Segamat district alone had 51 DRC with more than 5,800 victims, or in other words, comprising more than 70% of the total victims in the state of Johore. In addition, for the period of study, each district had its own flood occurrence and did not cascade to a major flood affecting neighbouring districts.

During the 2014 big flood incident, there were about 132 DRCs opened, however the worst flood that hit the state was in 2006 involving 10 districts and a state of emergency was declare (Interview 18, Southern WM, 2017). Apart from this, there were also reports of occasional flash floods in the city of Johor Bharu. Respondents for the case argues that most common cause of flooding due to monsoon rainfall is due to river overflow and water retention in plantation areas (Interview 18, Southern WM DSW, 2017; Interview 37, Southern WM Supplier, 2017). These accounts were verified

during the observation conducted by researcher as exhibited in the Figure 38 (Observation 2, Southern WM DRC, 2017). In addition to this, Figure 39 shows of the flood prone districts in the state of Johore.

**Figure 2:** Pictures of Segamat flood due to river overflow and water retention in plantation area



**Figure 3:** Flood prone areas in the state of Johore, Southern West Malaysia



Respondents in DSW listed environment uncertainty, manpower shortages, financial limitation and large geographical coverage as some of the major situational challenges faced by both states and district DSWs (Interview 18, Southern WM DSW, 2017). Due to unpredictability in the intensity of flood occurrence and the large geographical

coverage as exhibited in Figure 32, the districts DSWs staff were understrength to handle the large number of DRCs as in the case of Segamat which had a total of 51 DRCs. Other limitation includes staff's readiness to handle a large number of DRCs and meeting the supply volatility (Interview 19, Southern WM DSW, 2017). Arising from manpower shortage, the Johor state practise the purchase of food items to be additional handled by the respective State legislative member.

As a response to the unpredictable flooding and the organisation situational challenges, the State DSWs prepares through early preparations and forecasting, sourcing, pre-positioning of food stocks, fostering buyer-supplier relationship and training of staffs. (Interview 18, Southern WM DSW, 2017). The actions taken are categorise as pre-disaster, during disaster and post-disaster response. During pre-disaster preparation, DSWs identifies the DRCs and forward operating base (FOB) for pre-positioning of dry food items. As at 2017, the state DSW has listed 669 DRCs, 10 large depots for storage of relief items and supported by 5 mini depots and 69 FOBs. The distinction between a large depot to a mini depot is the former is used to store non-food items (Muar depots supports supplies to two other neighbouring states) and the latter is meant for storage of food related items. Meanwhile for sourcing purposes, 127 suppliers were enlisted, out of which 116 are small scale suppliers and 11 large scale suppliers (O, Southern WM DSW, 2017). Amongst the FOBs, five were prioritise for pre-positioning of food items especially uncooked rice for 5 islands under the district of Mersing, which

For sourcing solicitation, DSWs procures mainly non-food items and two type food related items, the uncooked rice and bottled mineral water, by performing competitive bidding during pre-disaster response or ex-ante approach. Meanwhile, priority is also given for food related items such as rice, flour, sugar and cooking oil to be procured and pre-positioned in the five islands in Mersing and for the remote areas occupied by the indigenous people especially in Mersing, Kluang and Segamat districts (Interview 18, Southern WM DSW, 2017). The supplies are given one or two months before the start of the monsoon season and held at FOBs under the care of FOBs. Food supplies for DRC were calculated for a fixed rate of RM10 per person per day and bought in advance of 3 days. These includes rice, flour, sugar, canned sardines, egg, raw and fresh food such as vegetable, chicken and fish.

As explained by the states DSW, the suppliers for Johor state consist of single large supplier to many small suppliers. The suppliers were appointed based on decision of the District Disaster Committee and in which the MDTCA allows the approved the appointed suppliers for the disaster relief to reserve stocks especially on the control items. For example, in the case of Segamat, there are two large suppliers and small suppliers for rural areas to supply for the needs of numerous DRCs located within the district of Segamat. For the present case involving one experienced large supplier, a letter of appointment synonyms to FA is awarded to the supplier based on mutual discussion by both parties (held in the month of July of the year) and the willingness of the said supplier to supply disaster relief supplies during flood occurrence (month of November to January, the next year). The supplier has had more than 10 years of experience dealing with the disaster relief supplies with the branch DSW, and are able to reserve a large number of food stocks for the supply of the district's DRCs (Interview 19 and 20, Southern WM DSW, 2017; Interview 37, Southern WM Supplier, 2017).

#### ***FA practices and collaboration pursued***

The FA as practised by DSWs branch is based on the emergency purchase regulation similar to the prior cases in the Northern and Central WM region. Bills are accumulated at the end of disaster period and forwarded to the state DSW for payment process. The FA features for the case based on branch DSW's supplier includes the following features short-termed, single large supplier covering a district radius, with no limit of quantity order and a mutual understanding of minimal reserve capacity in anticipation of the flood (Interview 19 and 20, Southern WM DSW, 2017; Interview 37, Southern WM Supplier, 2017). At the state level, Interview 18, Southern WM DSW (2017) apprised that FA are being promoted by the State authorities with large hypermarkets rather than small suppliers to support large scale floods relief activities, despite the occurrence is occasional such as in the year 2006 and 2014.

Meanwhile, in terms of collaboration between buyer-supplier for the present case, two set perspectives were highlighted. Firstly, involving small suppliers for rural areas, (Interview 19, Southern WM DSW, 2017) shared of the following instances:

“Usually in our case here it's quite easy as we have two large suppliers but for rural areas, they might have two or sometimes only one small supplier,

and the problem occurs when they backed out. This was the case in a rural area recently. Both of the suppliers back out, so this created a lot of problem for us”.

“Like in the 2011, 2012, the flood which occurred is of smaller scale. However, for 2017, it was quite large. So, when we approach them with large demand of quantities say for rice and so on, they become overwhelmed and could not supply”.

Secondly, concerning a large single supplier for the district, the followings are the perspective shared:

“Yes, it’s only this supplier who is willing to work with is 24 hours. The rest of them, it’s within their operational hours. But for this single supplier, there has been discussion and agreed upon, so we rely on them and stick to one”.

(Interview 19, Southern WM DSW, 2017)

“The supplier was ok, meaning we could just inform them that this is the list of the ration required and they could supply it”.

(Interview 20, Southern WM DSW, 2017)

Hence, it would appear in the first case involving small supplier to rural areas, large flood tests the small supplier to buyer collaboration essence due to high risk of not being able to comply with the supply demands. In contrast, large suppliers are steadfast on the collaboration attributable to the ability to meet the demand fluctuations. In fact, the case of the large single supplier for this region revealed that the buyer-supplier perspective on commitment and trust elements are deliberated to be high (Interview 19 and 20, Southern WM DSW, 2017; Interview 37, Southern WM Supplier, 2017). The collaboration encompasses mutual decision making on meeting supplies demand, early sharing of information and effort for ensuring continuous supplies with reserve capacity. As a reciprocity to the commitment, on-time payment coupled with relaxed regulation from MDTCA for stock keeping for controlled items in anticipated.

### ***Lean and agile practices***

Lean practices ascertained through price, is gauged through the cost control appraises of the actors of disaster relief. Interestingly, the perspective of cost control through price mechanism of the present case reveals that for food items, competitive bidding was performed for mineral water and dry stock food for pre-positioning at FOBs

especially for inhabitants of islands and remote areas involving the indigenous people of the state. Moreover, as revealed by the state DSW beginning 2016, most FOB's were stocked with food items to reduce risk of items spoiled and unused taking the experience from the year 2015. Since competitive bidding was performed and the fact that most of these items during this ex-ante approach are price-controlled items, cost controls is observed. While, at the point of near disaster expectance and during the occurrences, EPFA procedure were applied. Interview 18, Southern WM DSW (2017) argues that the price of the FA is fixed at RM10 per person which includes daily replenishment of dry food and raw/fresh food supplies for the DRCs. In addition, the rice is purchased using the central contract from *Bernas* (national rice producer) and the price is controlled. Moreover, the supplier (Interview 37, Southern WM Supplier, 2017) indicated of the followings:

“We will have to consider their budget, I do not want to give, oh! This is expensive, give them first. Cannot! Government also have audit as well as the budget. We want long term relationship with them...”

“During disaster, we give whatever that we have and we do not increase extra money. Some people say... Oh disaster come, this want RM2, we sell RM4 today... No, no, we still sell RM2. Normal RM2, we sell RM2. That is our business. I follow market price and plus I have sufficient stock, no worry, I could still sell old price”

“Even if the flood prolongs, we will have to re-check the price, may be there might be some incremental.... but we keep to the minimum. We try to keep the standard”.

In addition to this, the supplier also indicated that the reserve capacity may not cause a problem as they could sell it to sell to their various range of customers. Hence, it would appear that there are minimal wastages at the supplier's end.

Next, lean practices through quality adherence possible yardstick based on perspective on the number of complaints perspective and supplier's commitment. Based on perspective of respondent from state DWS (Interview 18, Southern WM DSW, 2017) and:

“Ok... our priority is rice, flour, sugar and cooking oil, this is the main items, based on my experience, there have never been an incident where the quality is compromised because the health Department will check the quality of these

food items and the cooked food in the relief centres. So far, I have not received any complaints by the victims on the food quality”

“For example, for fresh vegetables, we do not supply the green leaves vegetables but cabbages, eggplant, beans ... the ones the quality could last longer. So, we buy something like this for the three-day supply, although it’s not cooked, it could still be kept. The cabbage for instance, yes you peel the outer part, the reality of it is its still in good condition. For fish and chicken, of course they have cook on the spot. You saw the fish the other day”

Meanwhile, the supplier (Interview 37, Southern WM DSW, 2017) indicated that they have a large freezer and cold storage to keep their supply fresh and as for vegetables, cabbages were given priority since the quality could last longer. As a matter of fact, observation (Observation 2, Southern WM DRC, 2017) notes of the following:

“In terms Quality, as the items were checked and receiving at the centre also involved the village heads, hence quality of the food items were of priority”

Similar to lean practices, agility measurement based on flexibility and timeliness could be ascertained through the multi-source convergence. For instance, in meeting the volume flexibility due to food demand volatility during flood, respondents from state and branch DSW (Interview 18, 19, 20, Southern WM DSW, 2017) asserts that their suppliers are able to meet the demand volatility and constant communication via technology (e.g. WhatsApp application, fax, telephone calls) as the key driver for co-ordination between buyers. However, a point to note from the respondents that small suppliers might face challenges in meeting the demand due to large scale flood. However, in the case of a large supplier, the supplier (Interview 37, Southern WM DSW, 2017) strongly indicated that they are able to meet the volume of food supplies as they had experience handling small- and large-scale flood, a large reserve capacity and support from their supplier. In addition, their flexibility to meet the demand could be grasped based on the following perspective:

“It happened, by 2 o'clock, no more order coming in, so I thought I could go and sleep. By the time I arrived home, the telephone rang...centre opened, you must come and open”.

As for timeliness, respondents from state and branch DSW (Interview 18, 19, 20, Southern WM DSW, 2017) re-affirms that with help of their strategic partner such as the Works Department and the Armed Forces, delivery could be made within the time of co-operative cooking at the DRCs. Observation conducted at the Segamat district

(Observation 2, Southern WM DRC, 2017) revealed that by 8.30 am, the supplier had prepared the food items consisting dry food such rice, light noodles, spices and raw food such chicken, fish and vegetables. These items were already arranged based on the vehicle routes. These were then loaded to the Works Department and the military trucks before being sent to four DRCs. As the researcher was present in the delivery truck, it was noted that time taken for the whole duration of these trips was only 40 minutes and all items delivered by 9.40, which is well before the commencement of the co-operative cooking at the DRCs. In addition to this, perspective from victims was able to be recorded as following:

“At the centre, Observer had the opportunity to talk to the victims. In general, they were happy with the quality of the food and the delivery time”

(Observation 2, Southern WM DRC, 2017)

Moving on, in terms of the process of postponement and establishment of de-coupling point to gauge leagility in the case of flood relief supplies in the Southern WM region, it could be determined that postponement occurs from the point of FOBs to DRCs as in the case of bottled mineral water supplies and supplies for remote areas for indigenous and island inhabitants. In the case of bottled mineral, an ex-ante purchase using competitive bidding and stocked at the main depot by the month of July of the year and the items were moved to FOBs. Similarly, for the remote areas, the relief supplies were sent to the FOBs by the DSW and supplier before the expected flooding season, which includes uncooked rice, sugar and cooking oil for two weeks supplies (Interview 18, Southern WM DSW, 2017; O, Southern WM DSW, 2017). Once intensity is determined, EPFA is used to support delivery of the additional required bottled mineral water for the DRCs and the water and flood relief supplies for the remote areas.

## **East Coast West Malaysia**

Three states form the East Coast WM region namely Kelantan, Terengganu and Pahang. A total of 13 interviewee represented these agencies as the key respondents (Interview 21 to 33, East Coast WM, 2017), five secondary documents (D, J, N, R, S, East Coast WM, 2017), primary observation (Observation 3, East Coast WM, 2017) and five suppliers were interviewed (Interview 38 to 42, East Coast WM 2017) were obtained for the study. Overall, the greatest number of interviewees for the study came from this region as the east coast of Malaysia is known for the worst hit flood's region.

### ***Nature of operations***

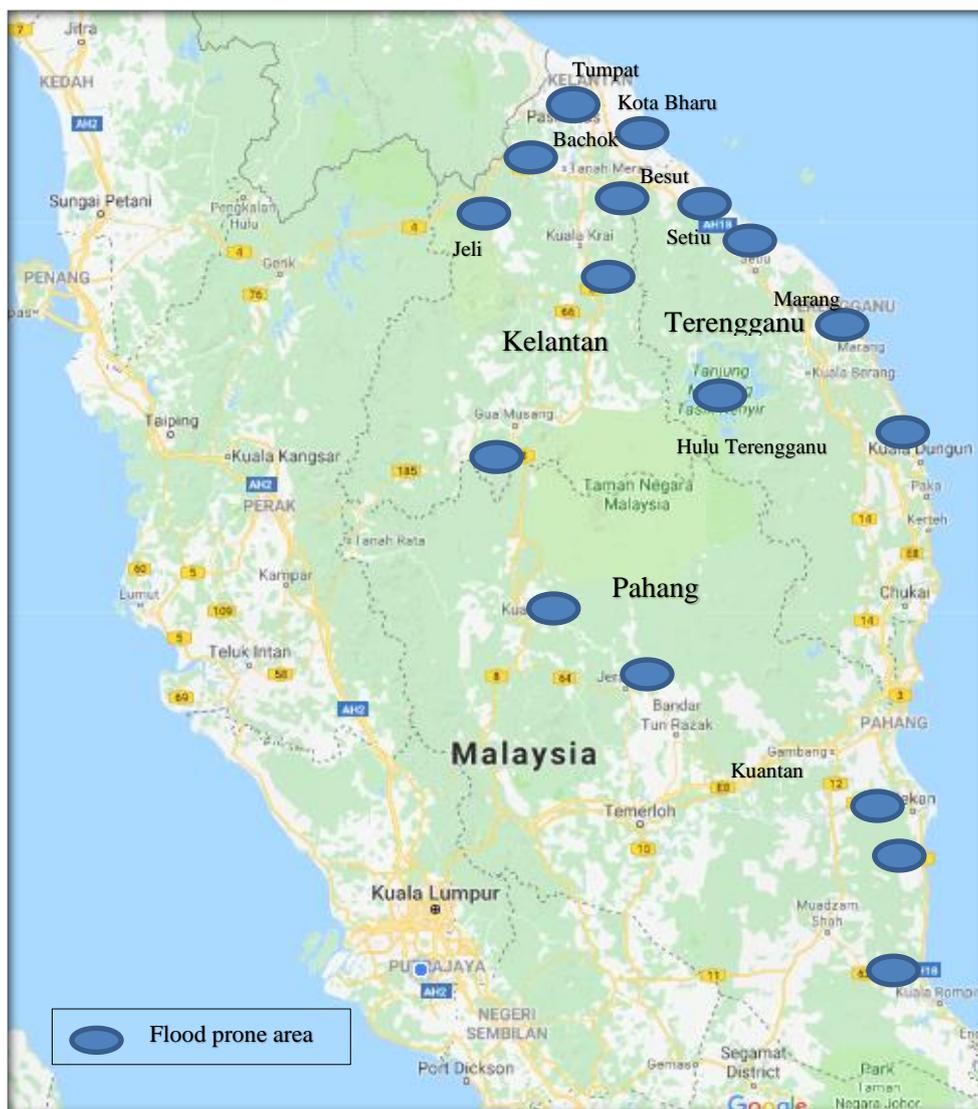
The east coast WM region experience the worst floods due the northeast monsoon season (October to March) heavy rainfall coupled with seasonal high tides. The heavy rainfall alone by itself causes flood when a river burst its banks and the water spills out onto the flood plain (Akasah and Doraisamy 2015) . Most compelling evidence was during the year of the 2014 big flood phenomena, in which some areas in these states received up to 1000 mm (IFRC 2015b) of rain causing flood water to rose above normal river level. For instance, some rivers surpassed dangerous water level of between 2 to 5 metres in Kelantan causing floods that was named as “big yellow flood” which had damaged infrastructure including roads and bridges as well displacing people in districts of Rantau Panjang, Gua Musang, Kuala Krai, Tanah Merah, Jeli, Pasir Mas and Kota Bharu. While in Terengganu, a total of 90 DRCs was opened and the worst hit area was in Kemaman followed by Dungun, Hulu Terengganu, Besut, Kuala Terengganu, Marang and Setiu. Meanwhile, in the states of Pahang, out of the four rivers that rose above the dangerous level, the Sungai Tembeling River rose more than 7 metres. DRCs were opened in districts such as Kuantan, which has highest number of displaced people in the state followed by the district of Maran, Lipis, Pekan, Jerantut and Rompin.

Notably, during the period of this study, flood that occurred in these states were not as severe as in the year of 2014. For instance, in Kelantan, for the year 2016-2017, a total 40,263 victims were registered at 222 DRCs as the flood hit in four waves from the period from 2<sup>nd</sup> December 2016 to 29<sup>th</sup> January 2017 (R, East Coast WM DSW, 2017). Similar to Kelantan, the state of Terengganu too had four waves of flood beginning from 29<sup>th</sup> November 2016 till 26<sup>th</sup> January 2017 displacing 21,231 victims in 211

DRCs (S, East Coast WM DSW, 2017). While, nine districts were affected by flood in 2016-2017 except for Bentong and Cameron Highlands. The flooding occurred in two phases: First phase, 24 January to 5th February; and, the second phase, 1st to 7th March 2017, but just involving the Rompin district. Figure 40 show of the flood prone areas of the east coast WM region.

The east coast region WM experience an almost annual flooding albeit the scale differs from year to year. Commonly, a smaller scale flood affects specific district of the states within the region. Hence, in terms of organisational situation, environmental uncertainty is the most talked about circumstances besides the commonly highlighted State SOP and the NSC adherent and issues such as manpower shortage, large geographical coverage, limitation in the finance and lack of coordination.

**Figure 1: Flood prone area in East Coast West Malaysia**



“However, this year's flood is not the same as the 2014 flood because the 2014 flood is due to river overflows to land and as compared to the current flood, which was due to rain, in which the water flow could not flow out certain areas, probably because of low slope perhaps. So, these place that we target are those that were never hit by flood before”.

(Interview 26, East coast WM DSW, 2017)

“The situation is different here because we have two rivers, the Golok River and the Kelantan River. If it floods near the Golok River, it's usually not large, and the relief centres opened are not that many. But if it's due to the Kelantan River, it will involve almost all of Pasir Mas and Kota Bharu as well”.

(Interview 26, East coast WM DSW, 2017)

“The weather is really unpredictable, sometimes there is flood, sometimes there are none. We are afraid of that. As it is, our business has slowdown”

(Interview 38, East coast WM Supplier, 2017)

“We really could not predict disaster, some people say such scale of flood occurs once in a hundred year, but the 2014 incident was equally big and that is not even a year from the previous big one”.

(Interview 30, East coast WM DSW, 2017)

Based on the environmental uncertainty, the region adapted a contingency response approach by focusing on early preparation which includes forecasting, pre-positioning, sourcing and a particular attention to buyer-supplier relationship. In performing forecasting, previous years number of victims provided by district DSWs were used as baseline for the current year preparation for food supplies and the calculation for the need of an FOB draws from the population of neighbouring villages multiplied by per person's and the number of days, either 3 days or 7 days (for the use in DRCs or by modular to the victims whom inaccessible/trapped at their homes and could not move to DRCs) (Interview 25, 28, 30 East coast WM DSW, 2017). This is necessary as the state budget for food is limited and all additional items if required will be purchased with EPFA (Interview 27 East coast WM DSW, 2017). However, forecasting based on previous year incident may create problem:

“What happened in 2013, something that was unexpected. I was also involved in supply delivery operations in a remote area. Like before, our current year preparation is based on previous year scenario, for example for 2017, we based

on 2016 or 2015 scenario to prepare for supplies. The incident in Kemaman, the previous year, 2012, the flood was a manageable scale, so for the supplies for 2013, it was based on 2011 or 2012 supply requirement. But in the actual fact, the flood in 2013 was a big scale disaster. So, the items that were sent for 7 days of supply was consumed in 2 days because there were too many victims, you can consider the whole village was hit”

(Interview, 30 East Coast WM DSW, 2017)

Next, sourcing will commence in July up to August of the year and supplies delivery to the FOBs are in the month of October or November especially for items that have short lifecycle such as uncooked rice, so that it could last for 3 months or throughout the northeast monsoon season (Interview 25, 27, 31 East coast WM DSW, 2017). Other items include canned sardines, milk powder, sweetener, cooking oil and non-food items such as sleeping mat, blanket, sarong and batik. The purchases for the supply of FOB were made through competitive bidding process with some using the electronic procurement platform known as e-procurement.

For pre-positioning, the operation of DRCs is supported by the same number of FOBs and often operated in the same premises with food stocks that could last up to 3 days. Firstly, for the state of Kelantan, once the stocks of FOBs are almost exhausted, replenishment is made via main depot (Interview 28, East coast WM DSW, 2017). In addition, an ad-hoc tender is performed for the supply of dry food for districts once the flood occurs and the uncooked rice is obtained via central contract from Bernas. Secondly, with regards to the state of Terengganu, the state prepared 160 FOBs with food stocks that could last up to 7 days to support an approximately 529 DRCs. The food items for the FOBs includes uncooked rice, canned sardines, chicken curry spice, sugar, tea, milk powder, biscuits, cooking oil, condensed milk, coffee, soy ketchup, dry noodles and bottled mineral water (Interview 30, East coast WM DSW, 2017; S, East coast WM DSW, 2017). Thirdly, for the state of Pahang, the state operated 107 FOBs, in which 104 of the FOBs were loaded with food supplies that could support 3 days operational, whereas three other FOBs were meant for inaccessible and remote areas comprising island and villages of the indigenous people (Interview 22, East Coast WM, 2017; Observation 3, East Coast WM, 2017).

Concerning the buyer-supplier relationship and the supplier base, two states of East Coast WM region namely Kelantan and Pahang preserve preferred supplier

collaborating on rare negotiations and short-term basis with goals of ensuring continuity of supplies after utilising FOBs supplies. The procurement is performed through EPFA. For instance, the Kelantan state DSW informed that the districts DSW appoints their own supplier, and the state DSW will record the list of suppliers. The district suppliers are usually small grocery shops or supermarket, with fairly large supplies. The orders will be performed for the third day supplies and onwards as the DRCs sustains the first two days using the supplies from FOBs. The order will include dry and fresh/raw food such fish, chicken and bread (Interview 26, 27, 29 East Coast WM DSW, 2017). Similar to Kelantan, the Pahang state operative of their appointed suppliers at district level is through the approval of the DO whom is also the Chair of District Disaster Committee. The supplier base for most of the Districts are mostly many small supplier to large suppliers except for two districts that retain single supplier for the EPFA purchases. In the event that the state could not fill in the required item for the FOBs, the state DSW will authorise the district DSW to proceed with the purchase of the required food item (Interview 22, 23, 25 East Coast WM DSW, 2017).

In contrast, the state of Terengganu performs an FA that could last a one-year flood cycle with large supplier whom will then supply to the respective districts based on their orders. Apart from utilising the FOB resources, the district may provide the victim with packed food meal at a price of RM6.50 per pack, also known as “first man meal” for the first arriving victims (Interview 30, East Coast WM DSW, 2017). Next, the state DSW may at its discretion also cater for fresh and raw food supplies together with dry food supplies from the FOBs for the co-operative cooking. The state DSW explained that the supplies for the packed food will be arranged by the district concerned, however for the supplies of fresh and raw food, this will be supported by the state DSW suppliers. This means that the respective district suppliers only supply the required items when the DSW state supplier could not supply or delayed. In other words, the district suppliers are only on standby basis. To date the Terengganu state and branch DSW has 60 suppliers, of which 20 are large suppliers. The state DSW itself has 10 large suppliers to support the FA for DRC operations (Interview 31, 32, 33, East Coast WM DSW, 2017).

### *FA practices and collaboration pursued*

The EPFA featured in the east coast WM region involves DSW branches working with few small suppliers with either grocery or supermarket alike operations located in the district concern or near the disaster area. The EPFA is pre-approved by at District level and states DSW respectively. It features limitless quantity order (in stated upfront quantity) and are usually short termed in practise, meaning the suppliers whom are listed for the current cycle of flood could either opt out or be dropped based on their performance. The EPFA is practised in the state of Pahang, Kelantan and as and when required by the Terengganu DSW branches mainly used for the purpose of securing post-ante food supplies for the use in DRCs after the third day of operations, with the first three days supplies supported by the respective FOBs. For remote and inaccessible areas involving island inhabitants and indigenous people, EPFA were used for to supply food and cooking related items when the 7 days supplies in FOBs were exhausted.

In contrast, in Kelantan, the priority of supplies is from the main deport where food stocks are kept and ad hoc competitive bid process is performed for the supply of dry food stock for replenishment of the main deport and for districts depot/FOB to support DRC operations. Apart from Kelantan, the competitive bid FA as practise by the Terengganu state DSW involves dealing with large suppliers such as hypermarkets to supply food and cooking related items for the supplies in DRCs, either by following the state disaster management SOP meaning after the 7<sup>th</sup> day of DRCs operations or stock depletion in FOB, or based on state discretion to supply the items in any day of the DRCs operations. This FA is featured for one year and could possibly be used for two cycles of flood, for instance from the cycle of monsoon in the year 2015-2016 up to end of 2016. The order base is also unlimited with geographical coverage of all districts that were affected by flood in the Terengganu state. As a result of utilising these FA, the response resembles a contingency response for the supplies for DRCs.

Meanwhile, in assessing the collaboration between buyer and supplier for East Coast WM region, the immense multi-source data indicates the highest with respect of collaboration constructs' responses pointed towards this region. To begin with, the collaboration natures in this region are purely based on mutual decision making (Interview 22, 27, 30, East Coast WM DSW, 2017; Interview 38 to 42, East Coast WM

Supplier, 2017). Respondents argues that mutual decision making involves involved, pricing negotiation, the delivery place and timing and meeting volume demands. Next regarding the collaboration efforts for sharing of information, respondents viewed that sharing of information were performed mostly prior to disasters and in some cases on-notice as well as during disaster:

“They have prepared in advance. I think they prepare earlier below than one month, meaning they would prepare too early of the month but say 15 days or 20 days earlier because they depend on input from the PKOB or disaster operational centre, so when they see that there is a movement in the numbers of victims, they will instruct their staffs. Usually, their drivers are on 24 hours duty and they will be moving in and out to send the supplies, wherever needed”  
(Interview 28, East Coast WM DSW, 2017)

“I need the information of the place to unload the items and the time that the required items to be sent, these we would require much earlier”  
(Interview 41, East Coast WM Supplier, 2017)

“We will just call them and inform them, say the number of chickens needed, what else they need to be flexible on depending on the needs at the centre. So far, we have done yet (referring to information from DID and relevant flooding information). We only inform them that if flood occurs, we will ask them to be prepared with the supplies”  
(Interview 28, East Coast WM DSW, 2017)

“For the recent incident in 2017, we were informed three days earlier and the officer’s calculation was quite accurate. But we standby earlier because we foresee the unexpected”  
(Interview 38, East Coast WM Supplier, 2017)

A common concern by the DSWs respondents is for the suppliers to have their supplies ready in anticipation of the flooding. This include reserving capacity either at their premise or through the supplier’s tier. As this is a silent policy as DSW will not commit to pay for the supplier’s reserve stocks in case of no flooding occurrences. However, based on the relationship nurtured and information shared, the suppliers commits to reserve the capacity either minimum or moderate to support the relief purpose:

“Yes, we had to stock these items early as early as a month or three weeks because we have been in this state for so long, so we know about the flood condition. So, during flood, we do not take any more stocks of supplies as we have already stocked it here”.

(Interview 39, East Coast WM Supplier, 2017)

“We were fortunate as our state suppliers, were supplying even at 2 o'clock in the morning. The supplier owns a big supermarket with very large stocks of supplies and were able to accommodate to our request. The supplier that we appointed could even supply up to 600 chicken a day. So, in terms of supply, we did not encounter a lot problem. Even at state level, they always back us up”.

(Interview 30, East Coast WM DSW, 2017)

The collaboration effort appears to steer a high sense of commitment and trust between buyer and supplier as indicated by the respondents (Interview 22, 27, 30, East Coast WM DSW, 2017; Interview 38 to 42, East Coast WM Supplier, 2017). Moreover, the reciprocal for such collaboration is built on honour in paying after the supplies were supplied as indicated by interview 39, East Coast WM Supplier (2017) and to foster long term relationship between the agency and the supplier for successful relief operations (Interview 41, East Coast WM Supplier, 2017; Interview 21, 22, 26, 29, 30, 31, East Coast WM DSW, 2017).

### ***Lean and agile practices***

The east coast region practices procurement through competitive bid for FOBs supplies and EFPA for continuation of supplies at DRCs, except for the state of Terengganu in which competitive-bid based FA supports both the supply for FOB and continuation at DRCs. Firstly, looking at EFPA based, leanness in term of cost containment with pricing mechanism was demonstrated with more price range and fixed price based as compared to market prices:

“The first man meal consists of packed rice with water for all the victims. Meaning if the victims are 200 in numbers, there will 200 packs of rice will be ordered and given to them. The value is not more than RM6.50 per pack”

(Interview 30, East Coast WM DSW, 2017)

“It's like this, when we supply to the forward operating base, we already knew the price, so we are prepared with the price list. But once disaster occurs, we inform KPDKK (MDTCA), so that the price fluctuations are reasonable

because MDTCA has its authority to allow incremental reserved stocks during disasters and they will monitor the prices, especially the items that are categorised under controlled price items. But there some from the eight items that do not fall under this. For example, cooking oil used to be priced at RM6, now it's at RM9, but during disaster it may go up to RM10, may be due to the logistic cost which was included as the items were sent to relief centres”

(Interview 30, East Coast WM DSW, 2017)

Secondly, in terms of cost containment through pricing, the state of Kelantan performs ad-hoc tender for supplies for the main depot, while the state of Terengganu capitalises the pricing through a contracted price for one year to support the districts:

“That is the reason I said earlier that for ad hoc tender, you cannot rely so much on gaining profit. With a smaller profit in mind, the work will still be done. The goal of the ad hoc tender is to help people”

(Interview 41, East Coast WM Supplier, 2017)

“We want these suppliers not only supply during the pre-disaster period but also during the occurrence of flood to all the districts that are involved. For example, in the district of Kemaman, once there are shortages of rice during flood occurrence, the suppliers that were appointed at state level must sent our orders in quantities to the district. Just that in the district level, say there is a scenario of floods that involves up to 7 districts, and the state suppliers could deliver but not immediately and that this item is required urgently, so that is why We allow for them to purchase at district”

(Interview 30, East Coast WM Supplier, 2017)

Next, concerning leanness through quality, overall the respondents from the East Coast WM region regards highly of quality adherence. For example, the DSWs argues that quality adherents are performed on ensuring compliance of specification by the supplier, receiving the items from supplier and checking by the Health Department (Interview 23, 26, East Coast WM DSW, 2017). Some items intended for FOBs which was near expiry date are returned immediately (Interview 24 East Coast WM DSW, 2017). Similarly, the supplier's responses on quality adherence reflects on meeting the specification given by the DSW (Interview 38, 40 East Coast WM Supplier, 2017) with additional comments on experience on supplying of fresh/raw food to other agency helped in dealing with the needs of quality for disaster victims (Interview 41, East Coast WM Supplier, 2017).

By the same token, agility viewed from the perspective of flexibility and timeliness of delivery entails more positive responses. Firstly, with regards to meeting flexibility due to volatility of food items demands which is in tandem with the fluctuation of the number of victims, DSW explains that although the numbers of victims could be ascertained at some point of time, they are not too rigid and would allow some contingencies for the order and that the suppliers are able to meet the required amount (Interview 30, 28 East Coast WM DSW, 2017). In addition to meeting the volume, Interview 26, East Coast WM DSW (2017) also revealed that their suppliers were flexible to perform late night deliveries. Apart from this, suppliers of the East Coast WM region also indicated that they had no problem in meeting the volume with reciprocal payments, on-going communications and support from tier suppliers (Interview 38, 39, 41, East Coast WM Supplier, 2017). Also, in terms of items medication on specification, a supplier also indicated that even to change the specification of the items to be delivered will be possible if sufficient time is given (Interview 42, East Coast WM Supplier, 2017).

Next, agility based on timeliness perspective also receive favourable response by the respondents with most indicating on-time to fast delivery. For small scale floods, DSWs informed that they have not receive any complaints from the victims and that delivery is either by the suppliers or with the help of their strategic partner agencies to assist on the delivery (Interview 22, 25, 30 East Coast WM DSW, 2017). Whilst, for big flood cases, the procurement is centralised at the DSW HQ and delivery will be made via aircraft and for local suppliers, they had to work longer hours to ensure delivery within 24 hours (Interview 26, East Coast WM DSW, 2017; Interview 39, East Coast WM Supplier, 2017). In addition, the suppliers also indicated that most of them have transportation to ferry the items and that usually they will not charge on transportation unless it is on ad hoc basis (Interview 39, 40, 41, East Coast WM Supplier, 2017).

Correspondingly, for the East Coast WM region, it could be ascertained that the SCM performance may possibly be distinguished between being lean and agile, and, leagile based on postponement. Based on scenario presented for the state of Kelantan, the

SCM practices suggest leanness in the procurement and supply of dry food items for the main depot and for district FOB supplies, and as postponement occurs at the FOBs followed by the determination of intensity of floods and determination of DRCs occupants, the SCM process appears in tandem with leagility. The use of EFPA becomes significant for the supplies of more than 3 days for the purchase of raw/fresh food, in which agility is seen as noteworthy. Similar pattern is noticed in the state of Terengganu, which in fact have a continuous supply of both dry and raw/fresh supplies for the DRCs, with the FA in force for 1-year period involving large suppliers. In contrast, for the state Pahang, the SCM approach appears to support leagility for the FOBs for 3 days and 7 days in remote areas, however as there is no back up of supplies either through contractual or storage, the food supplies thereafter is more likely inclined to agility through EFPA process.

## **East Malaysia Region**

East Malaysia region consist of the state of Sarawak and Sabah. Both states occupy 198,447 square kilometres or 60% of the total land area of Malaysia of 330,603 square kilo metres. The Sarawak state alone fills 63% of the total land area of the East Malaysia region or 38% of the total land area in Malaysia. In addition to this, it is noted that the whole East Malaysia region is also affected by the same north east monsoon season. Hence, the reason for the state to be chosen for the purposeful sampling as well as the consideration taken in terms of logistical feasibility to cover both states of the region. The state was also chosen for a pilot project for this study. Notably, for the larger case study, data collected from this embedded unit of analysis comprises of two interviewee from the state DSW (Interview 1 and 2, East Malaysia DSW, 2017), six interviewee from branch DSW (Interview 3 to 8, East Malaysia DSW, 2017), two interview with suppliers (Interview 35 and 36, East Malaysia Supplier, 2017), and, five secondary documents (A, G, H, I and P, East Malaysia DSW, 2017).

### ***Nature of operations***

The state of Sarawak receives high rainfall during the northeast monsoon season. The flood in this state could be categorised as annual phenomena and occurs in phases beginning from the month of November and ending in the month of February, the following year. The flood is usually due to river overflow and in some cases aggravated by unusual high tides. Occasionally some areas are also hit by flash floods on low lying areas and usual recedes swiftly. The districts/divisions that are commonly affected by includes Kuching, Kota Samarahan, Serian, Miri, Limbang, Sri Aman, Betong, Sarikei, Sibul, Bintulu, Lawas and Mukah as shown in Figure 41. Sarawak was not badly affected as West Malaysia due to the 2014 big flood with only 23 reported incidents of flood. In fact, based on the statistic provided, the number of flood incident before the big flood phenomena fluctuates from 2010 to 2013: 2010 (31 incidents); 2011 (313 incidents); 2012 (95 incidents); and, 2013 (160 incidents). However the state encountered acute flooding in 2015 to 2016 at the southern part of Sarawak in the areas of Kuching, Bau, Samarahan and Serian with reported total evacuees of almost 8,000 people (Star 2016) , and, in the year 2016 to end of 2017 in the northern part of the state involving Miri and Limbang areas mainly due to seawater overflowing into

coastal villages and flash flood hitting inland settlements along rivers due to rainfall of 200mm in 24 hours (Then 2017).

**Figure 5:** Flood prone area in Sarawak (East Malaysia Region)



Based on the commentaries given by the East Malaysia DSWs, environment uncertainty coupled with large geographical coverage and manpower shortage are the top most quoted organisation situations in handling flood crises for this region. For instance, Interview 3, East Malaysia DSW (2016) informed that despite the early preparation made in 2011 and 2012, flood did not occur in the southern part of Sarawak. In contrast to the year 2016, DSW informed that they encountered problem on supplying sleeping aids due to irregular high number of victims (Interview 2, East Malaysia DSW, 2016). Another example given was that the occurrence of the flood happened during the peak of Chinese New Year period and this had affected the source of getting supplies as some of the suppliers were not around (Interview 2 and 3, East Malaysia DSW, 2016). Moreover, as the flood occurrence covers a vast area and, in

some cases, remote ones, the officers had to work around the clock to manage the relief activities (Interview 1, 2, 3 and 4, 6, 7, East Malaysia DSW, 2016). Respondents also argue that because of the sudden flood occurrence, lack of coordination arises between the agency, its strategic partners and suppliers usually due to chaos on the first day of relief activities (Interview 3, 6, 7, East Malaysia DSW, 2016). Notably, the respondents also hinted that the coordination improves thereafter.

As a response to the uncertainty of the environment, the DSW in total relied on early preparation which includes forecasting, sourcing, pre-positioning and nurturing buyer-supplier relationship (Interview 2, 3, 4, 6, 7 and 8, East Malaysia DSW, 2016). As can be seen in Figure 34, the State of Sarawak is vast in land area and flood occurs almost all in near coastal districts and inlands. However, high uncertainty of its occurrence clouds DSW. Hence, the Sarawak state DSW prepared the SOP to streamline the relief operations by its branch agencies which is supported by its strategic partners namely the residence office (covers a few districts), the MAF, CDF, NSC, FRDM, MRP and the Education Department (A, East Malaysia DSW, 2017). The SOP outlines the role of relevant circulars, committee roles and three phases of disaster management: Level 1 by the DO; Level 2 by the Residence; and, Level 3, by the Minister as appointed by the Prime Minister. Next, in for early preparation or pre-disaster preparation includes population profiling, identifying disaster risked area, identifying DRC and the committee roles such as registration, cooking/food, utilities, health/cleanliness, safety, activity/recreational and coordination donation aid and the volunteers.

As for the response adopted by the state DSW, Interview 2, East Malaysia DSW (2016) argues that the MOU between buyer-supplier as promoted by Ministry of Welfare, Women and Family Development, Sarawak (Heng 2011) is to ensure continuous supplies and part of the preparation before food crises occurrence. The rationale for the MOU is not in written form is that the suppliers support the disaster relief, however are worried that they could not honour the service during crises and therefore do not want to be bonded. Correspondingly, DSW also do not want to be bonded to the supplier's reserve capacity especially in the event flood did not occur. However, over time trust develops between buyer-suppliers for reserve stocks at minimal for the relief activities and this in turn reduces the need for the need Sarawak DSW to keep large stocks at the FOBs. Stocking for FOBs began in 2010, however there were incidents that flood did not occur and this created wastages which were disposed to DSW's

monthly welfare receiver. Hence, reportedly the FOBs were reduced from 100 to only 25 (Interview 2, East Malaysia DSW, 2016) and its function is to store dry food that could last up to 6 months for inaccessible remote areas as agreed by the Divisional Disaster Committee (Interview 3, East Malaysia DSW (2016).

For the 25 FOBs, based on estimation, food was purchased using the competitive bidding/direct purchase procedure and packed in modular form for the consumption of two people, at a maximum price of RM75 (some division may get cheaper at RM65 to RM70) and could last for 5 days (Interview 2, 3, 7 East Malaysia DSW, 2016; A, East Malaysia DSW, 2016). These modular were purchased and kept at the FOBs by the month of October and ranges from 100 to 200 modular packs (Interview 6 and 7, East Malaysia DSW, 2016). Meanwhile for accessible areas, once the DRCs opens, victims will be given “refreshment kit” as an early meal consisting of bottled mineral water, box drink, crackers or bun at rate of RM5 per victims. Also, during the early stage in DRC, packed food was given for each victim for five times meals at a rate of RM25 per head. Once the flood intensity is determined and the victims prolongs their stay at the DRCs, co-operative cooking will commence. For co-operative cooking, a fixed rate of RM220 for the consumption of 10 victims per day to purchase and supply items such as uncooked rice, sugar, salt, soy ketchup, fresh meat/fish/chicken, egg, fresh vegetables, instant noodles, biscuits, bread and jam, coffee, tea, cooking oil, spices, drinking water and milk powder (for children below the age of 4 years old) (Interview 2, East Malaysia DSW, 2016; A, East Malaysia DSW, 2016). The purchases for refreshment kit, packed food and co-operative at DRCs are performed via EPFA (Interview 2, 4, 6, 8, East Malaysia DSW, 2016).

The suppliers for this region are based on respective district location and ranges from single small supplier that concentrate the supplies for particular DRC supplies or possibly consisting of few small suppliers to a large single supplier. The sourcing strategy focuses of preferred supplier and could collaborate with rare negotiation and short-term base. The suppliers for competitive bidding and EFPA procedures may be the same or difference as some areas lacks committed suppliers (Interview 8, East Malaysia DSW, 2016). The suppliers for the relief activity are gazetted and listed under the flood relief booklet (G, East Malaysia DSW, 2016). The appointment of these supplier was performed through sourcing activity during pre-disaster preparations, in which successful ones that could comply within the price range will

be given letter of appointment (I, East Malaysia DSW, 2016; Interview 7 and 8, East Malaysia DSW, 2016; Interview 35, East Malaysia Supplier, 2017).

### ***FA practices and collaboration pursued***

The FA features in East Malaysia region are that it is in EPFA mode and pre-approved by the district disaster committee, short-termed (for the current and specific cycle of monsoon season) with geographical location which covers either a disaster area (one or few DRCs) or for the district. Meanwhile, the FA order characteristics is that the orders are without limits (Interview 3, 6 and 8, East Malaysia DSW, 2016). The use of EPFA is used for the supply of FOB, when the supply of modular for 5 days runs out and it is also used for DRC's food supplies. The pricing of EPFA is fixed with the former RM75 per modular pack and the latter consist of set pricing, for example the refreshment kit at RM5 per person/day, packed food at RM25 per person/day and co-operative cooking priced at RM220 per 10 person/day (A, East Malaysia DSW, 2016).

In terms of collaboration, as buyer-supplier relationship is important to even-up the non-written MOU and create 'win-win' situation between DSW as the buyer and their suppliers. As mention by Interview 2, East Malaysia (2016), with such understanding with supplier, the suppliers would reserve capacity at minimal (some with moderate level reserve capacity due to flood prone) and this in turn reduces the need for DSW to keep larger stocks at their FOBs. Learning from past experience and together with the collaboration effort, the numbers of FOBs were significantly reduced to 25%. In promoting the collaboration, a mutual decision making is adapted by both parties. As price per head for daily basis needs is already known, the discussion between the parties concerns about the flexibility of the items purchased and delivery details. For example, about items flexibility, pricing and delivery:

“We have an alert mechanism about weather and flood forecast, once we sense that flood will occur, we will have meeting with our suppliers and will update for them to prepare earlier. Usually if the supplier knows earlier, they will prepare earlier for example for supplier who celebrate Chinese New Year, they already had stock reserved in their shop or at the warehouse. It's the same with other suppliers, they have also reserved some stocks at their premise. So, we would just call them and followed by fax, sometimes weekend the fax does not go through, but as we call, they are able to prepare the items and delivers”

(Interview 6, East Malaysia DSW, 2016)

“We will call them back and discuss to about the pricing because these things need to be coordinated and will not be a subject of inquiry. Even, if it’s due to distance, they would not charge because we will get agencies like CDF to pick the item and deliver it. The supplies need to be sent to us so for transit, so that we could check especially on expiry, where in some cases, supplier might have accidentally placed it. We are afraid of items that are spoilt or expired, so it must be done”

(Interview 6, East Malaysia DSW, 2016)

“Yes, because they put their "vegetables" and they cannot specify any type so they will just put vegetables. I will ask "Madam, what type you want, there is also long beans" and they will say this, I will say "this time these types are too expensive, can I change to cabbage" and they will say ok”

(Interview 36, East Malaysia Supplier, 2017)

“DSW do not take stock to use on that day, usually for the next day. Say they need certain quantities, they will order this much of fish, if today they have taken chicken. So, if they inform that base on my fish stocks are not sufficient, then I will take more stocks from my suppliers. So far, there is no problem in meeting the quantity requirement”

(Interview 35, East Malaysia Supplier, 2017)

Apart from the mutual decision making, the collaboration efforts include sharing information mainly for the preparation of stocks and reserve capacity. DSW branches in the Sarawak state early sharing of information is important however the current practise is mostly on notice as well as during the occurrence of disaster. The information shared includes a list of items send prior to flood incident (Interview 3 and 4, East Malaysia DSW, 2016), actual supplies and the required item needed (Interview 6 and 8, East Malaysia DSW, 2016). As informed by the (Interview 3, East Malaysia, 2016) that there maintained few suppliers to meet the demand needs of the DRCs or FOBs, and, the same principle was adapted by supplies as they form a conglomerate amongst them to meet the demand needs during disaster (Interview 36, East Malaysia Supplier, 2017). The suppliers also viewed that it is important for them to know the information early so that they could reserve some dry stocks and some consideration needed to keep the freshness of the vegetables and meat/chicken/fish (Interview 35, East Malaysia Supplier, 2017). At present, the perspective of sharing of information is performed as follows:

“Yeah, early information will help, but sometimes disasters are unpredictable and I know for a fact that CWD also prepares at their end. Like for this year, we did not

predict, the rain was continuously and the next the relief centres were opened. So, they came and order the next day, most importantly rice and sugar. I think they made enough estimates for the requirement at the relief centres”.

(Interview 35, East Malaysia Supplier, 2017)

“Here, we are very near to town centre and our communication system is here very good. Even if you go to remote area, we could still have WhatsApp or WeChat, certain officer who are stuck there and cannot go out from there, they could still WhatsApp me...please send me this and that, this is the proof of order for me and once the officer is back to the office, he will issue me another order list”

Interview 36, East Malaysia Supplier, 2017)

“For us, the officer in the relief centres, will inform the everyday status how many victims, normally the reporters will get update from here too, and there will be a notice board with a chart. So, this is how they will inform us that for example ...today, it had increased to 500 victims, it was 350 yesterday. All the centres will provide the records. As I am also in the Disaster Committee, so this becomes easy for me for the supply as well.”

(Interview 36, East Malaysia Supplier, 2017)

The collaboration entails commitment, trust as well as reciprocal between the parties. In terms of commitment, the operation officers in DSW branches had strong opinion of their supplier’s commitment in terms of preparing the supplies on-time, quality assurance, assisting in delivery even on holidays and odd hours (Interview 3, 6, 8 East Malaysia DSW, 2016). Equally, commitment is reflected in the suppliers’ perspective on the efforts to reserve capacity for the supplies either singularly or through a corporation of few suppliers in the same districts, and that they are willing to assist on delivery and some even view this as part of charity and not solely on earning profits (Interview 35 and 36, East Malaysia Supplier, 2017).

Next, trust and reciprocal appear to be interrelated in which the perspective of buyers that the suppliers will not withdraw as intensity of the floods rises and most importantly, able to share the sense of urgency of the relief activities as well as had adequately reserve sufficient stocks and trust is also placed on the previous good track records. (Interview 3, 5, 6 and 7, East Malaysia DSW, 2016). Correspondingly, the suppliers placed trust towards the buyer by taking risk on undocumented procedures (MOUs and the supplies without LPOs, WhatsApp based orders), reserved minimal to moderate level of capacity to honour the supplies needs and late payments which could

put them on a tight spot with their tier suppliers (Interview 35 and 36, East Malaysia Supplier, 2017). As reciprocal, the suppliers hope for the understanding of DSW for timely payment and prolonged business relationships (Interview 2, 3, 6, 8 East Malaysia DSW, 2016; Interview 35 and 36, East Malaysia Supplier, 2017).

### *Lean and agile practices*

The East Malaysia region's DSW performs competitive bids or direct purchase for the supplies of FOBs while EFPA was used for the supplies of DRCs. Leanness is gauged through cost containment based on the DSW's fixed price practices. As highlighted previously, for FOBs supplies, the price was fixed at RM75 per modular pack and in some cases with lower transportation cost in the capital and large towns, the price may be lowered to even RM65 (Interview 1 and 2, East Malaysia DSW, 2016). Apart from this, for the supplies at DRCs a fixed rate of RM5 per person/daily for refreshment kit, RM 25 per person/daily for packed food and RM220 per 10 person/daily for co-operative cooking was employed for the purchase with suppliers (A, East Malaysia DSW, 2016). Moreover, despite some fresh food items such as green vegetables possible hikes of up to 50% (Supplier 35 and 36, East Malaysia DSW, 2017), most items in dry food category are also controlled items by MDTCA. Hence, with the fixed price mechanism, cost is contained within the specified scope. In fact, the interference of MDTCA also supports in sustaining the price and reduce the risk of supplier's taking advantage during disasters. In addition, leanness is also demonstrated by the reduced number of FOBs as asserted by the respondents (Interview 2 and 3, East Malaysia DSW, 2016).

Meanwhile, leanness assessed through quality adherence reveal that the both buyer and supplier consider that quality as important element:

“This is a very subjective item. It's very dependent on the attitude of the supplier. If this supplier is really with heart of helping because the victims are really suffering with their house already flooded and the fact that they are staying there, so why at this moment we want to suffer an inferior goods to them? There are humans. So, it very much important. To me, I never compromise on the quality. You can ask around, supplied very good item to them”

(Interview 36, East Malaysia Supplier, 2017)

“So far based on the few supplies that I made, there is no problems in quality because the officer from CWD who will inspect and decide what supplies to take

(Interview 35, East Malaysia Supplier, 2017)

In addition to suppliers’ perspective, DSW informed that they just had a trivial complain on quality about being bored of the same item served to them (Interview 3, 6, and 7 East Malaysia, 2016). However, notably the DSW also mentioned of peculiar incident during Chinese New Year where the factory was closed and that the supplier had supplied poor quality diapers and expired canned foods, which were returned (Interview 4, East Malaysia DSW, 2016).

In comparison, agility is measured by the perspective on flexibility and timeliness of the supply delivery. Chiefly, DSW’s overall perspective suggest that that volume flexibility was a norm practise as the suppliers’ understood of the fluctuation in the number of victims and emphasized on communication to assist them on preparing for the supplies and engaging with their tier-suppliers (Interview 35 and 36, East Malaysia Supplier, 2017). For example:

“No problem... that one, we can cater because usually the increase would not be that huge, just small increase, so should not be a problem. If its big numbers too, we could source out.”

(Interview 36, East Malaysia Supplier, 2017)

DSW enlightened that they do not have much problems in meeting the volumes unless it was involving flood that occurs during an ethnic festival, in which the suppliers had closed their business during such time. DSW highlighted that the number of quantity of items needed was not mentioned during early discussions and experienced supplier could determine the requirement based on the possibility of occurrence and intensity of the flood. In the event that a single supplier could not supply the total number’s required, the balance will be acquired from the rest of their suppliers (Interview 3 and 7, East Malaysia DSW, 2016).

Next, agility based on the delivery timeliness entails similar positive reaction from the respondents on asserting that the delivery was on-time and fast. For instance, the suppliers view that because of the locality near disaster prone area of the suppliers whom are selected, transportation is not a drawback (Interview 35, East Malaysia

Supplier, 2017). Moreover, the suppliers also had their own transportation to support the delivery to places that could be accessed (Interview 36, East Malaysia Supplier, 2017). In addition to this, DSW informed that the delivery destination will either be to the respective DRCs, DSW's premise or to a premise for their strategic partners such as FRDM, CDF or MAF to perform the delivery with long boats or airlift (Interview 2, 3, 6 and 7, East Malaysia DSW, 2016).

Based on the respondent's perspective on East Malaysia region's lean and agile practices for the supply of the food items, it could be ascertained that the DSW's practice results in lean and agile SCM. For example, lean is due to the fact that FOBs are only intended for the inaccessible areas and the supply of item is based on modular. Moreover, the continuation of supplies will be performed with EFPA procedures as and when it is required. In contrast, agility approach could comprehend during the supplies for DRCs. In other words, EFPA procedures were utilised when the victims' starts to move into the DRCs and the supply process commences. Hence, it could be established that there is no postponement process except for the FOBs and these are stored at the respective villages. As a result, the de-coupling point could not be determined therefore the SCM process shows of no leagility.

**LIST OF CODES AND  
ASSOCIATIONS – CAQDAS  
OUTPUT**

(APPENDIX 4.6)

**Code neighbours list**

**Code-Filter: All**

---

HU: Data Analysis 2  
File: [C:\Users\User\Desktop\My Ph.D. Data\Data Analysis 2. hpr7]  
Edited by: Super  
Date/Time: 2019-01-23 10:11:02

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**Code: B-S COL COMMITMENT**

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**Code: b-s col commitment: price range**

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**Code: B-S COL NATURE**

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**Code: B-S COL RECIPROCITY**

---

**Code: b-s col reciprocity: possible**

---

**Code: B-S COL RES CAP**

---

**Code: B-S COL SHARING OF INFO**

---

**Code: B-S COL TRUST {7-0}**

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**Code: B-S RELATIONSHIP**

---

**Code: b-s relationship: preferred supplier and collaboration {20-0}**

---

**Code: b-s relationship: transactional**

---

**Code: b-s: highly collaborative & long-term contract**

---

**Code: b-s: rare nego & short-term contract**

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**Code: COLLABORATION AMONGST ACTORS**

---

**Code: collaboration amongst actors: government agencies {49-2}**

<is associated with> collaboration amongst actors: NGO

<is associated with> fa delivery time: fast

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**Code: collaboration amongst actors: NGO**

Collaboration amongst actors: government agencies <is associated with>

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**Code: Collaboration nature: Buyer dominance**

<is associated with> Proc strategy: Competitive bid

---

**Code: Collaboration nature: Mutual decision making {64-3}**

<is associated with> Commitment: High

<is associated with> Procurement strategy: EPFA for DRCs

<is associated with> Procurement strategy: FA (IFK Modular)

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**Code: Collaboration nature: Supplier dominance {1-0}**

---

**Code: Commitment: High {69-5}**

<is associated with> Reserve capacity: Minimum

<is associated with> Reserve capacity: Moderate/high

Collaboration nature: Mutual decision making <is associated with>

FA quality: high <is associated with>

Reciprocity: yes <is associated with>

---

**Code: Commitment: Low {8-2}**

Reciprocity: No <is associated with>

Reserve capacity: None <is associated with>

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**Code: COMPETITIVE PRIORITY {0-0}**

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**Code: competitive priority: agile {1-0}**

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**Code: competitive priority: leagile {2-0}**

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**Code: competitive priority: Lean {0-0}**

---

**Code: competitive priority: non-strategic {0-0}**

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**Code: FA CHALLENGES {0-0}**

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**Code: fa challenges: budget {8-0}**

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**Code: FA challenges: lack of assets {15-0}**

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**Code: FA challenges: large scale flood {40-0}**

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**Code: FA challenges: late payment {18-0}**

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**Code: FA challenges: late response {19-0}**

---

**Code: FA challenges: pre-positioning wastages {30-0}**

---

**Code: FA challenges: price hikes {15-0}**

---

**Code: FA challenges: red-tapes/finance regulation {50-0}**

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**Code: FA challenges: res cap {30-0}**

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**Code: FA challenges: supplier withdrawal {16-0}**

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**Code: FA challenges: tier-supplier {18-0}**

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**Code: FA delivery time: fast {18-4}**

<is associated with> Trust: High

Collaboration amongst actors: government agencies <is associated with>

Leagile features with postponement or de-coupling point: yes <is associated with>

Lean, agile, or lean and agile features <is associated with>

---

**Code: FA delivery time: on-time {32-1}**

<is associated with> Trust: High

---

**Code: FA delivery time: slow {5-2}**

Lean, agile, or lean and agile features <contradicts>

Sharing of information: During disaster <is associated with>

---

**Code: FA flexibility: high {55-3}**

<is associated with> Trust: High

Leagile features with postponement or de-coupling point: yes <is associated with>

Lean, agile, or lean and agile features <is associated with>

---

**Code: FA flexibility: low {0-2}**

Lean, agile, or lean and agile features <contradicts>

Proc strategy: Competitive bid <is associated with>

---

**Code: FA flexibility: moderate {15-0}**

---

**Code: FA geographical: District {12-2}**

<is associated with> Procurement strategy: EPFA for DRCs

FA geographical: Disaster location <is part of>

---

**Code: FA geographical: State {8-3}**

<is associated with> FA supplier selection: pre-approved  
<is property of> leagile features with postponement or de-coupling point: yes  
FA term: medium <is associated with>

---

**Code: FA geographical: Disaster location {6-2}**

<is part of> FA geographical: District  
Reserve capacity: Moderate/high <is associated with>

---

**Code: FA IMPROVE SUGG {0-0}**

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**Code: FA improve sugg: external {27-0}**

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**Code: FA improve sugg: management {45-0}**

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**Code: FA improve sugg: policy {49-0}**

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**Code: FA order qty: fixed order {1-1}**

Proc strategy: Competitive bid <is associated with>

---

**Code: FA order qty: minimum {0-0}**

---

**Code: FA order qty: no limit {29-2}**

Leagile features with postponement or de-coupling point: yes <is associated with>  
Lean, agile, or lean and agile features <is associated with>

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**Code: FA price: fixed price {52-2}**

Leagile features with postponement or de-coupling point: yes <is associated with>  
Proc strategy: Competitive bid <is associated with>

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**Code: FA price: market price {7-1}**

Lean, agile, or lean and agile features <contradicts>

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**Code: FA price: price range {39-0}**

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**Code: FA quality: high {29-4}**

<is associated with> Commitment: High  
Leagile features with postponement or de-coupling point: yes <is associated with>  
Lean, agile, or lean and agile features <is associated with>  
Proc strategy: Competitive bid <is associated with>

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**Code: FA quality: low {1-1}**

Lean, agile, or lean and agile features <contradicts>

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**Code: FA quality: moderate {24-1}**

Lean, agile, or lean and agile features <is associated with>

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**Code: FA SUPPLIER BASE {0-0}**

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**Code: FA supplier base: few large suppliers {5-0}**

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**Code: FA supplier base: few small supplier {36-0}**

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**Code: FA supplier base: large single supplier (trading) {5-0}**

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**Code: FA supplier base: single large with manufacturing capability {15-0}**

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**Code: FA supplier base: small single supplier {1-0}**

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**Code: FA supplier selection: pre-approved {52-3}**

<is associated with> FA: Long Term

FA geographical: State <is associated with>

Procurement strategy: EPFA for DRCs <is associated with>

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**Code: FA supplier selection: spot-approval {3-1}**

<is part of> Procurement strategy: EPFA for DRCs

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**Code: FA term: medium {6-2}**

<is associated with> FA geographical: State

Proc strategy: Competitive bid <is associated with>

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**Code: FA: Long Term {4-2}**

<is associated with> Procurement strategy: FA (IFK Modular)

FA supplier selection: pre-approved <is associated with>

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**Code: ITEMS DESCRIPTION {0-0}**

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**Code: items description: complex specs & impact Ops {6-0}**

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**Code: items description: critical to operations {21-0}**

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**Code: items description: high expenditure commodity {11-0}**

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**Code: items description: many alternatives {8-0}**

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**Code: LE AG LEA FEATURES (LEAN & AGILE) {0-0}**

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**Code: le ag lea features (lean & agile): no {0-0}**

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**Code: LE AG LEA FEATURES DE-COUP {0-0}**

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**Code: le ag lea features de-coup: no {0-0}**

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**Code: leagile features with postponement or de-coupling point: yes {6-8}**

<is associated with> FA delivery time: Fast  
<is associated with> FA flexibility: high  
<is associated with> FA order qty: no limit  
<is associated with> FA price: fixed price  
<is associated with> FA quality: high  
<is associated with> org response: buyer-supplier relationship  
<is associated with> org response: pre-positioning for FOBs  
FA geographical: State <is property of>

---

**Code: Lean, agile, or lean and agile features {3-10}**

<is associated with> FA delivery time: Fast  
<Contradicts> FA delivery time: slow  
<is associated with> FA flexibility: high  
<Contradicts> FA flexibility: low  
<is associated with> FA order qty: no limit  
<Contradicts> FA price: market price  
<is associated with> FA quality: high  
<Contradicts> FA quality: low  
<is associated with> FA quality: moderate  
Procurement strategy: EPFA for DRCs <is associated with>

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**Code: ORG RESPONSE {0-0}**

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**Code: org response: buyer-supplier relationship {48-3}**

<is part of> org response: early preparation/forecasting  
Leagile features with postponement or de-coupling point: yes <is associated with>  
Organisation situational: Environment uncertainty <is cause of>

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**Code: org response: early preparation/forecasting {81-5}**

<is associated with> Proc strategy: Competitive bid  
Org response: buyer-supplier relationship <is part of>  
Org response: pre-positioning for FOBs <is part of>  
Org response: sourcing <is part of>  
Organisation situational: Environment uncertainty <is cause of>

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**Code: org response: pre-positioning for FOBs {89-4}**

<is part of> org response: early preparation/forecasting  
<is associated with> Proc strategy: Competitive bid

Leagile features with postponement or de-coupling point: yes <is associated with>  
Organisation situational: Environment uncertainty <is cause of>

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**Code: org response: sourcing {44-3}**

<is part of> org response: early preparation/forecasting  
<is associated with> Proc strategy: Competitive bid  
Organisation situational: Environment uncertainty <is cause of>

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**Code: org response: training of staffs {3-0}**

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**Code: ORG SITUATION {1-0}**

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**Code: org situation: lack of coordination {3-0}**

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**Code: org situation: large geo coverage {23-3}**

<is associated with> org situation: limited financial  
<is cause of> org situation: manpower shortage  
<is property of> Organisation situational: Environment uncertainty

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**Code: org situation: limited financial {11-1}**

Org. situation: large geo coverage <is associated with>

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**Code: org situation: manpower shortage {27-1}**

Org. situation: large geo coverage <is cause of>

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**Code: Org. situation: Top down decision & SOP {35-0}**

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**Code: Organisation situational: Environment uncertainty {84-5}**

<is cause of> org response: buyer-supplier relationship  
<is cause of> org response: early preparation/forecasting  
<is cause of> org response: pre-positioning for FOBs  
<is cause of> org response: sourcing  
Org. situation: large geo coverage <is property of>

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**Code: Proc strategy: Competitive bid {31-10}**

<is associated with> FA flexibility: low  
<is associated with> FA order qty: fixed order  
<is associated with> FA price: fixed price  
<is associated with> FA quality: high  
<is associated with> FA term: medium  
Collaboration nature: Buyer dominance <is associated with>  
Org. response: early preparation/forecasting <is associated with>  
Org. response: pre-positioning for FOBs <is associated with>  
Org. response: sourcing <is associated with>  
Term: short <is part of>

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**Code: Procurement strategy: EPFA for DRCs {36-11}**

<is associated with> FA supplier selection: pre-approved  
<is associated with> Lean, agile, or lean and agile features  
<is associated with> Term: short  
Collaboration nature: Mutual decision making <is associated with>  
FA geographical: District <is associated with>  
FA supplier selection: spot-approval <is part of>  
Reserve capacity: Minimum <is associated with>  
Reserve capacity: Moderate/high <is part of>  
Reserve capacity: None <is part of>  
Sharing of information: During disaster <is associated with>  
Sharing of information: Early/pre-disaster <is part of>

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**Code: Procurement strategy: FA (IFK Modular) {4-2}**

Collaboration nature: Mutual decision making <is associated with>  
FA: Long Term <is associated with>

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**Code: Reciprocity: No {0-2}**

<is associated with> Commitment: Low  
<is associated with> Trust: Low

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**Code: Reciprocity: yes {21-2}**

<is associated with> Commitment: High  
Trust: High <is associated with>

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**Code: RELIEF RESP CATEGORY {0-0}**

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**Code: relief resp category: contingency {124-0}**

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**Code: relief resp category: ex-ante {15-0}**

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**Code: relief resp category: post-ante {8-0}**

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**Code: RELIEF RESP FLOOD FREQ {0-0}**

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**Code: relief resp flood freq: annually {16-0}**

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**Code: relief resp flood freq: occasionally {1-0}**

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**Code: relief resp flood freq: rare {1-0}**

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**Code: RELIEF RESP FLOOD SCALE {0-0}**

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**Code: relief resp flood scale: 2 - 3 districts {4-0}**

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**Code: relief resp flood scale: more than 3 districts {2-0}**

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**Code: relief resp flood scale: one district {10-0} ~**

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**Code: RELIEF RESP FLOOD TYPE {0-0}**

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**Code: relief resp flood type: flash flood {11-0}**

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**Code: relief resp flood type: river overflow {16-0}**

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**Code: relief resp flood type: soil blockage {7-0}**

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**Code: Reserve capacity: Minimum {10-3}**

<is associated with> Procurement strategy: EPFA for DRCs  
Commitment: High <is associated with>  
Sharing of information: On notice <is associated with>

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**Code: Reserve capacity: Moderate/high {63-4}**

<is associated with> FA geographical: Disaster location  
<is part of> Procurement strategy: EPFA for DRCs  
Commitment: High <is associated with>  
Sharing of information: Early/pre-disaster <is associated with>

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**Code: Reserve capacity: None {2-2}**

<is associated with> Commitment: Low  
<is part of> Procurement strategy: EPFA for DRCs

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**Code: Sharing of information: During disaster {19-2}**

<is associated with> FA delivery time: slow  
<is associated with> Procurement strategy: EPFA for DRCs

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**Code: Sharing of information: On notice {7-1}**

<is associated with> Reserve capacity: Minimum

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**Code: Sharing of information: Early/pre-disaster {53-3}**

<is part of> Procurement strategy: EPFA for DRCs  
<is associated with> Reserve capacity: Moderate/high  
<is associated with> Trust: High

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**Code: SOURCING {0-0}**

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**Code: sourcing: few alternatives sources {10-0}**

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**Code: sourcing: few qualified suppliers {6-0}**

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**Code: sourcing: many sources of supply {3-0}**

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**Code: sourcing: many suppliers {1-0}**

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**Code: Term: short {18-2}**

<is part of> Proc strategy: Competitive bid

Procurement strategy: EPFA for DRCs <is associated with>

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**Code: Trust: High {82-5}**

<is associated with> Reciprocity: yes

FA delivery time: fast <is associated with>

FA delivery time: on-time <is associated with>

FA flexibility: high <is associated with>

Sharing of information: Early/pre-disaster <is associated with>

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**Code: Trust: Low {1-1}**

Reciprocity: No <is associated with>

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