

Make-or-buy decisions in crisis response operations

Outsourcing logistics during the sustainment phase in a crisis response supply chain



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Faculty of Management Science

Master Thesis Supply Chain Management

Open University of the Netherlands, Heerlen

1st Supervisor: Drs. D. Hofenk

2nd Supervisor: Prof. dr. J. Semeijn

Author: Bart Sijtsma (838901936)

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Preface

This master thesis on the subject of outsourcing logistics during crisis response operations is the final piece of my study Supply Chain Management at the Open University. Writing this thesis in part-time was not easy, it took me almost 18 months to accomplish. The process of writing a thesis is exciting and something you can do by yourself. Without the help of my employer it would be impossible to finish it. I would like to thank 104 Reccesquadron for the time they gave me to study, to hold interviews and to write this thesis. The development of this thesis would also be impossible without the help and advice of my supervisors drs. Dianne Hofenk. She gave me direction and was fanatic in correcting my English grammar. I would also like to thank jhr. pr one of my lecturers at the Royal Netherlands Military Academy, for the opportunity he gave me to brainstorm about a proper thesis subject. I would also like to thank Supreme, Cordaid and the Dutch Ministry of Defense, for their cooperation and enthusiasm. My special thanks go out to Robert Jan Beck, Meindert van der Werf and Colonel Alexander Fievez. ally my girlfriend, who had to deal with an enormous mess in the study room and a lot of fun wanted study weekends.

1st lieutenant Bart Sijtsma
Army Regiment of supply and transport troops

Oosterbeek, October 2009

Summary

The political and humanitarian influence of conflict on the international community is enormous and generally results in an international intervention. An extensive humanitarian relief community has developed since the Second World War. It includes multilateral agencies such as the United Nations, Non-Governmental Organizations and Defense organizations operating abroad and providing more security and aid to conflict or disaster zones than before. There are even commercial organizations working in this relatively new market. To provide the necessary aid to people in these areas, it is essential that logisticians provide the right goods in the right place in the shortest possible time. Unfortunately, research has shown that supply chains of crisis response operations usually underperform. Operating in an environment with many stakeholders, different cultures, lacking infrastructure, crossing borders, criminality and violence, makes it even more difficult to serve customer needs. Therefore, a crisis response supply chain needs to be agile. Outsourcing logistics functions might increase the agility of a crisis response supply chain.

This explorative research approaches logistics outsourcing in crisis response operations from a supply chain management point of view. The aim of this thesis is to describe the influence of factors on make-or-buy decisions with regard to logistics during the sustainment phase of a crisis response supply chain by comparing outsourcing logistics theory with crisis response supply chains in practice.

Crisis response supply chains differ from regular supply chains in many ways. These differences demand a different way of make-or-buy decision making. Seven influence factors are identified: demand uncertainty, length of supply chain, need for agility, availability of logistic service providers, controversy about ethical and legal aspects, costs of performing in-house versus effectiveness and level of military type acceptance enforcement.

These seven influence factors were translated in propositions:

1. Demand uncertainty has a positive effect on logistics outsourcing in CROs.
2. The length of a supply chain has a positive effect on logistics outsourcing in CROs.
3. Need for agility has a positive effect on logistics outsourcing in CROs.
4. The availability of logistic service providers has a positive effect on logistics outsourcing in CROs.

5. Controversy about ethical and legal aspects of collaboration has a negative effect on logistics outsourcing in CROs.
6. A) Costs of performing in-house have a positive effect on logistics outsourcing.
6. B) The importance of supply chain effectiveness has a negative moderating effect on the relation between costs of performing in-house and logistics outsourcing.
7. The level of military peace enforcement has a negative effect on logistics outsourcing in CROs.

The propositions were addressed in three case studies. By selecting a profit (Supreme), governmental (Dutch armed forces) and a non-profit (Cordaid) organization, three important actors in conflict zones were included in this research. The key-informants were crisis response logistic experts working within the senior management of the organizations.

From the results seven conclusions can be drawn. First, demand uncertainty has a positive effect on logistics outsourcing. Second, the length of a supply chain has no (positive) effect on logistics outsourcing. Third, the results of this research show a positive relation between the need for fragility and logistics outsourcing. Fourth, limited availability of *reliable* suppliers in conflict zones has a negative effect on outsourcing logistics. Fifth, there is a positive relation between costs of performing in-house and logistics outsourcing. The need for effectiveness has a negative moderating effect on the relation between costs of performing in-house and logistics outsourcing.

The results for the following proposition show some differences between the organizations. The sixth conclusion is about the controversy about ethical and legal aspects. In case of NGOs, it is clear that the controversy about ethical and legal aspects has a negative effect on logistics outsourcing. In case of the governmental and the profit organization, the relation between controversy about ethical and legal aspects and the profit organization, the relation on the one hand and logistics outsourcing on the other hand cannot really be determined based on the results of this research. The last conclusion is about the level of military peace enforcement. For profit and governmental organizations, it can be concluded that there is a positive relation between the risk of violent attacks and logistics outsourcing. The results of the NGO, with regard to the relation between the level of military peace enforcement and logistics outsourcing, differ from the

governmental and profit organization. In case of the level of military peace enforcement and logistics so eNGOs there is no relation between the outsourcing.

Another possible influence factor could be determined from the interview results. In case of the NGO and the governmental organization there were design that the aim of stimulating local economies has a positive effect on logistics outsourcing.

The outcomes of this research contribute to managers' awareness of which factors may need to be considered when making a logistics make-or-buy decision. This research shows that not only lower costs or higher service quality are important, but that there are also other factors which might need to be taken into account. Only with this knowledge they are able to understand the influence of the factors and it helps them to consider the make-or-buy decisions carefully, which ultimately prevents decision making based on ignorance. The differences in approach between the organizations create opportunities for all companies to learn from other kinds of organizations operating under the same circumstances. This research specifically focuses on CROs. However, since global chains, the number of multinationals operating in undeveloped and up coming markets is growing. Undeveloped markets are quite similar to Crisis Response markets, which means that the results of this research will also be useful for logistics make-or-buy decisions in undeveloped markets.

This research has an exploratory nature, therefore, the evidence provided is not enough to draw indisputable conclusions. However, the interview results provide some initial evidence to support or reject the propositions that were formulated and they give a first insight into this relatively new area of management science. The use of limited cases and key-informants in combination with limited availability of literature might have consequences for the reliability and validity of the results. Therefore, findings cannot be generalized to all make-or-buy decisions in CROs. Further research is needed to replicate and validate the results of this study. Further research, with a larger number of key-informants from different kinds of organizations, should focus on the differences between non-governmental, governmental and profit organizations with regard to outsourcing logistics in crisis response operations. In conclusion, it will be valuable to explore more supply chain management aspects of crisis

response operations. It would be interesting to see how the differences between crisis response supply chains and regular supply chains influence partner selection, relationship management or buyer-supplier dependency, among others.

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1. Introduction

This chapter describes the context of the research, the research questions and the relevance. Therefore it contributes to the fundamentals of this master thesis by giving direction and creating understanding for the reader.

1.1. Problem definition

Iraq, Afghanistan, Sudan, Bosnia, Kosovo, Sierra Leone are some of the examples of conflicts which took place after the Cold War. After this period of bipolarity, world politics have changed and the nature of conflicts became increasingly asymmetrical (Kirkelsetal., 2004). This means that regular armed forces will face irregular opponents, whose tactics are characterized by guerilla techniques, hit-and-run actions, merging into the civilians society and fighting with an ideological mind set. The political and humanitarian influence of these conflicts on the international community is enormous and generally results in an international intervention. It may sound strange, but these conflict zones are a huge potential business sector. This is shown by the combined budget in 2004 of the ten largest aid organizations in the world, which exceeded 14 billion US dollars (van Wassenhove, 2006). Almost every government in the world is involved either as a donor or recipient of crisis response operations (Kovacs & Spens, 2007).

An extensive humanitarian relief community has developed since the Second World War. It includes multilateral agencies such as the United Nations and the World Food Programme (Olorunjoba & Gray, 2006). Non-Governmental Organizations (NGOs) and Defense organizations operating abroad and providing more security and aid to conflict or disaster zones than before.

To provide the necessary aid to people in these areas it is essential that logisticians provide the right goods at the right place in the shortest possible time. Crisis response operations can be divided into three phases; deployment, sustainment and redeployment (Leidraad Doctrine Publicatie, 2000). Logistics efforts account for 80 percent of humanitarian aid operations and the only way to conduct a successful operation is through efficient and effective supply chain management (Kovacs & Spens, 2007). Unfortunately, research has shown that supply chains of crisis response operations usually underperform,

which results in wrong goods at the wrong place at the wrong time (Pettit & Beresford, 2005).

Operating in an environment with many stakeholders, different cultures, lacking infrastructure, crossing borders, criminality and violence, makes it even more difficult to serve customer needs. All these aspects have resulted in serious disruptions to supply chain activities. Unsurprisingly, the humanitarian business supply chain is, unlike the regular business supply chain, often unstable (Olorunjobi & Gray, 2006). In these situations 'business as usual' is not always an option (Christopher & Peck, 2004). The humanitarian supply chain is the ultimate sense-and-responses supply chain (Thomas & Kopczak, 2005) and therefore it needs to be agile and resilient. This means that an organization should be able to thrive in a continuously changing, unpredictable business environment and that the supply chain should be able to return to its original state or move to a new, more desirable state after being disturbed (Christopher & Peck, 2004; Prater et al., 2001). To understand supply chain agility Prater et al. (2001) broke down the supply chain into three basic segments, see Figure 1.

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different cultures, lacking infrastructure, crossing borders, criminality and violence, makes it even more difficult to serve customer needs. All these aspects have resulted in serious disruptions to supply chain activities. Unsurprisingly, the humanitarian business supply chain is, unlike the regular business supply chain, often unstable (Olorunjobi & Gray, 2006). In these situations 'business as usual' is not always an option (Christopher & Peck, 2004). The humanitarian supply chain is the ultimate sense-and-responses supply chain (Thomas & Kopczak, 2005) and therefore it needs to be agile and resilient. This means that an organization should be able to thrive in a continuously changing, unpredictable business environment and that the supply chain should be able to return to its original state or move to a new, more desirable state after being disturbed (Christopher & Peck, 2004; Prater et al. (2001) broke down the supply

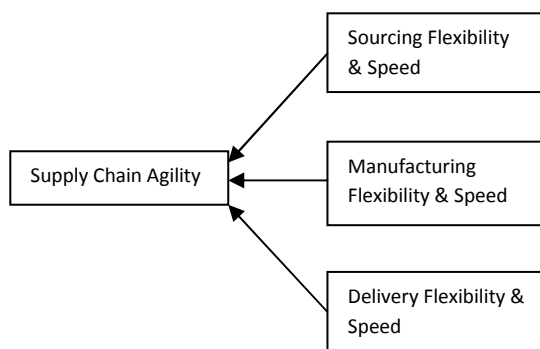


Figure 1: Supply Chain Agility

The combination of these supply chain segments (i.e. sourcing, manufacturing and delivery) on the one hand and speed and flexibility on the other lead to the definition of supply chain agility. If the speed and flexibility of one of these segments increases, the level of supply chain agility increases. Therefore, flexibility and speed are important components of the agility of a supply chain.

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As crisis response operations become increasingly complex not only collaboration between governments and NGOs, but also collaboration through partnerships with private

complex not only collaboration through partnerships with private

business will become more and more important (van Wassenhove, 2006). It can be concluded that outsourcing logistics functions might increase the agility of a crisis response supply chain.

Supply Chain Management is about supply chain participants sharing a strategic orientation toward synchronized intra-firm and inter-firm operations and capabilities to create customer value (Boer et al., 2006). The increased number of partnerships resulted in more flexible organizations concentrating on their core competencies and reducing logistic costs. Outsourcing and supply chain management are integrating when supply chains are optimized by thinking beyond organizational boundaries and establishing partnerships.

For many decades organizations have gone through a process of restructuring, building flexibility and reducing costs by contracting out services and activities traditionally provided in-house. Outsourcing has grown to an important issue for many organizations. Some authors have indicated that logistics outsourcing has become a rapidly growing source of competitive advantage and logistic cost savings. It is reported that some firms routinely have achieved up to 30% to 40% reductions in logistic costs and have been able to greatly streamline global logistics processes as a consequence of outsourcing (Rabinovich et al., 1999).

Due to its multi-disciplinary nature, outsourcing has been approached from different views such as economics, purchasing, accounting and strategic management (Canez et al., 2000). However, previous research primarily paid attention to outsourcing logistics in a regular business environment. As Christopher & Peck (2004) recommended, further research should pursue in detail the trade-off between the different risks associated with the make-or-buy decision. Especially in crisis responses supply chains, where managers face extraordinary aspects and risks that may influence the make-or-buy decision, further research could be very useful.

1.2. Research objective and practical relevance

The aim of this thesis is to describe the influence factors on make-or-buy decisions with regard to logistics during the sustainment phase of a crisis response supply chain by comparing outsourcing logistic theory with crisis response supply chains in practice.

The results of this research contribute to understanding the make-or-buy decision during Crisis Response Operations. For this reason it supports managers of governments, relief and commercial organizations with outsourcing decisions under circumstances other than 'business as usual'. Crisis response supply chains differ from regular supply chains in many ways. These differences might demand a different way of make-or-buy decision making. This research identifies the influence factors and how these factors affect make-or-buy decisions. It is important for managers operating in crisis response operations to become acquainted with these influence factors. Only with this knowledge they are able to consider the make-or-buy decisions carefully, which ultimately prevents decision making based on ignorance.

This research is specifically focusing on crisis response operations. However, since globalization will lead to more than overseas supply chains, this framework could also be useful for multinationals operating in undeveloped and upcoming markets, such as Shell, DHL, VAL, Procter & Gamble and Akzo Nobel.

1.3. Research model

A research model is a schematic overview of the different steps leading to the research objective (Verschuren & Doorewaard, 2000), see *Figure 2*.

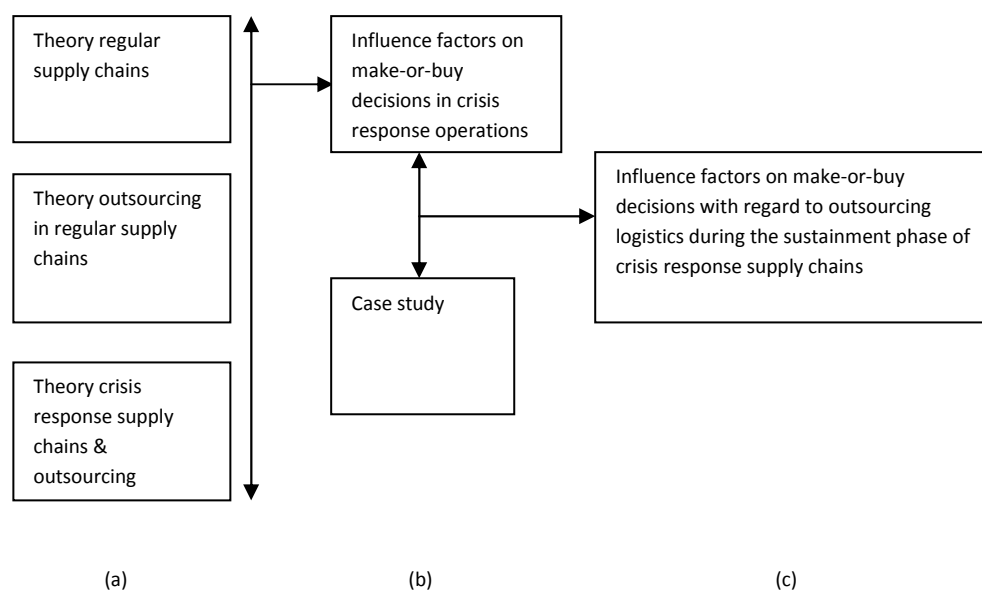


Figure 2: Research model

(a) Studying, comparing and analyzing the available literature on supply chains, outsourcing and supply chains in crisis response operations results in an overview of influence factors on make-or-buy decisions with regard to logistics in crisis response supply chains (b) These factors will be put to the test by conducting a case-study of supply chains in crisis response operations (c) The definitive influence factors can be determined by analyzing the results of the confrontation between literature and reality.

1.4. Research question

The research objective will be achieved by answering the research question. This question can be derived from the research model, see *Figure 2*. In this research the following central questions need to be answered;

1. *What are the influence factors on make-or-buy decisions with regard to outsourcing logistics during the sustainment phase of crisis response supply chains?*
2. *How do these influence factors affect the make-or-buy decisions?*

It is important to note that only the specific influence factors for crisis response operations will be discussed. The general influence factors on make-or-buy decisions will be identified in the theoretical chapter, but will not be part of the empirical research.

1.5. Structure

This research starts with a theoretical chapter, chapter 2, which analyses relevant literature and results in a set of propositions. The research methodology will be further explained in chapter 3. Chapter 4 presents the research results and at the end of this research, in chapter 5, the conclusions will be presented.

2. Theory

This chapter reviews supply chain and outsourcing literature and will be the basis for answering the research question from a theoretical point of view. The first paragraph is a reflection on regular supply chain management and its relation with outsourcing. The second paragraph discusses outsourcing theory and derives important factors in the outsourcing decision-making process in a regular business environment. Finally, the scope of this chapter will be transferred from a regular business environment to supply chain management and outsourcing in conflict zones. The aim of this chapter is to present an overview of factors, the propositions, that influence the make-or-buy decision regarding logistics in conflict zones, which will be presented in the last paragraph.

2.1. Supply chains in regular business environments

For many years, supply chains have been considered as a simple channel of distribution. From this perspective, the focus of channel management was on making each firm in the distribution channel more efficient and productive, which is known as sub-optimization (Lancioni, 2000; Ploos van Amstel & Goor, 2002). With the rising of the supply chain management concept, the focus changed from an intra-functional vision to a concept of direct, extended coordination of operations across the entire supply process. The key is the integration of operations of both internal and external suppliers (Schary & Skjott-Larsen, 2001). Mentzer et al. (2001) presented an overview of all the varieties of definitions of supply chain management. In this research the definition of Cooper et al. (1997), which is simple and robust, will be used:

“Supply chain management is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers.”

All participants have to acknowledge and strive for the common objectives of the entire supply chain; serving customer needs instead of striving for optimization of the firm's own operations only (Ploos van Amstel & Goor, 2002). Mentzer et al. (2001) used a model, see *Figure 3*, to illustrate a supply chain and all its components. This regular business supply chain can be pictured as a pipeline with

different supply chain flows (products, services, information, etc.). The traditional business functions (marketing, sales, research, finance, etc.) manage these flows from the supplier's supplier through the customer's customer to ultimately provide value and satisfy the customer. The figure also shows the critical role of customer value and satisfaction to achieve competitive advantage and profitability for the individual companies in the supply chain, and the supply chain as a whole. Another important factor is the global environment, which influences the strategic decision-making process and the structure of the supply chain (Mentzer et al., 2001).

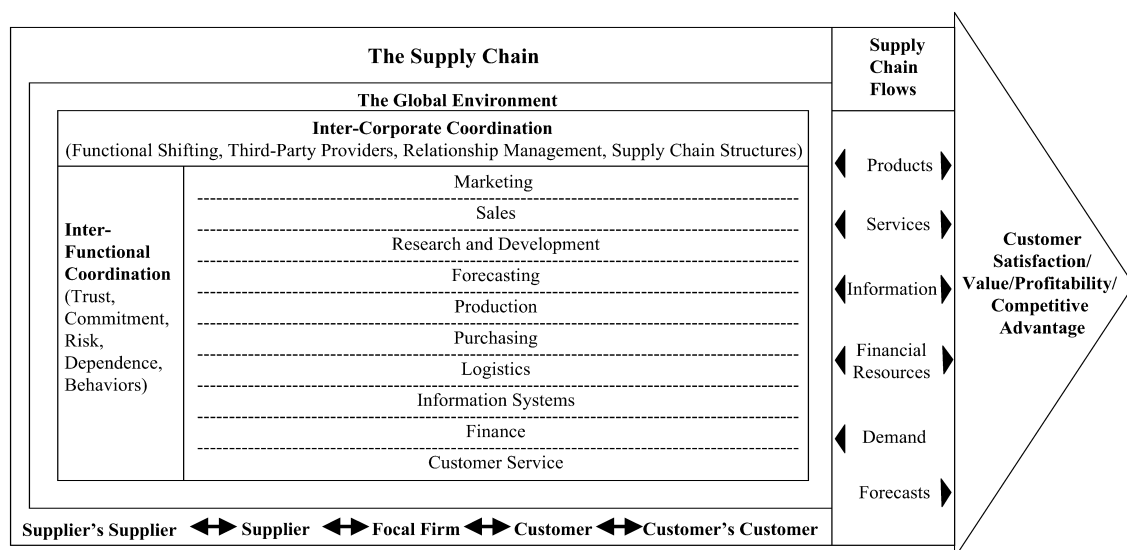


Figure 3: The supply chain in regular business (Mentzer et al., 2001)

There are many reasons for the popularity of this concept, which may be traced to trends in global sourcing: an emphasis on time and quality -based competition, and the greater environmental uncertainty. Customers demand that products are delivered faster, exactly on time, and with no damage. Each of these makes closer coordination with suppliers and distributors necessary. This global orientation and increased performance-based competition, combined with rapidly changing technology and economic conditions, all contribute to marketplace uncertainty. This uncertainty requires greater flexibility in the supply chain, which in turn demands greater flexibility in supply chain relationships (Mentzer et al., 2001).

Turbulent and volatile markets are becoming the norm as life-cycles shorten and global economic and competitive forces create additional uncertainty. To be reliable in an

uncertain and changing environment, firms must be able to quickly respond to changes. The ability to do this in a useful time frame is called agility. Agility is needed in less predictable environments where demand is volatile and there is a requirement for variety is high (Christopher, 2000; Christopher & Peck, 2004; Prater et al., 2001).

2.1.1. Outsourcing

Outsourcing has received a lot of attention in various streams of literature. Examples of these streams are transaction cost analysis, the resource-based view, strategic management and evolutionary economics. Furthermore, it can be found in literature on ICT, human resource management, operations research, accounting and logistics (Canez et al., 2000; de Boer et al., 2006). Outsourcing can be defined as acquiring services from external service providers (Grover et al., 1994). For organizations the potential number of outsourcing decisions is enormous. Besides cost and profitability considerations, sourcing decisions also involve consideration of strategic issues, detailed financial evaluation, efficiency and risk dimensions relating to supplier quality, lead times and delivery reliability. When all of these factors are taken into account, a sourcing decision can be highly complex, one that impacts on profitability, investment decisions and competitive position. A wrong decision can lead to higher production costs, misuse of resources and lost opportunities, customers and market shares (Tayles & Drury, 2001). In some articles, the terms outsourcing and make-or-buy are used as synonyms, which may lead to misinterpretations. Therefore, it is needed to clarify the relationship between both terms. In general, the following steps in the outsourcing process can be distinguished, see *Figure 4*. This research is only focusing on the make-or-buy analysis, which is one part of the outsourcing process.

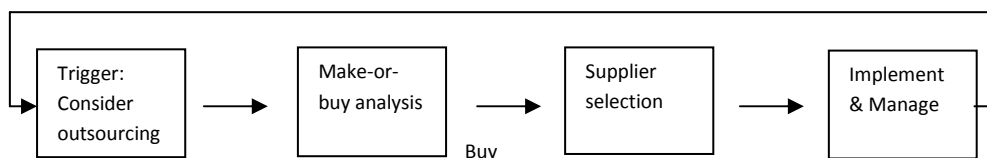


Figure 4: The outsourcing process

From the literature review, two mainstreams of the ory can be identified. The first stream aims at answering the make-or-buy question from a cost viewpoint. These second stream approaches make-or-buy from a strategic perspective, acknowledging other factors in addition to costs (Canez et al., 2000).

The conceptual basis for outsourcing is Williamson's (1975) theory of transaction cost analysis. Transaction cost analysis combines economic theory with management theory to determine the best type of relationship a firm should develop in a marketplace. The idea of transaction cost analysis is that the properties of a transaction determine which governance structures should be used; market, hierarchy or alliance. Transactions are characterized by asset specificity, uncertainty and frequency. For example, if asset specificity and uncertainty are low, and transactions are relatively frequent, transactions will be governed by markets. High asset specificity and uncertainty lead to transactional difficulties resulting in transactions held within the firm, in other words vertical integration (McIvor, 2000).

Cost analysis of the outsourcing decision involves attempting to measure all the important costs associated with the two alternatives: perform in-house or outsource. McIvor (2000) states that many authors tried and failed to design a cost calculation which is able to produce a clear marginal decision in either direction. The problem with sourcing decisions is primarily based on costs which is increased by the inadequate costing systems that many companies have.

The second stream of research has emphasized the need to adopt a more strategic focus. A term that is frequently used in recent literature on strategic sourcing is 'core competence' (Prahalad & Hamel, 1990; Quinn & Hilmer, 1994; Sink & Langley, 1997). These researchers argue that core competences should be performed internally and non-core activities should be outsourced. While there are many ways to define core competence, Prahalad & Hamel (1990) suggest at least three tests. A core competency should provide potential access to a wide variety of markets, make a significant contribution to perceived customer benefits and be difficult for competitors to imitate. According to Fill & Visser (2000), a more focused organization is imperative for competitive success. Companies that continue to make sourcing decisions solely based on cost will not survive. Thus, by combining strategic aspects with cost analysis, organizations are better positioned to make

outsourcing decisions that bring them close to the longer term goals (Fill & Visser, 2000).

Several meta-studies (Canez et al., 2000; de Boere et al., 2006; Fill & Visser, 2000; McIvor, 2000; Tayles & Drury, 2001) tried to present a complete model which is able to support the make-or-buy decision. In this research, an overview of most complete models will be presented, see *Annex A*. Most models, except the one from de Boere et al. (2006) basically consist of a limited number of steps. Common aspects, although not necessarily appearing in similar steps and/or in all models are:

1. Core competences and strategy
2. Cost analysis
3. Analysis of external environment (suppliers and competitors)

2.1.2. Outsourcing logistics

In recent years, much has been written about outsourcing logistics activities. Various terms have been introduced to describe the outsourcing phenomenon, such as third-party logistics and logistical alliances (Berglund et al., 2000). However, there is not much literature on the make-or-buy decision regarding logistics. Most of the research focuses on supplier selection, dynamics in partnerships, implementation and buyer-supplier relationships. Only a few articles discuss the first and most crucial step, the make-or-buy decision itself.

Developments in business logistics increased the need for outsourcing (Razzaque & Sheng, 1998; Sink & Langley, 1997). In general the following developments can be identified:

1. Globalization of business: the continuing growth in global markets and foreign sourcing has placed increasing demand on the logistics function. Consequently, this has led to more complex supply chains. Lack of specific knowledge of customs and infrastructure of destination countries forces firms to acquire the expertise of third-party logistics providers.
2. Just-In-Time (JIT): the complexities and costs of operating in a JIT environment are prompting many of its potential adopters to supplement their own resources and expertise by using sources outside their corporate structure.

3. Emerging technology: developing and implementing new technologies in-house is time consuming and expensive.
4. Versatility of third-parties: third-parties provide firms with improvements in flexibility, control, technology, and location and turning fixed costs into variable costs.

Several studies on outsourcing logistics suggest a number of driving forces that encourage firms to outsource logistics functions, but they also warn for obstacles and problems that might occur (Bagchi & Virum, 1998; Berglund et al., 2000; Rabinovich et al., 1999; Razaque & Sheng, 1998; Sink & Langley, 1997). Next, an overview of the benefits and concerns with regard to outsourcing logistics will be presented, see *Table 1*;

Benefits of outsourcing logistics	Concerns about outsourcing
<ol style="list-style-type: none"> 1. Allows companies to focus on core competences. 2. Improves competitive position by: <ol style="list-style-type: none"> a. Improving strategic flexibility in adapting market changes b. Improving customer service quality (specific expertise and experience) c. Improving on-time delivery d. Reducing (inventory) costs e. Reducing capital investments in facilities, IT, equipment and manpower f. Higher customer satisfaction g. Adding measurable value to products h. Assisting in opening new markets i. Providing dedicated resources j. Enabling to offer an extended product/service range 3. Management is able to focus on strategic planning, management issues and on their core business competency, rather than on logistics. 	<ol style="list-style-type: none"> 1. Loss of control 2. Lacking advanced IT for linking all the participants 3. Failure to select or manage providers properly 4. Lack of understanding the buyer's business goals 5. Difficulty of changing provider 6. Poor performance 7. Inadequate knowledge 8. Over-dependence on single provider

Table 1: Benefits and concerns with regard to outsourcing logistics (Bagchi & Virum, 1998; Berglund et al., 2000; Rabinovich et al., 1999; Razaque & Sheng, 1998; Sink & Langley, 1997)

After reviewing the relevant literature, it can be mentioned that influence factors on outsourcing in general and logistics outsourcing are quite similar. However, there seems

to be a difference in approach between the first and the last one. The stream of logistics outsourcing underlines the need for selection criteria and relationship management. The stream of general outsourcing more strongly emphasizes the strategic aspects of outsourcing and takes into account costs and the internal and external environment. This approach is more focused on the make-or-buy decision itself and identifies more concrete influence factors.

Combining the influence factors of the two research streams has resulted in the following model, see *Figure 5*.

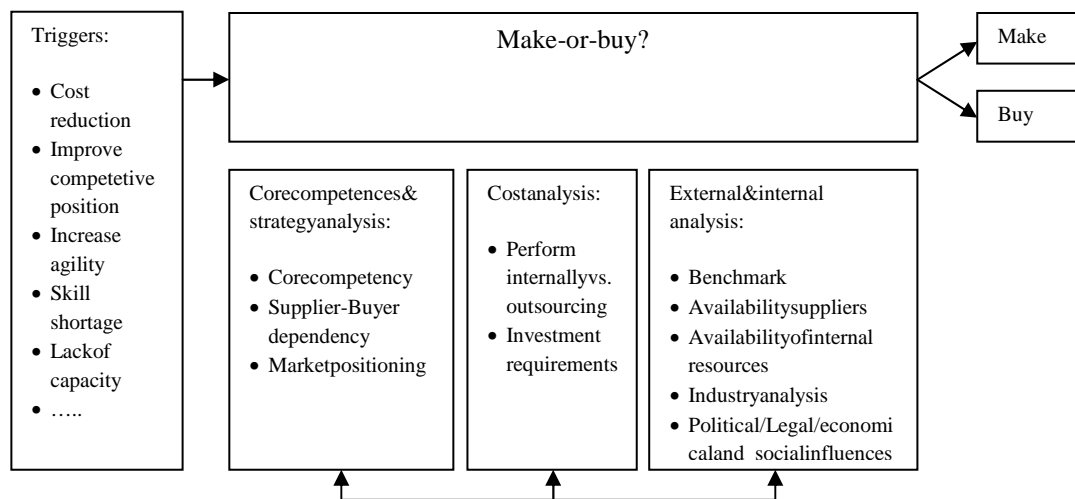


Figure 5: Factors influencing the make-or-buy decision with regard to logistics outsourcing in regular supply chains

It is important to note that the three analyses are influencing each other during the decision making process.

2.2. Supply chain management and outsourcing during Crisis Response Operations (CROs) in conflict zones

As the nature of conflict is becoming increasingly asymmetrical, a trend can be observed in which logistics acquires a more and more central position as a means to react responsively everywhere, in any circumstance (Kirke et al., 2004). In asymmetric conflict the enemy's statics are based on 'being unpredictable'. Therefore, logistics

support should focus on agile networks, which consist of permanent or ad hoc collaboration (Vermunt & Thoolen, 2004).

It is important to define the term Crisis Response Operations:

'Operations aiming at controlling, preventing or restricting a crisis' (Doctrine commissie Koninklijke Landmacht, 1996)

Thereby, a crisis is considered as:

'A crisis arises when there is a turning point in the relation of a state with another (inter)national actor, somewhere in the continuum from peace to war.' (Doctrine commissie Koninklijke Landmacht, 1996)

The term CRO is allied with the well known term Peace Operations. In case of peace operation the military aspect is often underlined. This research is also focused on civilian organizations working in crisis response areas. Therefore, the more neutral term CROs instead of Peace Operations is chosen.

CROs consist of a number of phases with different characteristics. This research focuses on the phase that follows after the immediate response, the so-called sustainment phase. This phase has more similarities with a regular business environment than the initial deployment phase. The following stages in CRO can be determined, see *Figure 6*.

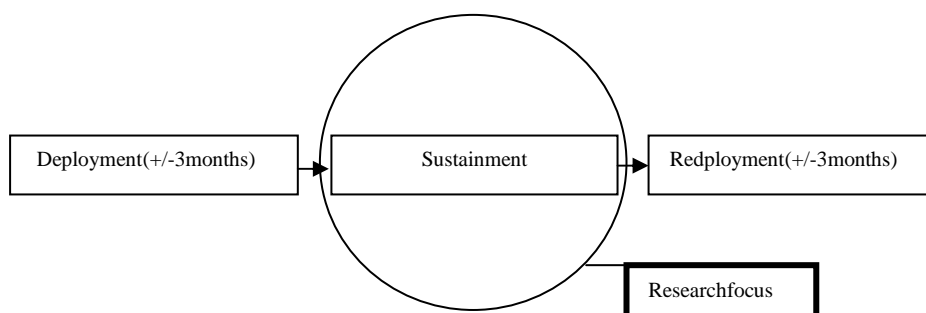


Figure 6: CRO stages (Doctrine commissie Koninklijke Landmacht, 1999)

In these kind of operation there are a lot of different actors performing their activities. The following supply chain actors in CROs can be distinguished, see *Figure 7*.

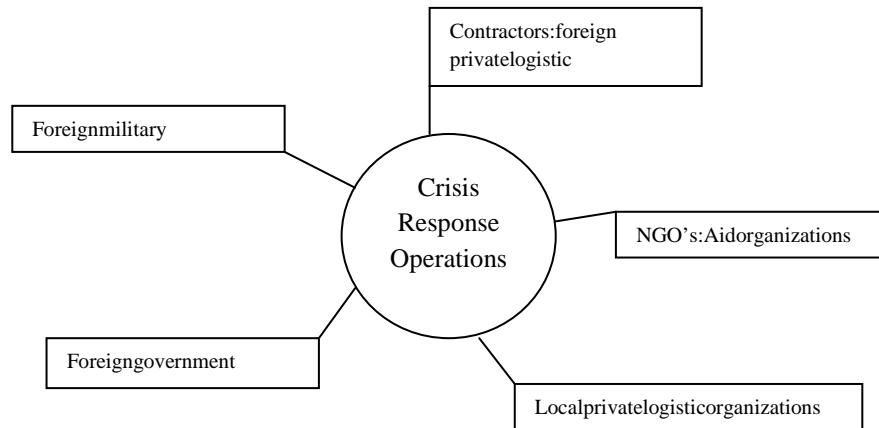


Figure 7: Logistic actors in CROs (Kovacs & Spens, 2007)

All these actors have the ability to collaborate with each other, but in this research the collaboration between government, military and NGOs, the so-called Civil Military Cooperation (CIMIC), which is focused on collaboration to increase the effect of the strategic operation, will be outside the research scope. This research primarily focuses on the logistic collaboration between the military, NGOs and (local) private companies. The business environment influences the way of positioning a business. For example, a company working in a stable environment with a predictable homogeneous demand will probably choose for standardization instead of customization. The business positioning of organizations working under crisis response circumstances, mostly government and NGOs, is both similar to and different from regular business. The main similarity is that they both want to focus on an optimal business positioning to maximize the ratio between effectiveness and efficiency. However, in CRO effectiveness has priority over efficiency if a disruption takes place. In case of such disruption, the optimal business positioning will no longer be leading (Vermunt & Thoolen, 2004). Especially the presence of military forces brings up another discussion. In recent years, there has been an ongoing debate about the legal and ethical aspects of hiring Private Military Companies (PMCs) in conflict zones. PMCs as a commercial organization trying to make profit where governments and NGOs are trying to provide aid to the region.

These companies provide a wider range of services, from fully armed battalions to maintenance and catering services. If personnel of PMCs participate in military operations, it seems that a new era of mercenaries develops. What is going to happen if they get involved in war crime? Which law is going to judge them? It is acknowledged that there is a difference between hiring 'fighting services' and logistic services. The Dutch government provides some legal guidelines for hiring PMC services, which are sufficient to close the accountability gap (AIV, 2007). When comparing regular supply chains with supply chains in CROs, there are some significant differences. Supply chains in CROs are characterized by:

1. Long supply chains
2. High demand uncertainty
3. Need for agility
4. High chance of disruptions
5. Changing security situation
6. Third-country standards (demand and supply)
7. Lacking infrastructure

(Christopher & Peck, 2004; Cottam et al., 2004; Kovacs & Spens, 2007; Olorunjoba & Gray, 2006; Pettit & Beresford, 2005; Prater et al., 2001; Sheffi, 2001; van Wassenhove, 2006; Vermunt & Thoolen, 2004)

Besides these main factors, there are some characteristics which are only mentioned in a specific study, *Table 2* gives an overview.

basis for this case-study. It is important to keep in mind that there is a possibility that there are influence factors that are still unidentified.

The characteristics that might have an influence affect the outcomes of all three analyses: strategy, cost and external and internal (see *Figure 5*). For this research it is important to describe the influence factors which are unique to crisis response supply chains. This means that the general influence factors will not be researched.

The degree of logistics outsourcing is the dependent variable. This variable depends on the influence factors, which are the independent variables.

The propositions that are formulated are solely based on plausible causal relations derived from theory:

Strategy analysis:

- Demand uncertainty

CRO supply chains are characterized by an unpredictable demand for goods and services (Christopher & Peck, 2004; Cottam et al., 2004; Kovacs & Spens, 2007; Olorunjoba & Gray, 2006; Pettit & Beresford, 2005; Prater et al., 2001; Sheffi, 2001; van Wassenhove, 2006; Vermunt & Thoolen, 2004). Therefore, crisis response supply chains should focus on agile networks, which consist of permanent and ad hoc collaboration (Vermunt & Thoolen, 2004). This suggests that high demand uncertainty has a positive effect on logistics outsourcing.

P1: Demand uncertainty has a positive effect on logistics outsourcing in CROs.

- The length of supply chains:

The process of globalization results in long supply chains through different countries which forces firms to acquire expertise of third-party logistics providers (Razzaque & Sheng, 1998; Sink & Langley, 1997). CRO supply chains are characterized as long supply chains (Christopher & Peck, 2004; Cottam et al., 2004; Kovacs & Spens, 2007; Olorunjoba & Gray, 2006; Pettit & Beresford, 2005; Prater et al., 2001; Sheffi, 2001; van Wassenhove, 2006; Vermunt & Thoolen, 2004). This indicates that the length of supply chains has a positive effect on logistics outsourcing.

P2: The length of a supply chain has a positive effect on logistics outsourcing in CROs.

- Need for agility

As Prater et al. (2001) mentioned, outsourcing will contribute to the agility of a supply chain. The need for agility in CRO supply chains (Christopher & Peck, 2004; Cottam et al., 2004; Kovacs & Spens, 2007; Olorunjoba & Gray, 2006; Pettit & Beresford, 2005; Prater et al., 2001; Sheffi, 2001; van Wassenhove, 2006; Vermunt & Thoolen, 2004) suggest a positive effect on logistics outsourcing.

P3: Need for agility has a positive effect on logistics outsourcing in CROs.

- Availability of logistics service providers:

The limited availability of suppliers in conflict zones influences outsourcing logistics (Kovacs & Spens, 2007). If an organization knows that proper suppliers are scarce, it will concentrate more on current operations instead of thinking about make-or-buy options. In worst case scenario, when there are no suppliers available, outsourcing is simply not an option. This suggests that the availability of logistics service providers has a positive effect on logistics outsourcing.

P4: The availability of logistics service providers has a positive effect on logistics outsourcing in CROs.

- Controversy about ethical and legal aspects of collaboration:

Collaborating with questionable PMCs might have a negative effect on the image of an organization. Depending on its position in society, a company might have a vision on collaborating with PMCs. If a company wants to outsource logistics to a PMC, full attention should be paid to the legal aspects (AIV, 2007). Besides this, there is a possibility that the local suppliers have different labour standards compared to the western standards. These unique aspects might have a discouraging effect on logistics outsourcing.

P5: Controversy about ethical and legal aspects of collaboration has a negative effect on logistics outsourcing in CROs.

Cost analysis:

- Efficiency vs. Effectiveness

Companies are encouraged to outsource logistics when costs of performing in-house are higher than logistics outsourcing (Canez et al., 2000; de Boer et al., 2006; Fill & Visser, 2000; McIvor, 2000; Tayles & Drury, 2001).

P6a: Costs of performing in-house has a positive effect on logistics outsourcing.

In case of a disruption in supply chain activities, CRO effectiveness has priority over efficiency and as a result business positioning (with a focus on costs) will no longer be leading (Vermunt & Thoolen, 2004). This implies that in emergency situations costs are less important compared to normal situations. The importance of effectiveness is also demonstrated by the need for agility. Agility should not be confused with leanness, which implies doing more with less. Agility seeks for the ultimate construction of a supply chain to be flexible, fast and cheap. Sometimes it is needed to prioritize effectiveness above efficiency to fulfill customer demands (Christopher, 2000). This implies that the importance of supply chains' effectiveness has a negative moderating effect on the relation between costs of performing in-house and logistics outsourcing.

P6b: The importance of supply chain effectiveness has a negative moderating effect on the relation between costs of performing in-house and logistics outsourcing.

External/Internal analysis:

- Presence of military

According to Pettit & Beresford (2005) and Sheffi (2001) cooperating with the military during CRO is important for success. However, sometimes cooperating with the military is not an option. It might be possible that a military force is strongly present and trying to create a stable and safe environment with all its heavy military means. In this case, it is impossible for a company to deploy its activities. A company will get no access to the region and information sharing is very difficult if the level of military peace enforcement is high (Sheffi, 2001). This suggests that the level of military peace enforcement has a negative effect on logistics outsourcing.

P7: The level of military peace enforcement has an negative effect on logistics outsourcing in CROs.

A conceptual model of the propositions is shown in *Figure 8*.

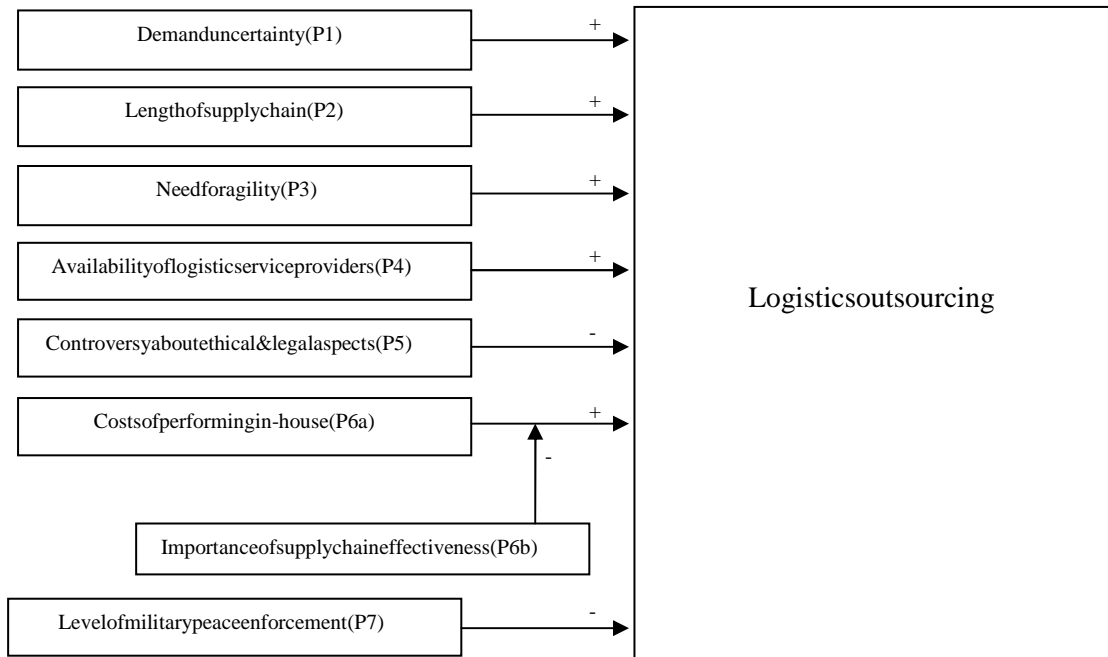


Figure 8: Conceptual model of propositions

3. Methodology

This chapter reviews the research methodology from strategy to analyzing the evidence.

3.1. Research strategy

This research is trying to approach logistics outsourcing in CROs from a supply chain management point of view. This is one of the first attempts to clarify this blind spot in management science. Therefore, this research can be characterized as an exploratory research. The goal of this exploratory research is to develop pertinent propositions to develop further inquiry. Research aimed at developing propositions is a justifiable rationale for conducting an exploratory study. This research requires no control of behavioral events and focuses on contemporary events. According to Yin (1990), these two factors plead for the use of a case-study.

3.2. Research design

Despite the small number of accessible cases, this research will be a multiple case-study. Due to the explorative character three cases are selected which are different kinds of organizations all working in CROs. This enables literal replication. After analyzing the three cases independently the results of the cases will be compared with each other, which is the so-called 'hierarchical' method (Verschuren & Doorewaard, 2000).

3.3. Quality of research design

The quality of a research design depends on its construct validity, internal validity, external validity and reliability. To increase the construct validity of this research multiple sources of evidence are used. Besides multiple sources enable triangulation. Besides the triangulation it is important to create a chain of evidence, which increases the construct validity and reliability. The chain of evidence is achieved by archiving the interview protocol, the results and finally the conclusions. This enables an external observer to follow the derivation of any evidence from initial research questions to ultimate case study conclusions. Another measure to increase construct validity is by letting the informants review the draft case study report. This review is done by the informants, which enhances the accuracy of the case study.

There are several analytic tactics to prevent a researcher from making incorrect inferences. The use of these tactics contributes to the internal validity. This research uses data matrices of Hutjes & van Buuren (1992) which support the researcher during analyzing the causal relations.

Furthermore, it is important that the research results can be generalized to other cases. The goal is to expand and generalize theories and not to analyze frequencies, this is called analytic generalization. The results can be generalized to all organizations operating in CROs. By doing a multiple case-study the external validity will increase. The goal of reliability is to minimize errors and biases in the study. The procedure of the case-study will be described to reach this goal. Besides this, all evidence will be archived in a case study database. This ultimately enables a auditor to perform a reliability check (Yin, 1990).

3.4. Units of analysis

The different organizations operating in CROs are the cases (units of analysis). The nature of the chosen cases is the most important selection criterion. By selecting a profit, governmental and a non-profitable aid organization all actors in conflict zones are part of this research. Within each case, one unit of data collection (key informant) is selected. The informants are crisis response logistic experts working within the senior management of the organizations. This results in the following overview, see *Figure 9*.

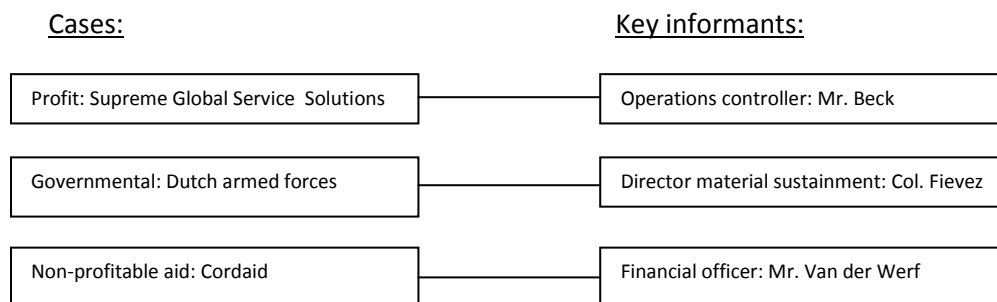


Figure 9: Case-study structure

Other selection criteria of the cases are:

- Geographical:

The organizations should be operating in conflict zones.

- Outsourcing logistics:

The organizations should have made a make-or-buy decision with regard to logistics.

- Recent:

Despite the small number of accessible cases, it is important to select recent cases. Recent data are more reliable and relevant than information from a decade ago.

3.5. Collecting evidence

In general, there are six different sources of evidence: documentation, archival records, interviews, direct observation, participant observation and physical artifacts (Yin, 1990).

The use of observation and physical artifacts in this research is not an option. These

sources are mainly used in psychology and/or anthropology. The units of data collection

in this research might have interesting documentation or archival records that can be used

in the case-study. But, the most important sources of evidence are the interviews. The

results of these different sources are combined to achieve triangulation.

The interviews are of a semi-structured nature consisting of mostly open questions that are

derived from the theoretical propositions, see *Annex B*. According to Yin (1990) there are

three forms of interviews: open-ended, focused and formal surveys. In this research the

focused interview is chosen. In this way the respondents are considered as key-informants,

which is often critical for success of a case-study. However, to ensure that in the different

interviews the same information will be asked, it is necessary to follow a certain set of

questions. In this way the benefits of the open-ended interview and the formal survey are

combined.

Interviews are held in Dutch with senior managers who are/were involved in the

outsourcing decision-making process during a crisis response operation. The interviews

were recorded and placed in a case study text database. This database is an archive which

contains all the collected data (interviews and documents) and is accessible on request.

This case study database ensures the chain of evidence and contributes to the reliability.

3.6. Analyzing case-study evidence

After collecting the data it is important to know how the data is analyzed. This research follows the strategy of relying on theoretical propositions. This helps to focus attention on certain data and to ignore other. The results of the interviews will be analyzed and compared with the theoretical propositions (Yin, 1990). The way of analyzing qualitative data is important for the reliability of the research results. After the raw data is collected the cases will be categorized by topic and source. These topics are based on the propositions that were formulated. With the results of this first step it is possible to create a data matrix per case. This matrix provides a systematic overview of concentrated data per unit of data collection in relation to the topics. Analyzing all cases in the same structured way makes it easier to compare the results afterwards. In this process of analyzing it is important to work in a structured way to the essence (Hutjes & van Buuren, 1992).

4. Results

This chapter reviews the results of the analyzed data and is essential for drawing conclusions in the next section. The structure of presenting the results is determined by the categorization of the propositions. In some paragraphs quotes from the informants are used to enhance transparency. The author translated these quotes from Dutch into English.

4.1. General

To understand the results of the interviews it is important to know in which context the companies are working and what their philosophy is with regard to outsourcing logistics.



This NGO provides humanitarian aid all over the world in 40 different countries. Two hundred and eighty employees work at the headquarters in The Hague. The Cordaid organization is structured around the programmes. There are four programme sectors: (1) participation, (2) emergency aid and reconstruction, (3) health and well-being and (4) entrepreneurship. The programme sectors have regional teams. Besides regional teams the sector emergency aid and reconstruction has a team for immediate emergencies. Thus, Cordaid focuses on healthcare, sheltering, food security and stimulating local economies. There are multiple aid organizations working in the humanitarian aid market. The aid providing organizations consider each other as possible partners instead of competitors. However, every organization tries to raise as much funds as possible. Cordaid has local partners all over the world who execute the aid operations under supervision of Cordaid. These local partners make use of products and services from the local markets as much as possible. Due to the importance of stimulating local economies, Cordaid prefers to outsource activities locally. However, it seems inevitable to outsource logistics to a western company. Therefore, Cordaid has a prime vendor contract with a logistics service supplier which provides all types of goods and services. The supply chains which are managed by Cordaid are mainly intra-continental. Global supply chains arise when the logistics service provider delivers goods. These supply chains distributed different kinds of goods, for example: food packages, medicines, vehicles, tents, etcetera.



Supreme provides goods and services in demanding environments for governments, the United Nations or other companies. Their range of services has expanded to more than just the supply of food, they also engage in complex supply chain management and logistic services. These services involve catering, retail services, fuel supply, camp building construction, commercial restaurants supply, transport logistics and technical support. Supreme has 4000 employees working all over the world. Its core competence is developing and operating customized supply chains in demanding areas, for example: Afghanistan, Nigeria and Sudan. In the near future, Supreme wants to become competitive in supplying oil and mining facilities all over the world. In contrast with Cordaid and the Dutch Armed Forces, Supreme creates value as a logistic service provider for other companies. In this market, there are approximately five serious competitors. The competition between these organizations is fierce. Supreme protects its market leader position by delivering high service levels at low costs. The global supply chains are designed and operating within 60 days. A wider range of products are distributed, for example meat from Argentina, fuel from Kuwait, trucks from Germany and rice from Japan. All supply chains are managed from headquarters in Dubai. The organization is strongly cost driven and believes in its own operational excellence. Because of this belief, Supreme prefers to perform activities in-house. However, also in this case it seems inevitable to outsource some logistic activities, mainly transport.

Defensie

This governmental organization provides peace and stability all over the world. With 68.108 employees, the ministry is one of the largest employers in the Netherlands. The ministry is organized in several business units: management staff, defense service centre, defense material organization, royal navy, royal military police, royal air force and the royal army. The organizational goals are strongly influenced by the Dutch political agenda. The structure of the supply chain strongly depends on the character of the CRO. At this moment, they mainly operate in Afghanistan. The military supply chain is managed from The Hague (strategic) and Tarin Kowt (tactical and operational). The Dutch Armed Forces have their own logistic military units with means and personnel.

The organization is willing to outsource logistics if performance increases or costs decrease (Secretaris Generaal, 2008). In Afghanistan, activities like transport, catering and facility services are outsourced to logistic service providers. The Dutch Armed Forces gave two documents which are used as a source of evidence in this research:

1. Defensie beleid over zelf doen, uitbesteden en samenwerking (sourcing beleid), aanwijzing SGA/938 (2008).
2. Civiele diensverleners in operatiegebieden, author: Colonel G.L. de Gooijer (2008)

4.2. Demand uncertainty (P1)

The theory in chapter 2 presumes that demand uncertainty has a positive effect on logistics outsourcing. All informants speak of a dynamic market in which they operate. These dynamics result in a high demand uncertainty. In case of Supreme, demand uncertainty is a result of getting insufficient information about customer needs. For example: *“10.000 extra mouths per week to feed is a big difference for us. Everybody can read the paper and is informed about the extra troops that are coming in the near future. In that stadium Supreme still hasn't heard anything from our customers. So, do we have to purchase more ingredients and transport capacity? We do not. Ultimately we get informed too late. But, the extra troops have to eat. In this case we had to fly in all the stocks. In these situations we face an unpredictable demand”*.

The demand uncertainty may cause capacity shortage which forces companies to outsource. All informants confirm that demand uncertainty has a positive effect on logistics outsourcing. For example, Cordaid: *“Because of the unsteady demand we decided to close our own logistics branch and started cooperating with a logistic service provider”*.

4.3. Length of supply chain (P2)

The theory in chapter 2 presumes that the length of the supply chain has a positive effect on logistics outsourcing. Supreme and the Dutch Armed Forces manage global supply chains from different single suppliers to end user. These supply chains make use of different transport modalities and cross more than one continent. Cordaid manages mostly short supply chains and some long supply chains. According to Razzaque & Sheng (1998) and Sink & Langley (1997) globalization results in long supply chains through different

countries which forces firms to acquire expertise of third-party logistics providers. All informants explain that globalization made the world smaller in which the length of supply chains has no significant influence on logistics outsourcing. For example quote from Supreme: *“I don’t think the length of the supply chain matters, for us the security situation is what counts”*. The Dutch Armed Forces clarify that the availability of infrastructure might have an influence. In case of Afghanistan and African countries, which are landlocked and do not have a seaport, the dependence on hiring aircrafts increases.

4.4. Need for agility (P3)

Speed and flexibility in the supply chain are inevitable for the three companies to fulfill customer needs. Supreme has built a global network of possible partners which improves agility of the supply chain. In most cases Supreme is, due to the financial situation, able to adjust the supply chain quickly. Cordaid has its own partners all over the world. These local Cordaid offices consist of primarily local people whom make use of, in general, slower, local markets. In case of an emergency need, Cordaid tends to make use of their logistic service provider. According to the Dutch Armed Forces, a network of logistics service providers enhances agility. But, in an emergency situation, outsourcing to a new partner, which is not part of the network, is not a noption. This is a result of slow mandatory governmental tender processes. Supreme is willing to outsource if there is no other option available. For example, Supreme: *“If we have to do it, we have to do it. And are we willing to outsource some activities. For example, when we have a shortage in some kind of specialized personnel. First we would try to recruit a specialist instead of outsourcing the service”*. In all cases, outsourcing logistics does not seem to be necessary for being agile. However, when agility is really needed all organizations tend to outsource logistic services more.

4.5. Availability of logistics service providers (P4)

According to Kovacs & Spens (2007), limited availability of suppliers in conflict zones influences outsourcing logistics. In Afghanistan, there is a high number of logistics service providers. However, Supreme and Cordaid state that the availability of reliable suppliers in these regions is very limited. Especially in South Afghanistan the level of violence and

attacks increase during the summer and autumn. In these high risk periods, some suppliers seem to be unreliable and refuse to deliver their service. Supreme has a lot of experience with the local transport companies in Afghanistan and learnt it the hard way. After making several wrong choices in selecting partners, they know which companies are reliable and which are not. At this moment they have a service contract with two of these local companies. Because of the risk of losing personnel and trucks, these reliable service providers are more expensive. Supreme considers alternatives, for example: “ *when there are less proper suppliers available, we will start looking for other options, making use of airplanes for example*”. Cordaid will contact their logistics service provider when there are no reliable local partners available. Reliability is also for the Dutch Armed Forces very important. But, they state that a high number of logistics service providers makes it easier to consider outsourcing, for example: “ *when company A seems to be unreliable, there might be an alternative, company B or C*”. The danger of a small number of logistics service providers is dependency. When delivery speed is needed and dependency increases, the influence of the Dutch Armed Forces to negotiate reasonable prices decreases. In case of a small number of logistics service providers, accurate contracting is required (de Gooijer, 2008).

4.6. Controversy about ethical and legal aspects (P5)

The organizations cope differently with the controversy about ethical and legal aspects. All cases acknowledge the presence of the controversy and confirm its importance. Cordaid formulates criteria regarding, for example, child labour, to which partners have to comply. In this way they try to prevent collaborating with controversial logistics service providers. Cordaid will not outsource when potential logistics service providers are not able to comply to these criteria. Supreme has to deal with non-western labour conditions and above all the exposure of personnel to dangerous working environments. These topics result in ethically and politically sensitive dilemmas. Supreme prevents these dilemmas as much as possible in the same way as Cordaid, by transparent contracting. This kind of measure does not fully prevent unwanted working conditions, for example: “ *We demand in our contracts that the identity of every driver is indisputable and that driving licenses are valid. We are not checking every driver. Okay, but what is the alternative? That one is going to cost money. We can use our airplane to fly goods. In that case we have to*

change the runways from sand into concrete. The costs will increase from 30 euro cent per kilo to 2 euro per kilo". In some situations there are expensive alternatives available to avoid these dilemmas. However, Supreme is a cost-driven organization that accepts certain risks to keep costs low. The threat of violence that results in an ethical controversy leads in case of Supreme to more outsourced logistics services, especially transport, by which Supreme thinks that also the ethical dilemmas are outsourced. The Dutch Armed Forces depend on the vision of the Dutch government. In 2007, the AIV published a report by order of the Dutch government. This report recommends showing to cope with the ethical and legal aspects of cooperating with PMCs. The Dutch government does not agree with all recommendations. The Dutch Cabinet states that contracting armed civilian companies is not forbidden in advance. But, the Dutch Armed Forces have to be cautious in contracting these kind of companies. Also, the Dutch government will not take legal responsibility for the actions of contracted civilian personnel. The Dutch government stimulates civilian logistics service providers to compensate their victims (de Gooijer, 2008). With his government vision it is legitimate for the Dutch Armed Forces to outsource logistics services, even if they hire armed personnel in exceptional situations. In case of Afghanistan, military catering is outsourced to Supreme. Reasons for outsourcing to Supreme are: outsourcing the risk of violence and saving military capacity for combat operations. Supreme makes use of civil force protection, which guards the convoys through high risk areas, to transport the goods to military camps. According to the Dutch Armed Forces the risks and the ethical dilemmas are the responsibility of the logistics service provider to whom is outsourced, in this case Supreme.

In case of Supreme and the Dutch Armed Forces, the controversy about ethical and legal aspects has less effect on logistics outsourcing than in case of Cordaid. Supreme and the Dutch Armed Forces state that ethical and legal dilemmas can be outsourced. However, they try to force the logistics service providers, by contracting, to work along western standards. Cordaid is more sensitive to ethical and legal dilemmas and does not want to cooperate with any suspicious company. The difference between Cordaid and the other two cases might be a result of the difference in organizational culture and type of organization.

4.7. Efficiency versus effectiveness (P6a+P6b)

Stimulating local economies is a priority in Cordaid's business model despite possible higher costs. Where exactly the trade-off point between stimulating local economy and costs is situated is difficult to point out exactly. For example, Cordaid: " *In case of exorbitant high local costs we will consider to buy a our logistics service provider* ". In case of an urgent need, where effectiveness is required, costs of performing in-house are less important for Cordaid. For example: " *An assessment will be made between costs and speed & service. When goodshavetobesomewherequickly,wejusthavetoarrangeit,nomatterwhat.Inextremesituationswedonotevenmakeuseofourregularlocaltender process, everything to guarantee speed* " .

Costs and profit are the highest priorities in Supreme's business model. When the costs of performing in-house are higher than outsourcing, they are willing to outsource the logistics service. In some cases, the needed investment for performing in-house is too high and only profitable in the long term. In these situations, mainly transport services are outsourced to e.g. Maersk and APL. In case of an increasing need for effectiveness, for example need for drinking water or fuel, costs are less important than during regular operations. Supreme is willing to incur higher costs in order to achieve effectiveness. The Dutch Armed Forces prioritize effectiveness and use efficiency as an optimizing factor. Logistics services are outsourced if service levels increase or costs decrease (Secretaris Generaal, 2008). In case of an increasing need for effectiveness, the costs of performing in-house are less important. In most of these situations the choice will be made to perform in-house to avoid long tender processes.

4.8. Level of military peace enforcement (P7)

There are some differences on this item between the cases. Cordaid prevents cooperating with the military during CROs in order to remain a neutral organization. In situations where Cordaid has no other choice, they cooperate only low-profile. In case of inaccessible areas as a result of a high level of military peace enforcement, outsourcing is not an option. Cordaid's logistics service provider has no freedom of movement in these regions.

Supreme is experienced in operating at the same time and place as the military. Also in highly kinetic war areas, where a maximum of military power is used, Supreme performs

all kinds of activities. These areas are mostly un- safe working environments with high risks for personnel. For that reason Supreme prefers outsourcing high risk transport services with destinations like desolated military camps. These camps are often safe havens and for that reason, the activities in the camps are performed in-house. For example, Supreme: *“When Afghanistan turns into a safer place in the future, it is without a doubt that you will only see our own Supreme trucks driving. The risk factor is most important”*. Supreme has never experienced military no-go areas, they always kept their freedom of movement. The Dutch Armed Forces are executors of peace enforcing operations. During these operations the freedom of movement of companies will be deprived only locally and temporarily. The Dutch Armed Forces do not prefer to outsource purely military tasks, like patrolling an d ground reconnaissance. However, recently even the air reconnaissance has been outsourced to an Australian drone company. In Afghanistan, logistic services are outsourced in unsafe war areas because of the high risk for own personnel and to save military combat capacity. These logistic services are for example delivered by Supreme, which also outsources when it gets too dangerous for own personnel. In the end Afghan drivers are transporting the goods by indirect order of the Dutch military. In case of Supreme and the Dutch Armed Forces, not the level of military peace enforcement is most important, but the risk of violent attacks on personnel and material is what counts. For example, Supreme: *“In case of a high level of violence, we choose to outsource locally. In Iraq it was quite safe and simple, so we drove the trucks with our own British drivers. Afghanistan is a whole lot different”*. The risk of violent attacks has a positive effect on logistics outsourcing. Cordaid avoids areas where they can be seen as a partner of the military in order to remain neutral. In this way, Cordaid prevents being confronted with violent attacks.

4.9. Other influence factors: stimulating local economies

Cordaid, as well as the Dutch Armed Forces (partly), concentrates on providing aid. One of their goals is stimulating the local economies by trading with local companies. To stimulate local economies, Cordaid prefers to contract local partners instead of the logistic service provider. For example: *“First we try to solve it locally. If that is not possible, we try to solve it regionally. Our basic idea is to stimulate the local economy”*. The Dutch Armed Forces contract local cleaning services to clean the military camps in

Afghanistan. However, they are aware of the risk of hiring personnel which collaborates with the enemy (de Gooijer, 2008). Supreme has no humanitarian ideals and is not trying to stimulate local economies. The importance of stimulating local economies might have a positive effect on logistics outsourcing.

hiring personnel which collaborates with the enemy (de Gooijer, 2008). Supreme has no humanitarian ideals and is not trying to stimulate local economies. The importance of stimulating local economies might have a positive effect on logistics outsourcing.

The following table, *Table 3*, gives an overview of the research results.

Nr	Proposition	Cordaid	Supreme	Dutch Armed Forces
P1	Demand uncertainty (↑) → logistics outsourcing (↑)	Supported	Supported	Supported
P2	Length of supply chain (↑) → logistics outsourcing (↑)	Not supported	Not supported	Not supported
P3	Need for agility (↑) → logistics outsourcing (↑)	Supported	Supported	Supported
P4	Availability of logistics service providers (↑) → logistics outsourcing (↑)	Supported	Supported	Supported
P5	Controversy about ethical & legal aspects (↑) → logistics outsourcing (↓)	Supported	Not supported	Not supported
P6a	Cost of performing in-house (↑) → logistics outsourcing (↑)	Supported	Supported	Supported
P6b	Moderator: importance of supply chain effectiveness (↑) → P6a (↓)	Supported	Supported	Supported
P7	Level of military peace enforcement (↑) → logistics outsourcing (↓)	Not supported	Not supported	Not supported
Other	Stimulating local economies (↑) → logistics outsourcing (↑)	Indicated	Not indicated	Indicated

Table 3: Research results

5. Conclusion and discussion

The aim of this thesis is to describe the factors that influence make-or-buy decisions with regard to logistics during the sustainment phase of a crisis response supply chain by comparing outsourcing logistic theory with crisis response supply chains in practice. In order to achieve this, two research questions need to be answered. This chapter presents the research answers, reflects on the research limitations and identifies areas for further research.

5.1. Answering the research questions

This research formulates two research questions:

1. What are the influence factors on make-or-buy decisions with regard to outsourcing logistics during the sustainment phase of crisis response supply chains?
2. How do these influence factors affect the make-or-buy decisions?

In chapter 2, seven propositions were formulated as a result of a literature study. These propositions, from which each represents an influence factor, were researched by conducting a case-study. This paragraph outlines the conclusions, based on the results, for each proposition and other possible influence factors. From the results, it can be concluded that demand uncertainty has a positive effect on logistics outsourcing. Crisis response supply chains are characterized by an unpredictable demand for goods and services (Christopher & Peck, 2004; Cottam et al., 2004; Kovacs & Spens, 2007; Olorunjoba & Gray, 2006; Pettit & Beresford, 2005; Prater et al., 2001; Sheffi, 2001; van Wassenhove, 2006; Vermunt & Thoolen, 2004). This research shows that crisis response supply chains operate in dynamic markets, which result in a high demand uncertainty. This demand uncertainty may cause a capacity shortage which forces companies to outsource.

Another finding is that the length of a supply chain does not have an effect on logistics outsourcing. According to previous research, the process of globalization results in long supply chains through different countries which forces firms to acquire expertise of third-party logistics providers (Razzaque & Sheng, 1998; Sink & Langley, 1997). The three companies in this research all manage global supply chains. All informants explain that

globalization made the world smaller in which the significant influence on logistics outsourcing. The next conclusion is that the result of this research shows a positive relation between the need for agility and logistics outsourcing. Speed and flexibility (agility) in the crisis responses supply chain are necessary to fulfill customer needs. According to Prater et al. (2001) outsourcing contributes to the agility of a supply chain. However, outsourcing logistics does not seem to be necessary for being agile. The fourth conclusion is that there is a positive relation between the availability of *reliable* logistics service providers and outsourcing logistics. According to Kovacs & Spens (2007), limited availability of suppliers in conflict zones influences outsourcing logistics. The result of the case-study shows that not only the availability counts, but the availability of *reliable* logistics service providers is most important. Adding unreliability can be explained by the importance of being effective, being agile and minimizing controversies about ethical and legal aspects in the crisis responses supply chain. In case of NGOs, it is clear that the controversy about ethical and legal aspects has a negative effect on logistics outsourcing. In case of the governmental and the profit organization, the relation between controversy about ethical and legal aspects on the one hand and logistics outsourcing on the other hand cannot really be determined based on the results of this research. All cases acknowledge the presence of these controversies and confirm its importance. They try to minimize the risk of controversies by accurate contracting. However, there are differences in how the organizations cope with the controversy about ethical and legal aspects. NGOs try to avoid these ethical and legal aspects under any circumstance. This might be a result of a high ethical awareness, which is caused by an NGO's origin, culture and political nature. As van Wassenhove (2006) stated, the differences in how organizations cope with the controversy about ethical and legal aspects could pose potential collaboration problems for humanitarian principles. The governmental and profit organization state that the ethical dilemmas are their responsibility of the logistics service provider to whom is outsourced. This idea might be a result of a business-like organizational culture and makes it easier for them to outsource logistics compared to NGOs. The need for effectiveness has a negative moderating effect on the relation

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between costs of performing in-house and logistics outsourcing. This can be explained by the fact that effectiveness can be a matter of life and death in crisis responses supply chains.

For profit and governmental organizations, it can be concluded that there is a positive relation between the risk of violent attacks and logistics outsourcing. The results of the NGO, with regard to the relation between the level of military peace enforcement and profit organization. In case of the NGO there is no relation between the level of military peace enforcement and logistics outsourcing. When the level of military peace enforcement increases, NGOs will decrease their activities in these areas. This can be explained by the great importance of being neutral in order to remain a reliable aid organization. To keep their neutrality they minimize cooperation with the military. This can be confirmed by van Wassenhove (2006), he stated that one of the main challenges for humanitarian efforts in Afghanistan was to disassociate the activities of the humanitarian community and the military. In case of the governmental and profit organization, the outcomes are different. Instead of the level of military peace enforcement, the risk of violent attacks is the main factor of influence. This can be confirmed by Sheffi (2001), who states that 'preparing for another attack' is one of the main challenges for firms in the new era. Organizations are vulnerable not only to attacks on their own assets, but also to attacks on their suppliers, customers, transportation providers and other elements in their supply chain. Another possible influence factor could be determined from the interview results. In case of the NGO and the governmental organization there were signs that the aim of stimulating local economies has a positive effect on logistics outsourcing.

5.2. Managerial implications

This research contributes to understanding the make-or-buy decision during CRO. It becomes clear that crisis responses supply chains differ from regular business supply chains and that these differences influence the make-or-buy decision. Not only the influence factors are identified, also their effect on make-or-buy decisions are described. The explorative character of this research contributes to transparency and knowledge in this relatively unknown business segment. It is important for managers operating in crisis response operations to become acquainted

with these influence factors. The outcomes of this research contribute to managers' awareness of which factors may need to be considered when making logistics make-or-buy decision. This research shows that not only low costs or higher service quality are important, but that there are also other factors which might need to be taken into account. Only with this knowledge they are able to understand the influence of the factors and it helps them to consider the make-or-buy decisions carefully, which ultimately prevents decision making based on ignorance. The differences in approach between the organizations create opportunities for all companies to learn from other kinds of organizations operating under the same circumstances. This research specifically focuses on CROs. However, since globalization will lead to more overseas supply chains, the number of multinational also operating in undeveloped and upcoming markets is growing. Undeveloped markets are quite similar to Crisis Response markets, which means that the results of this research will also be useful for logistics make-or-buy decisions in undeveloped markets.

5.3. Limitations and further research

This research has an exploratory nature, therefore, the evidence provided is not enough to draw indisputable conclusions. However, the interview results provide some initial evidence to support or reject the propositions that were reformulated and they give a first insight into this relatively new area of management science.

There is not much literature about crisis response supply chains available. The literature study resulted in a set of potential influence factors, but it was unknown if this set was complete. To compensate this, open questions about influence factors were added in the interviews.

Because of the international character of the companies, the availability of cases and key-informants in the Netherlands was quite low. Therefore, only three cases and one key-informant per case could be selected. The use of limited cases and key-informants in combination with limited availability of literature might have consequences for the reliability and validity of the results. Therefore, findings cannot be generalized to all make-or-buy decisions in CROs. Further research is needed to replicate and validate the result of this study.

The result of this research shows some differences (propositions 5 and 7) between NGOs,

governmental and profit organizations. Because of the limited use of key-informants and cases it is not possible to generalize these results. Further research, with a larger number of key-informants from different kinds of organizations, should focus on the differences between NGOs, governmental and profit organizations with regard to outsourcing logistics in CROs. These outcomes might explain the differences in this research. Cordaid's decision to outsource all logistic activities has been made a few years ago. Because of this time gap the results of this interview might be less reliable. Further research should focus on organizations which made a make-or-buy decision recently. Furthermore, every organization is coping differently with the controversies about ethical and legal aspects surrounding outsourcing in CROs. At this moment there is no such thing as the best way to deal with it. To gain more insight it needs to be researched from more points of view, for example from a legal point of view. In conclusion, it will be valuable to explore more supply chain management aspects of CROs. It would be interesting to see how the differences between crisis responses supply chains and regular supply chains influence partner selection, relationship management or buyer-supplier dependency, among others.

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ANNEXA: Models for make-or-buy decisions

Authors	Characteristics	Suitability for outsourcing logistics
McIvor (2000)	<p>McIvor (2000) designed a generic framework and identifies three key aspects of the outsourcing process: Value chain perspective, Core competency thinking, Supply base influence.</p> <p>This framework attempts to integrate these aspects into the decision making process. The following stages are identified :</p> <ol style="list-style-type: none"> 1. Defining the core activities 2. Evaluate the relevant value chain activities 3. Total cost analysis 4. Relationship analyses. 	<p>The framework considers almost all the aspects; strategy, cost and buyer-supplier competencies. However, it contains only the basic ideas. It is difficult to extract all the influence factors from this model.</p>
Tayles & Drury (2001)	<p>The nature of this framework is very practical and is trying to take the decision maker through the decision-making process. The framework consists of four basic elements:</p> <ol style="list-style-type: none"> 1. Determine strategic nature of product/process (Core or non-core) 2. Cost analysis: perform internally versus outsourcing. 3. Capital spend analysis: if no investment is required the company should 'make'. 4. Assess availability of internal resources and external suppliers 	<p>The framework considers almost all the aspects; strategy, cost and buyer-supplier competencies. However, it is a very prescriptive one. For that reason, it might not be very useful for organizations. Nevertheless, it is valuable to determine the influence factors.</p>
Canez et al. (2000)	<p>This paper achieves to design a framework which combines most important factors from the literature. This model considers the external environment (political elements, availability of suppliers, competition, social elements etc.) as an important factor. The make-or-buy question will always be initiated by a 'trigger', e.g. cost reduction. The make-or-buy decision is based on four aspects:</p> <ol style="list-style-type: none"> 1. Technology & Manufacturing processes 2. Costs 3. Supply Chain Management & Logistics 4. Support Systems 	<p>This model considers all the aspects of the other models. Thereby it combines generic insights with in-depth analyses. This model is very useful as a basis for further defining.</p>

<p>Fill&Visser (2000)</p>	<p>This research derives four key aspects from a literature review:</p> <ol style="list-style-type: none"> 1. The contextual factors represented by an organization's particular internal and external conditions. 2. The strategic and structural aspects associated with an organization's decision to reconfigure. 3. The costs associated with the process or activity under review (transaction costs). 4. Management consideration and judgment, which leads to the make-or-buy decision. 	<p>The framework considers almost all the aspects; strategy, cost and buyer-supplier competencies. However, it contains only the basic ideas. It is difficult to extract all the influence factors from this model.</p>
<p>DeBoer et al. (2006)</p>	<p>This research distinguishes itself by integrating outsourcing theory with the behavioral decision-making theory from Mintzberg et al. (1976). This model is based on the following stages:</p> <ol style="list-style-type: none"> 1. Recognition 2. Diagnosis 3. Search 4. Design 5. Screening 6. Evaluation/Choice 	<p>None of the factors of other outsourcing models is used in this model. Thinking from this perspective gains new insights and might be useful.</p>

ANNEXB: Interview structure for all key-informants

Place:

Time:

Date:

Informants name:

Informants job title:

1. Organization

- 1.1. What is the core business of your organization
- 1.2. In which markets is your organization performing
- 1.3. How is the competition in the market
- 1.4. How many people are working in your organization
- 1.5. Can you draw the organization chart of your organization
- 1.6. What is your function (tasks and responsibilities)

2. Supply Chain

- 2.1. Can you give a schematic overview of the supply chain
- 2.2. In which geographical area is the supply chain active
- 2.3. Which products are in the supply chain
- 2.4. Do you collaborate with third parties
- 2.5. How do you manage this supply chain and what are the key challenges
- 2.6. What is the organization's logistic capacity in terms of personnel and equipment

3. Outsourcing

- 3.1. Make-or-buy
 - 3.1.1. Did the organization recently outsource logistic activities
 - 3.1.2. Which logistic activities were outsourced
 - 3.1.3. What were the reasons for outsourcing
 - 3.1.4. To which organization did you outsource
 - 3.1.5. What was the trigger for considering make-or-buy
 - 3.1.6. Can you describe the decision making process (which steps did it include, what were the considerations)
 - 3.1.7. Do you have a standard guideline for make-or-buy decisions
 - 3.1.8. Which factors influenced the make-or-buy decision

4. Possible questions

- 4.1. Demand uncertainty
 - 4.1.1. Is there a predictable demand of goods and/or services in the supply chain in which your organization operates
 - 4.1.2. Did this have an effect on the make-or-buy decision (if positive, what kind of effect)

- 4.1.3. Did this uncertainty have a positive or negative effect on logistics outsourcing
- 4.2. Length of supply chain
- 4.2.1. Did the length of the supply chain have an effect on the make-or-buy decision (if positive, what kind of effect)
- 4.2.2. Did this length have a positive or negative effect on logistics outsourcing
- 4.3. Need for agility
- 4.3.1. Can you describe the need for flexibility and speed in this supply chain
- 4.3.2. Did this need have an effect on the make-or-buy decision (if positive, what kind of effect)
- 4.3.3. Did this need have a positive or negative effect on logistics outsourcing
- 4.4. Suppliers availability
- 4.4.1. How many potential suppliers of logistics services that you could outsource were available
- 4.4.2. Did the availability of suppliers have an effect on the make-or-buy decision (if positive, what kind of effect)
- 4.4.3. Did this have a positive or negative effect on logistics outsourcing
- 4.5. Ethical/Legal
- 4.5.1. Were there any PMCs available to cooperate with and did you cooperate with one
- 4.5.2. Were there any differences in labour standards between your organization and the third party
- 4.5.3. Did any ethical/legal aspects have an effect on the make-or-buy decision (if positive, which aspects and what kind of effect)
- 4.5.4. Did these aspects have a positive or negative effect on logistics outsourcing
- 4.6. Effectiveness vs Efficiency
- 4.6.1. Do you face violence, crime or disasters etc. during supply chain activities (if positive, how often and how severe)
- 4.6.2. What is the effect of these on the organization of the supply chain
- 4.6.3. What is the organization's vision about effectiveness versus efficiency in the crisis response supply chain
- 4.6.4. Did the costs of performing in-house have an effect on the make-or-buy decision with regard to logistics (if positive, are there any situations in which costs of performing in-house have less effect on logistics outsourcing)
- 4.6.5. How would you describe the differences between regular business and CROs with regard to the influence of costs of performing in-house on the make-or-buy decision

4.7. Level of peace enforcement

- 4.7.1. Was the supply chain confronted with the presence of foreign military forces
- 4.7.2. Was the military conducting a peace enforcing mission or a humanitarian aid mission
- 4.7.3. Did the military cooperate with your organization (if positive, in which way)
- 4.7.4. Did the presence of military have an influence on the supply chain activities (if positive, what kind of influence)
- 4.7.5. Did the level of peace enforcement have an influence on the make-or-buy decision with regard to logistics (if positive, what kind of influence)

5. Rounding off

- 5.1. Would you like to add something with regard to the influence factors on make-or-buy decisions in crisis response supply chains?