

Sourcing decisions for military logistics in Peace Support Operations

A case study of the Swedish armed forces

PER SKOGLUND



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Sourcing decisions for military logistics in Peace Support Operations: A case study of the Swedish armed forces
JIBS Dissertation Series No. 081

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ISSN 1403-0470
ISBN 978-91-86345-33-4

Printed by ARK Tryckaren AB, 2012

Acknowledgements

A Thesis will never be written without support from family, friends and colleagues. This thesis is no exception. My heartfelt thanks go to all of you who have supported and encouraged me on my tortuous path.

I'm very grateful for all the understanding and support my family, Annmarie, Sanna and Mattias, have given me during the whole process: you really helped me to get focused this last spring and make the final changes in turning the manuscript into a thesis. I also would like to extend a special thanks to my parents for always being behind me and supporting me in whatever I have done.

I also would like to thank all my professional colleagues and friends in the academia who have supported me in my studies in one way or another. Without Professor Susanne Hertz's encouragement in many discussions over the years I would never even have reached the identification of a suitable research proposal. My thanks go to Professor Thomas for his constructive comments to make this thesis focused and readable. I also would like to say a special thank you to Professor Marjolein Caniels: you gave me many fruitful and supportive comments during the final stage of the writing. An important role in this sense has also been my discussant in the final seminar, Professor Thomas Jonsen. I guess I argued against some of your comments in the seminar but you definitely helped me to understand the difference between a manuscript and a quality thesis, and to make the necessary improvements to the manuscript. Important too, was Annika Hjalmarsson, without your language guidance this thesis would not be readable. You not only corrected the grammatical errors, but also pointed out several weaknesses in my argumentation.

I would like to send a special thank you to my colleagues and friends at FMV, Försvarsmakten, FHS and FOI; Anders Brunnberg, Peter Sohlberg, Elvira Kaneberg, Håkan Rugeland, Michael Dorn and Thomas Ekström. Without your support this study would never have taken place.

I want to send a special thought to my Nordic friends who have inspired and pushed me into not giving up and for understanding how important friendship is in research, especially when you question what you do and whether your writing has any value at all. Vesa Autere and Tore Listou: meeting with you, and establishing a Nordic network in military logistics research has been important not only for me, but for all three of us, I hope.

Last but not least, thank you to all of the respondents for letting me have some of your time and for your fruitful answers, comments and suggestions.

Per Skoglund

Jönköping, 1 June 2012

Abstract

What role has sourcing for the logistical outcome when Swedish Armed Forces plan for and conduct PSOs? What are the logistic needs to support the operating units? Can logistics in itself contribute to the overall goals with the Peace Support Operations? It depends of course on how the logistics is organised and what is required in order to support the military operations. The research on military logistics in general is limited and within the conduct of small nations forces almost non-existent. The role of sourcing depends on the military supply chain and FM decisions on make or buy, choice of market, number of suppliers and relations with the supplier.

Therefore this thesis addresses how the sourcing decisions impact the military logistics in FM Peace Support Operations and the achievement of short-term and/or long-term objectives. The short term objectives represent the operational needs and the long term objectives represent the overall goals for PSOs.

In order to understand the military logistics in PSOs a thorough review of the literature in the field was conducted. A second review was done with the focus on the four sourcing decisions. The Swedish Armed Forces Peace Support operations during the period 2002-2010 was studied. The case focused on two on-going operations, Liberia and Atalanta, and complementary information was collected from a third on-going operation, Afghanistan. Also the central processes in the headquarters and the connections upstream to the Swedish government and the international decision processes for peace support operations were studied. The case was built up by interviews, field visits and secondary data.

For military logistics in peace support operations, three areas on different levels, with in total twelve constructs of importance were developed. Of special importance is the logistic tier structure. The sourcing decisions showed to be one of four logistic key decisions. The sourcing decisions turned out to have an outcome that changes between different logistic phases. The decisions as such showed to be of importance for the logistic outcome. The make or buy decision enable responsiveness in the logistics system in a hostile environment. Proximity between customer and supplier showed to be important for all phases in an on-going Peace support operation. Due to the unstable situation dual sourcing showed to be important to create redundancy in the supply chain through dual sourcing. The supplier relations changed from arm's length to partnership when an operation was initiated. The Swedish Public Procurement Act did put limitations on the procuring organisations to utilise the possibilities to be efficient and effective.

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Acronyms

CSE - Contingent Support Element
CONOPS - Concept of Operations
ERP - Enterprise resource planning
EUNAVFOR – European Union Naval Force
FM - Swedish Armed Forces
FMLOG - Swedish Armed Forces Logistics
FMV - Swedish Defence Procurement Agency
HQ - Head Quarter
HQ:Mtrl - Head Quarter, Materiel Command
ISAF - International Security Assistance Force
JSS - Joint Service Support
LOU - Act of Public Procurement
Medevac - Medical Evacuation
MoD - Ministry of Defence
MoU - Memorandum of Understanding
MOVCON – Movement Control
MV - Military Workshop
NavLogBat - Naval Logistics Battalion
NGO - Non Governmental Organisation
NSE - National Support Entity
PSO - Peace Support Operation
OHQ - Operational Head Quarter
OHQ:G4 - Operational Head Quarter, Logistics element
RDIF - Radio-frequency identification
SIDA - Swedish International Development Cooperation Agency
SIPRI - Stockholm International Peace Research Institute
UNIFIL - The United Nations Interim Force in Lebanon
UNMIL - United Nations Mission in Liberia
UNSC - United Nations Security Council
WFP – World Food Program

I. Introduction

Since the end of the Cold War¹, peace support operations (PSO) have been the focus of Swedish military efforts. For more than 15 years, the Swedish Armed Forces (FM) has been engaged in operations in the former Yugoslavia, currently in the province of Kosovo. FM has also been engaged in operations in Congo, Lebanon, Liberia and Chad. The Navy has been engaged in the Bay of Aden outside Somalia to reduce piracy and to protect World Food Program (WFP) transports to suffering populations in the area. Lately, the Army's largest operation has been in northern Afghanistan. All these operations aim to create security, stabilise peace and to indirectly or directly assist the suffering population. Military operations involve a high degree of complexity and uncertainty, where activities, objectives and threats change over time (Försvarsmakten, 2009a), and the logistics needs to mirror the operational situation (Ferris & Keithly, 2001). The requirements on and of the type of main equipment, supplies and services are unique for each operation. The activities in PSOs are to a large extent about military logistics and one of its critical elements, sourcing, that is, to get the right equipment, supplies and services to the right part of the world when needed by the soldier or the unit. Presented below are four examples about sourcing and logistics problems that Swedish units² have experienced in deployment preparations or during on-going PSO.

First example:

The early stages of a PSO include gathering of supplies and transportation of the supplies to the area of the operation. When the chartered ship, which was supposed to take the supplies for the Swedish mission in Liberia (2004), was ready to leave the quay in Norrköping with the destination of Monrovia, it was hindered by the Swedish harbour authorities. The packaging of explosives and the matching documents did not follow the international regulations concerning the handling of explosives on ships. Fortunately, this incident did not delay the transportation; it was identified early enough to be handled before departure. In this case, the problems occurred due to the combination of time constraint and lack of in-house employees within FM who had the authority

¹ As the end of the Cold War are often the occasions mentioned, the fall of the Berlin wall the 9 November 1989, the reunification of Germany the 3 October 1990 and the collapse of Soviet Union the 25 December 1991.

² Many civilian and officer colleagues have shared their own experiences from different peace support operations, before and after interviews and during coffee breaks. Some of them are exaggerated and some is in itself unbelievable, but still very much the truth, especially since different persons tell the same story. The examples in the introduction are all coming from more than one source. But no matter if they in all details are correct or not, they still point at a number of aspects which made me interested in this research area.

and knowledge to coordinate loading military supplies on civilian cargo ships. On this occasion it was only the military organisation that was involved. In the future, one can foresee that both the military and the industry deliver supplies for a PSO directly to the harbour. This leads to more general questions:

Will all the domestic and international suppliers be able to handle the required packaging and the adherent administration? Are the suppliers knowledgeable about all international transportation rules for shipment of military supplies? Should one specialist generally handle transportations? Should the specialist be one's own resource or a supplier's? Done in the wrong way transportations will be delayed causing large problems in the area of operation with both casualties and materiel losses.

Second example:

In PSO, some materials and services are sourced locally in order to reduce transportation costs or to complement supplies coming in from the home country or from international suppliers. In the operation in Lebanon, a local supplier sold bottled water to the Swedish unit. The bottles were of a well-known European brand. By pure coincidence, it was discovered that the supplier refilled used bottles from his own well, behind the store. Luckily, no one got ill; moreover, the supplier was friendly towards the peacekeeping troops. This incidence raises the following questions: From which markets should the FM source: the domestic, the global or the local³ market? If sourced from local suppliers, how is business conducted in a war-zone to ensure timely deliveries and quality of goods? The problems with the decision, that is, from where to source, can be many, from not getting the products needed to getting the wrong products. The consequences can be anything from minor interruptions in deliveries to a temporary stop of all activities in a PSO. The economic and humanitarian consequences can be serious with the outmost consequence being escalation of the military conflict. Accordingly, the logisticians will be blamed for not knowing how to do their work.

Third example:

Readiness is a key logistics issue. It requires a certain degree of speculation about what to do, when and where. To be prepared for too many different mission alternatives is costly and not realistic in the long run. The Nordic Battlegroup 07 (NBG07), one of the EU battlegroups⁴, was in standby mode during the first six months of 2007 in case of an emergency situation. To be fully prepared, it was decided that the logistics organisation should hand out three different uniforms to each soldier to meet different operational requirements. However, NBG07 was never deployed and the handling of the uniforms cost a not negligible sum. There is always a dilemma between how

³ With local, sourcing in the region of the peace support operation is considered.

⁴ Rapid reaction force in accordance with EU headline goals 2010 (EU, 2004b).

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prepared a unit must be 'just in case' or if it is possible to postpone the certain activities until it becomes probable that the unit will be deployed and the location and type of materials needed are known. If FM had done a more careful adapting of how to postpone the distribution of the personal materials, money could be saved, both in case of being deployed and with the status quo where they were never deployed. The possibilities to plan the logistics differently lead to the question: If a decision is made to postpone, how can FM make sure that the requested type, quality and number of the specific item can be delivered when needed? Absence of analysis and decisions in this area are both costly and a hindrance to the ability to react to quickly emerging catastrophes.

Fourth example:

In the Liberia operation it was decided that Sweden should contribute with a rapid reaction force. When it was decided on what material the unit should use, an internal discussion started within FM/FMV⁵ as to how to support the unit in Liberia. It was decided to negotiate with suppliers about getting technical support on site in Liberia. Some suppliers agreed to give support with personnel of their own in Liberia, if needed. Others said no to the request, and only offered Internet or telephone support. The problems with getting a solution for good logistics support on site in Liberia raises the question: What relations are needed with the suppliers to ensure logistics support in international operations? Not getting the proper support for a PSO will reduce the capability to meet the operational requirements. The operations will require more resources, both in number of soldiers and more material, to meet the same goals.

These examples illustrate not only the importance of the logistics and the adherent sourcing, but also the possibilities and problems with logistics and sourcing decisions. The examples above are presented to highlight four key sourcing issues and related general logistics problems, which this thesis addresses. To have the production in house or to outsource, which geographical market to use, how many suppliers are needed for the same product to meet lead-time and volume requirements, and what type of relations are required with the suppliers to meet the logistics needs? The examples show the complexity of the sourcing decisions and also how relatively small errors in these decisions can have huge impact on the logistics outcome and the operational aspects of a PSO.

The complexity and uncertainty in the examples point at a number of aspects that are believed to be important for the study. These aspects need to

⁵ FMV- The Swedish Defence Procurement Agency, is an authority formally separated from FM. Since this organisational separation was of limited importance for this study, FM and FMV are viewed as one joint organisation.

be covered in the study and guide the study in terms of the theoretical framework:

- Large diversity of supplies is needed in a PSO. The type of supply affects the decisions as to: whether to make or buy, where to source (domestically, globally or locally), how many suppliers to source from and what the supplier relation looks like. (From the first example.)
- Aspects that will affect the choice of suppliers are: the supplier's ethical standpoint, risk of having backorders or delayed deliveries, delivery times meeting the needs, and that the deliveries meet the quality requirements. (From the second example.)
- FM has an ambition to stockpile in order to be efficient and to have a high readiness. This ambition can also be found in NATO (NATO, 2007). However, financial constraints and insecurity in operational requirements force FM to make postponement decisions, which also require a responsive supply chain. After the end of the Cold War and the subsequent reduction of stock levels, logistics and sourcing decision have larger effect on the capability for international operations. (From the third example.)
- By thinking long-term in a PSO, logistics and sourcing can contribute to a positive development and a lasting peace. This is not considered in Swedish PSOs, but there are activities going on that can increase the knowledge in this area. (From the second example.)
- Supplier relations are important in several different aspects for the support of operations. It affects both lead-times and the possibility of getting support in the operational area. (From the fourth example.)

This thesis discusses sourcing and military logistics in Swedish PSOs. To frame the research purpose and questions in greater details, this chapter continues below with a discussion on what a PSO is, and what the short-term and long-term objectives are for the logistics in such operations (paragraph 1.1). Military logistics is a subject that has developed over more than 150 years. In paragraph 1.2, the definition of military logistics is discussed and the interpretation for this research positioned. Other important aspects of military logistics, which are relevant for this study, are also presented in this paragraph. The supply chain upstream activities in the logistics are to a large extent based on the sourcing decisions. The sourcing perspective used in this research is presented in the last section of the paragraph. The theoretical gap is discussed in paragraph 1.3. In paragraph 1.4, the purpose and questions of this research are presented. Finally, the chapter ends with a presentation of the structure of the thesis in paragraph 1.5.

I.1 Peace support operations

Operations represent the military efforts performed by units on strategic, operational or tactical levels (Försvarsmakten, 2002). Operations include: Peace Support Operations (PSO), Humanitarian Operations, Evacuation Operations, Power Demonstrations or Offensive Operations in support of international law. Only logistics for PSO is discussed in this thesis. PSO are either: Peace Enforcement Operations to get peace agreements, Peacekeeping Operations to support a peace treaty, Security Support Operations to reduce the risk of conflicts erupting or to hinder a minor conflict from escalating. Needs or requirements discussed in this thesis are based on PSO performed outside the homeland borders. PSO performed by small nations normally require cooperation with other nations and/or organisations. The character of the operations discussed is thereby multinational and is led by a framework nation or an international organisation (NATO, EU or UN).

The objective of PSO can be viewed in a short-term or long-term perspective. The short-term objective is to successfully perform the given operational tasks. The main objective with logistics in PSO is to create the means for the operational units (Skoglund & Dorn, 2008). Nevertheless, the details for creating the means are very complex and not thoroughly defined in any research. The long-term objectives are normally the same as the overall operational objectives for PSO, that is, to create security and lasting peace. PSO can and should put requirements on the supply chain and the logistics activities to contribute to the overarching goal:

Peacemaking and peacekeeping operations, to be truly successful, must come to include comprehensive efforts to identify and support structures, which will tend to consolidate peace and advance a sense of confidence and well-being among people. (Boutros-Ghali, 1992)

Since Former Secretary-General of UN, Boutros-Ghali, wrote *An Agenda for Peace* (Boutros-Ghali, 1992, 1995), many studies have been conducted on how lasting peace is achieved, with mixed results. The general picture points to complex context dependent aspects with military, civilian authorities and private businesses as actors (Fort, 2007; Pearce, 2005). The Swedish Government has the ambition to coordinate and participate in combined engagements using both civilian and military resources, and to work not only with security, but also with democracy, justice and business life aspects (Utrikesdepartementet, 2008b).

1.2 Military logistics

Research in military logistics took an early lead, with 50 years of publishing, starting with Thorpe (1917) up to Eccles (1959), before the business area entered the field. Later research in the military logistics area has lacked behind the development in the business area. Articles presenting research in military logistics in peer-reviewed journals have been rare the last 20 years. Therefore, it is difficult to build a solid theoretical framework from the limited military logistics research literature. To create the framework for this study, theories from both military and business logistics are combined with practitioners' publications and government documents. Accordingly, it is important for this study to contribute to the build-up of theories for military logistics. Theories developed in the business logistics and supply chain management (SCM) research need to be evaluated in a military context and expanded to also be valid for that context.

1.2.1 Definition of military logistics

In military literature there are a number of different definitions and descriptions of logistics in a military environment for example defence logistics, operational logistics or military logistics (Skoglund & Dorn, 2008). In this thesis, logistics refers to military logistics. If a matter of general character applying to other fields of logistics, business or humanitarian is discussed, it will be specifically commented upon.

The usage of military logistics in the literature is similar to the situation described by Larson, Poist and Halldórsson (2007), where researchers have different perspectives on business logistics and SCM. In military logistics literature two trends seem to dominate the scene: the traditionalist view (e.g. Eccles, 1959; Peppers Jr., 1988; Sarin, 2000) or the intersectionist view (e.g. Kress, 2002; Tuttle Jr., 2005). The traditionalist view regards SCM as a subset of logistics. The intersectionist view is that SCM and logistics are partially overlapping but separate subjects.

The most commonly used definition is the NATO (North Atlantic Treaty Organisation) definition:

Viewed from the life cycle perspective, logistics is the bridge between the deployed forces and the industrial base that produces the weapons and materiel that the forces need to accomplish their mission. NATO therefore defines logistics as:

Logistics: The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:

- *design and development, acquisition, storage, transport, distribution, maintenance, evacuation and disposal of materiel;*

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- *transport of personnel;*
- *acquisition or construction, maintenance, operation and disposition of facilities;*
- *acquisition or furnishing of services;*
- *and medical and health service support.*

(NATO, 2007, *NATO Logistic Handbook*, p. 7)

The NATO definition is quite broad, in a sense covering just about everything except the planning and execution of combat. It describes the traditionalist view of military logistics. Kress (2002) uses a production system to illustrate the definition of operational logistics.

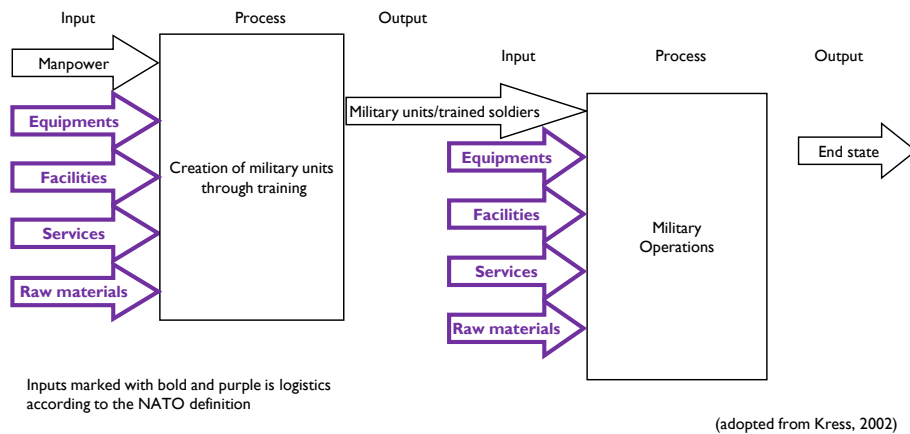


Figure I.1 Logistics in the military production system with the NATO definition perspective.

In Figure 1.1, NATO's definition is integrated into Kress' (2002) model. With the NATO definition perspective, the inputs in the first process are all logistics, except for the supply of manpower. In other words, these are all the means necessary to train soldiers and military units. In the second process, all inputs are viewed as logistics, except for the output from the first process. All means that are required to project, sustain and phase out military force in operations is viewed as logistics. The NATO definition gains support from a similar definition in EU military capability processes (EU, 2011). In the Swedish logistics doctrine, both of these definitions are supported (Försvarsmakten, 2007a).

Therefore, in this thesis the NATO definition of logistics is used. This means also that SCM and sourcing is a subset of the logistics activities.

1.2.2 Logistics in peace support operations

Military logistics in PSOs are about supporting the operating units with supplies, services, and transportation. The main differences between military logistics and logistics or SCM in the business or humanitarian fields are the higher degree of complexity in military logistics and uncertainty in the PSO requiring contingency plans in case of hostile activities or changes in the operational requirements (Skoglund & Dorn, 2008). The military logistics system contains a great number of different products and product groups, ranging from drinking water to complex fighter airplanes, and services from basic camp management to medical or technical specialists services. During a military operation, the whole military supply chain is an accepted target for hostile activities according to international law (Försvarsdepartementet, 1996a). When operating in areas with criminal warlords or terrorist groups, it is not possible to rely on international law being followed, which places even higher requirements on the supply chain. Another aspect which military logistics partially has in common with humanitarian logistics is the high degree of uncertainty (Beamon & Kotleba, 2006). Military logistics personnel do not know what type of operation to support in advance; moreover, unexpected changes often occur during an on-going operation. One can never know what specific operational plans the belligerent parties have (Ohlson, 2008). To get all equipment, consumables and services to create, support and dismiss the units for a PSO, FM must establish relations with the framework organisation (the UN, NATO, the EU or a lead nation), the nations and other organisations participating in the operation, as well as host nation and suppliers, domestic, international and local. The needs are met by own resources, stored material and own personnel, or by advance planning, including dormant supplier relationships, or last minute ad hoc sourcing. Since peacekeeping units are working with many different aspects such as security, relation building, law obedience and infrastructure building, it is reasonable and relevant that their logistics contribute to the peace by engaging and developing the local business life. In *the defence proposition 2009*, the Government declared that the major part of the logistics in the operational area should mainly be handled by their own military personnel (Försvarsdepartementet, 2009). However they also stated that in the planning of every operation, FM should strive for a rational and optimal solution even if it meant outsourcing some of the logistics.

Small nations' PSOs put high demands on a flexible, supporting logistics system. Each operation tends to be unique in some respect; the tasks can differ, different equipment might be needed or the allied partners can differ. To be able to handle the different requirements and conditions, a combination of stable and flexible processes for the logistics is necessary to meet the needs, and at the same time the logistics organisation must be efficient with the taxpayers' money. Strategies for the logistics are needed. FM's Logistics Doctrine, gives guidelines for logistics planning and execution (Försvarsmakten, 2007a). In

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addition, other documents provide guidelines for FM logistics, for example *FM strategy for sourcing of defence materiel* (Försvarsmakten, 2007b) and *PPP strategy* (Försvarsmakten, 2009b). These documents only cover some overarching aspects of logistics so a majority of issues are handled as the situation arises. FM has been and continues to work with projects to formulate and update business processes for logistics and for supplying the armed forces. These activities are carried out both for peacetime homeland production and for international operations. Different types of sourcing decisions have existed in FM for similar products, which make it possible to compare and discuss results of different approaches to logistics. Thereby the results in this study are also interesting for FM and their future development of logistics.

This thesis does not discuss the term strategy as such. However, based on the discussions above and a process perspective four logistic key decisions concerning logistics, which are important parts when formulating the logistic strategy, form the baseline for the study. These four logistic key decisions investigate the issues of (Figure 1.2):

- The basic supply decision: Where to get the needed products; bring what is needed or obtain needed products in the operational area or to get products from outside when needed (Kress, 2002; Van Crevald, 1977).
- The stockpile decision: What and how much to stockpile and what to postpone until needed (Berg, 2006): What level of readiness is required?
- The balance decision between being efficient or effective: How flexible the supply chain needs to be to meet changes in the demands (Försvarsmakten, 2007a; Tatham, 2005; Tatham & Worrell, 2010).
- The sourcing decision: How to source the needed products (Försvarsmakten, 2007a).

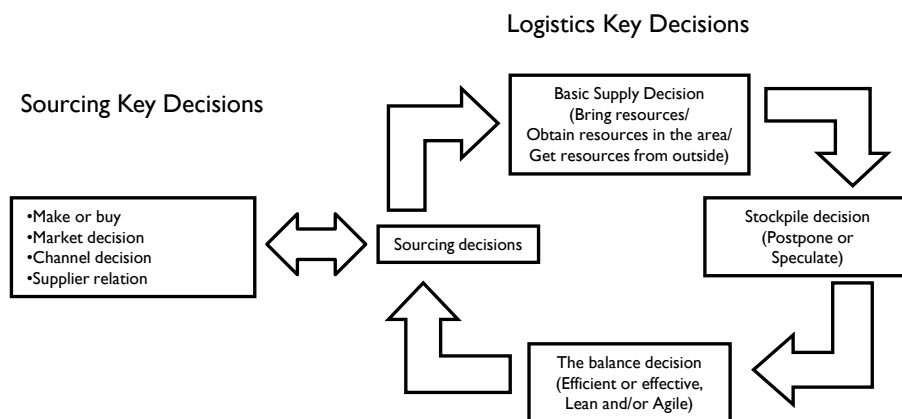


Figure 1.2 Overview of logistic and sourcing key decisions

These four decisions will be further explained and discussed in the following two chapters.

Early in this study it became evident that the sourcing decisions proved to be especially important for a small nation's logistics in PSOs. With limited budgets and relatively high demands on flexibility sourcing capabilities is crucial. This creates both a theoretical and practical interest how sourcing decisions affect the outcome of logistics. Therefore, sourcing has been given special attention.

1.2.3 Military sourcing

In business research many different terms have been used to describe the activities about how to get the needed products to support the own production and to support the end-customers' needs. Within the public sector has public procurement and acquisition been used. Public procurement has often been used as a synonym to purchasing, with a SCM perspective (Prier & McCue, 2009), while acquisition has a more limited meaning with a strong focus on the compliance to the legal system (Lloyd & McCue, 2004). Sourcing is commonly viewed as the first stages of the purchasing process (Mookherjee, 2008).

Gary and Zenz (1994) suggest that sourcing is a strategic firm integrated philosophy on selecting vendors. Much has happened since 1994, but they touch on some interesting aspects of sourcing that are still relevant. They refer to a strategic philosophy where sourcing becomes more important for the firm and the possibilities to have closer relations with the suppliers can be viewed as a key aspect to successful sourcing. This strategic perspective on sourcing is important in the choice to use the term sourcing in this thesis. Sourcing is here defined as the early stages in the process of procuring supplies. It starts with the make or buy decision process and ends with a signed contract (see also paragraph 2.1.2).

Sourcing for PSOs includes the handling of the relationship in a supply chain of both physical products and service products. It is applicable to describe the supply chain as a network of many different suppliers (Axelsson, Hallén, & Elbe, 2007; Ford, Gadde, Håkansson, & Snehota, 2003; Lambert, Cooper, & Pagh, 1998). This naturally leads to the conclusion that sourcing strategy also can be viewed as the basic element of SCM (van Weele, 2005). Using the above definition of military logistics, sourcing is also one of the basic elements of the military logistic strategy (the NATO definition of logistics uses the word acquisition, but with a similar perspective as sourcing is used here with the exception for the discussion concerning make or buy). Cousins, Lamming, Lawson, & Squire (2008) view sourcing strategy as choices of different possible approaches to stay competitive, efficient and effective. It is a number of sourcing related choices made to create a plan of actions for the sourcing to achieve the logistic objectives in PSOs.

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Theoretically sourcing and sourcing strategies have become more important over the years (Cousins, et al., 2008; Gadde & Håkansson, 2001; Håkansson, 1982; Lambert & Knemeyer, 2004; Skjøtt-Larsen, Schary, Mikkola, & Kotzab, 2007; Wouters, van Jarwaarde, & Groen, 2007). The perspectives are many, but several researchers have at least three out of the four decisions in common when creating a sourcing strategy (Freytag & Mikkelsen, 2007; Monczka, Handfield, Giunipero, Patterson, & Waters, 2010; Åkesson, Jonsson, & Edanius-Hällås, 2007):

- Make or buy decision
- Geographical market decision - Domestic, global, regional or local sourcing
- Channel decision - Number of suppliers for the product or product group
- Type of relationship with the suppliers

The examples in the beginning of this chapter relate to the four sourcing decisions. These four aspects are chosen to be the decisions studied in this research, partially because of the fact that they are used in business applications, but mainly because of their importance for sourcing in PSO:

- The make or buy decision is important from several aspects in PSO. To begin with it may be illegal (laws of war), but it can also be a matter of life and death in PSO, where the supplier can get infiltrated by the enemy.
- The market decision is connected to the objectives, e.g. sourcing on the local market in the operational area. The Act of Public Procurement plays an important role, pointing to the international market. The aspect of homeland defence plays a crucial role for this decision with the relation to the domestic market. And the regional market can be used for efficiency reasons or fulfilling PSOs objectives.
- The number of suppliers is related to the anticipated risk of not receiving requested supplies and the ability to get alternative supplies. However, other factors are also important for PSOs, e.g. available suppliers for a certain product.
- FM has individual relations with different firms. These differences affect the lead-times in the supply chain.

Studies on sourcing can be based on several different perspectives, for example organisation, processes or information. In PSOs, many different supply types are needed such as drinking water or technical support of fighter airplanes. Accordingly, the type of supply is important for the sourcing decisions. The process of deciding upon the four decisions presented above for each product is to be interpreted as an important part of the sourcing strategy for PSOs.

The reasons to why these four decisions are chosen for this study are further explained in chapter 2. Many other sourcing aspects exist, which can be

argued to also be important. But from more than 15 years of practical experience, these decision are considered to be the most important ones.

1.3 Theoretical gap

Most research looks for filling a theoretical gap. In military logistics, the lack of knowledge is large and the gaps are many. To start with the limited amount of modern research oriented literature on the operational perspective on military logistics, has been based on large nations capabilities and planning (e.g. Henderson, 2008; Sarin, 2000; Tuttle Jr., 2005). Research on military logistics for smaller nations is very rare more or less non-existent; possibly can Kress (2002) and a few others show influences from empirical data from smaller nations' operations. This research aims to start building a theoretical framework for smaller nations' logistics in PSOs. On the sourcing side of military logistics the literature is also scarce in academic journals or peer-reviewed books. It has been dominated by two perspectives; an economics perspective, for example *handbook of defence economics volume 1 and 2* (Hartley & Sandler, 1995, 2007) or a supply chain perspective to develop the long-term efficiency and defence capability (Johnsen, Howard, & Miemczyk, 2009; Lundmark, 2011; Tatham, 2009). This research aims to connect sourcing to a military operational logistic perspective, to study the link between sourcing input in the supply chain and the output of logistics and the fulfilment of the of its objectives. The effect of sourcing decisions in logistics in PSOs has rarely been studied. Filling the theoretical gap in this area is important for the overall theory building for logistics in PSOs and has practical importance for the improvement of future PSOs.

In the military supply chains, the phenomena of private military companies is well covered (Singer, 2008). The ethics in both these firms and in the procuring authorities are important to the public community. It is possible to build further on the studies of private military companies to develop a more general understanding of the ethics in the relations between the defence forces and their suppliers.

1.4 The research purpose

PSO are intended to reduce the suffering of the population in an area of a conflict. The ability to fulfil the operation depends on the means that logistics create for the operation. The most important input factor to the logistics is the sourcing decisions.

The logistic solutions in PSOs are dependent on the supply chain, and in turn the formation of the supply chain is dependent on the FM sourcing

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decisions. The flows in the supply chains will vary to some degree from one PSO to another. The difference will depend on the characteristics of the operations and the decisions on how to supply and support the operation. In the details the logistic solution for all operations will differ from each other. The total volumes of goods, however, will roughly be about the same for the same type and size of force. It will be possible to purchase some of the goods locally, others will be delivered from national and international suppliers and the remaining needs must be supplied from own warehouses with stored materiel. Many requirements on the handling of the goods or personnel will be similar despite the type of PSO conducted or which method of supplying the operation that will be used. The main objective for the logistics is to create the means for the operational force, even if other goals also exist in a long-time perspective.

This chapter begins with four examples of failures and successes of the logistics system in PSOs, which relate to the four different sourcing questions discussed in paragraph 1.3. PSO is introduced and the objectives for logistics in PSOs are briefly discussed. The short-term objective concerns the creation of the means for the unit or the soldier. Long-term objectives are about how logistics can contribute to the creation of security and sustainable peace and when necessary give aid to the local population. Military logistics is defined, which coincides with the NATO definition, where sourcing is a subset of the logistics. Important aspects of guiding and limiting the study are also discussed. The sourcing decisions and how they are interpreted in this thesis is discussed. Finally the theoretical gap this study aims to cover is presented. The discussions in previous paragraphs lead to the purpose of the research presented in this thesis:

The purpose of this study is to analyse how the sourcing decisions impact the military logistics in FM Peace Support Operations and the achievement of short-term and/or long-term objectives.

To grasp the research purpose and to consider important aspects of the introduction above, three research questions are developed to guide the study:

1. What theoretical constructs within military logistics are vital for sourcing in PSOs?
2. What are the outcomes of the logistics key decision process?
3. How can the outcome of the sourcing key decisions impact the fulfilment of the logistics objectives in PSOs?

As defined above sourcing is a subset of all the activities within military logistics. Due to the fact that logistics in PSOs is complex in nature and changes over time, the sourcing can affect different parts of logistics in different phases of the operations. Also the logistic objectives change over time

and are partially dependent on previous logistics activities. Even if this dependency not is part of the purpose, it is still important to understand it in order to evaluate the achievement of the objectives. The purpose of the study and the relations between the different variables are shown in figure 1.3.

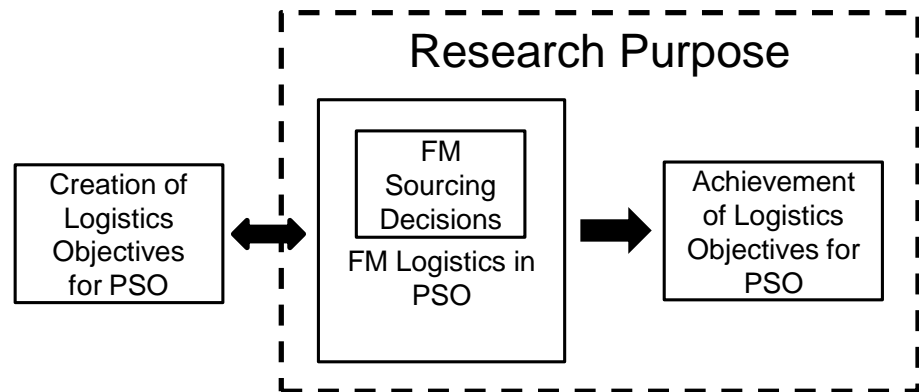


Figure 1.3 Dependency between elements in the research purpose

To fulfil the purpose of the study and answer the research questions a number of aspects needed to be looked at. It was previously stated that logistics in a PSO is complex and changes over time. Therefore the different phases in PSOs needed to be investigated and a process-oriented perspective has to be applied. Research on military logistics has been limited, therefore business SCM constructs are applied and tested in a military setting. Generally, it is important to discuss and develop theoretical constructs for military logistics.

1.5 Structure of the thesis

Even though the thesis is about sourcing, the starting point in this study is to understand military logistics in PSOs. This also explains the structure of the thesis. The chapters alternate between logistics and sourcing and are synthesised in the last two chapters.

Chapter 1 Introduction

The chapter begins with four examples on problems FM has encountered based on sourcing decisions. The first chapter defines military logistics and PSOs. It problematises why sourcing is important to logistics in PSOs. Thereafter the research purpose and research questions are presented.

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Chapter 2 The peace support operation and its logistics

This theoretical chapter starts by presenting some key concepts for the thesis. Next, the military logistics and its important theoretical aspects are presented. This includes long and short objective for logistics in PSOs, supplies for PSOs, and logistic key decisions.

Chapter 3 The sourcing decisions and their elements

The second theoretical chapter begins with a presentation of some aspects of public procurement then discusses the four sourcing decisions and underlying constructs. It ends with a discussion on how to analyse the sourcing decisions and its effect in the military supply chain.

Chapter 4 Methodology

This chapter is based on the use of three levels for knowledge generation, a meta-level, a discipline level and practise level. Epistemology, ontology and the researchers role are discussed on first level. Theory creation, research design and research quality are discussed on the second level. Data collection analysis and trustworthiness are discussed on the third level.

Chapter 5 FM in peace support operations

This is the first empirical chapter. It presents some historical background on FM PSOs, followed by a discussion of the phases identified in the operations. Central processes are discussed and two operations are presented; the UN lead operation in Liberia and the EU lead operation in the Bay of Aden (Operation Atalanta).

Chapter 6 Supplying peace support operations

This is the second empirical chapter. It presents the supplying of PSOs, followed by some consequences of LOU. It presents FM sourcing decisions, the supply chain and the supplier relations.

Chapter 7 Analysing logistics in peace support operations

This is the first analysis chapter and discusses and analyses the logistics in PSOs. Three levels of theoretical areas are analysed: macro structures for the organisation of logistics in PSOs, objectives and requirement on the logistic planning for PSOs, and strategic or key decisions made for logistics in PSOs.

Chapter 8 Analysing the sourcing key decisions in peace support operations

This is the second of three analysis chapters. In this chapter the analysis continues with the sourcing decisions and the relations in the upstream parts of the FM supply chain. It starts with a discussion about the military supply chain, its complexity and unpredictability. Thereafter the four decisions are analysed, in turn.

Chapter 9 The dynamics and importance of the logistics key decisions

This is the third and final analysis chapter. In this chapter the analysis continues with two aspects of special interest in this study; the development of the logistic key decisions including the sourcing key decisions in the different phases of PSOs and the logistic consequences of the sourcing key decisions.

Chapter 10 Conclusions, implications and future research

This chapter presents the conclusions based on the purpose presented in the first chapter. It begins with a presentation of the results based on the purpose. Thereafter the answers on the three research questions are presented. Then managerial implications are discussed and presented. Finally five suggestions for future research are presented.

2. The peace support operation and its logistics

According to FM (1997) a nation's participation in a PSO is about:

- Identify the need of military force.
- Recognize a political opportunity with participation.
- Study the operational area; identify a suitable place for own infrastructure, and identify friends and foes.
- Make the decision to participate.
- Prepare the materiel and personnel for the operation.
- Move materiel and personnel to the operational area and staging of the operational units.
- Set up the infrastructure when needed, for example a camp or warehouses.
- Run the operation. Create new business relations in the operational area. Try to get the population to ask for your services, mainly providing security.
- End the operation.

In many perspectives is it no different from new business operations, that is Greenfield ventures. International military operations also have much in common with humanitarian relief operations. Military and humanitarian organisations often work in parallelly in complex emergency operations (Bessler & Seki, 2006; Eide, Kaspersen, Kent, & von Hippel, 2005). The operations start with relatively short notice and with limited time to prepare for unique aspects in a specific operational area.

But on the other hand some aspects of military operations are rather unique, for example hostile actions, international law concerning combatants. In this thesis, public military organisations⁶ are discussed which also mean that some theory in the public sector is more relevant than pure private business. The complexity, the level of the threats of violence, and the political dimension makes military operations different from for example security firms services, which otherwise could be a comparable private business. The border between

⁶ Public military organization can be described as the opposite to private military companies (PMC). Public military organizations are controlled by a state or interstate organisation (e.g. UN or EU) and are given the mission and overarching rules of conduct by the state. A PMC is controlled by its company board i.e. overarching rules of conduct are given by the board. PMC can be contracted by a state or an organization for a certain mission.

military and private military companies (PMC) has since the First Gulf war turned more blurred, which makes literature in this area relevant (Kinsey, 2006; Singer, 2008). In recent years, there is a growing body of research on PMC. The focus of these studies has mainly been covering how PMC came about, what type of activities they are engaged in, what the ethics⁷ are within the firms, and what ethical responsibility the customers using their services have (Alexandra, Baker, & Caparini, 2008; Kinsey, 2006; Singer, 2008; Verkuil, 2007). None of these authors do however discuss military operations from a SCM perspective. They only discuss the role of these firms as logistic suppliers in military operations. Previous studies done in the defence area have been performed based on a theoretical framework developed mainly in business SCM studies. The focus of these studies has been peace time supply chain relations, for example Humphries and Wilding study of UK defence supply (2004a, 2004b).

The core of this research is based on military logistics and SCM (as already mentioned in chapter 1, SCM is viewed to be a part of military logistics) with an industrial network perspective. An industrial network perspective is chosen because it is believed that it reflects the situation in the relations for international operations. There is a limited amount of actors. On the national level there is often no more than three suppliers that are engaged in supplying international operations in one product area, and on the international level the situation is very similar (Markowski, Hall, & Wylie, 2010). On the local market in the operational area only a limited amount of supply areas exist where different suppliers can deliver to FM (Skoglund & Hertz, 2011). In the other end of the supply chains, the different national armed forces are few in an operation and no real competition exists between them, even if successful conduct in operations is recognised. Relevant for the choice of industrial network perspective is also the different consequences of having a limited number of customers (Ford, et al., 2003).

The study of the logistic solutions, logistic objectives, and sourcing in PSOs, has to build on a theoretical framework from several fields; military logistics, post conflict development, and business SCM. The last field focuses on postponement and speculation, lean and agile, and sourcing. Postponement and speculation have always been an important aspect of military capability where above all the Cold War did to a large extent build on stock piling and speculation. Lean and agile have become more important recently with higher requirements of overall efficiency and flexibility specifically when it comes to international operations.

According to Eccles (1959), it is not enough to define a theoretical area without discussing the objective of the activity studied. In other words, it will influence the choice of theories for a research framework. In this study the area

⁷ Ethics and Corporate Social Responsibility (CSR) are often used synonymously in the literature. Ethics is most common in British literature while CSR is more common in US literature. In this thesis Ethics is used.

2 The Peace Support Operation and its Logistics

is military logistics and the objective is to study if the sourcing decisions have any effect on the creation of the means for PSOs or the contribution to a lasting peace. With Eccles' perspective is it important to discuss how a lasting peace is created and what PSOs are before discussing military logistics and sourcing strategies.

The objective with this chapter is twofold: It forms a theoretical framework supporting the first research question of the study (How can the theoretical important aspects of FM logistics in PSOs be described?) and it provides the reader with an understanding what military logistics in PSOs is about. The low number of academically published articles in the field of military logistics was a complicating factor for this study. The framework discussed in this chapter relies therefore on different types of documents; academic articles, published books from military history or military theory, practitioners' articles and books, government guidelines and policy documents as well as business SCM literature. These vary in relevance and quality, but together they form a relatively stable picture both for understanding the setting of PSOs and to create a framework for the analysis in this study. Many of the government documents on military logistics are based on unpublished research⁸ or studies, which makes them valuable as a theoretical source. The third chapter builds mainly on academic articles and books from the field of business logistics and SCM. In theoretical terms that chapter is more solid. The restriction of chapter 3 is the limited relation to the military logistics field. One important theoretical contribution with this thesis is to add to this relation.

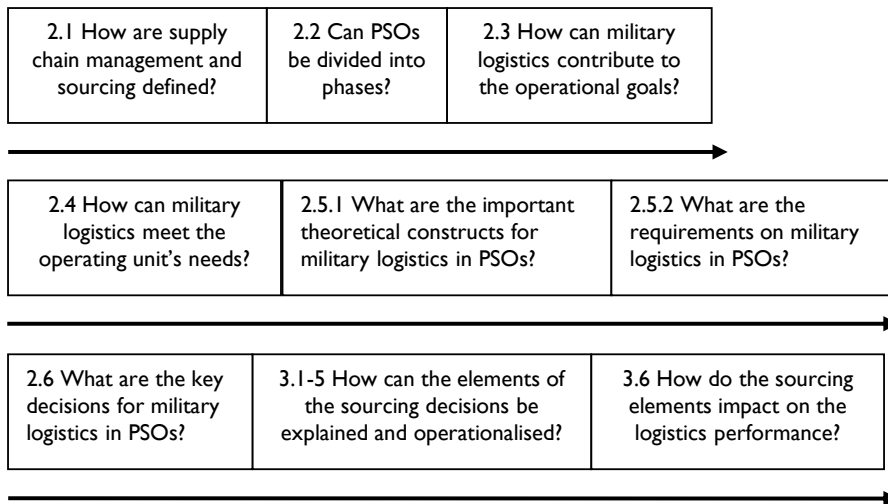


Figure 2.1 Overview of framework development

⁸ Many studies have been classified secret by the military.

The outline of chapter 2 and 3 is based on the research questions presented in the previous chapter, where each paragraph intend create a framework for a sub-question supporting the research questions. The outline of the theoretical framework is shown in figure 2.1.

This chapter starts with a discussion about different phases in PSOs (2.2). Then follows a discussion concerning long-term and short-term objectives with logistics in PSOs (2.3-4). In section 2.5 the focus is on understanding the theoretical underpinning of the logistics for PSOs. Then four strategic decisions for the logistics in PSOs are presented (2.6). At the end of the chapter the discussions are summarised with the support of the research questions presented in the first chapter.

2.1 Key concepts

2.1.1 Supply chain management and industrial networks

There are numerous different perspectives on what supply chains or SCM are and how they should be interpreted. To avoid confusion for the reader the understanding in this thesis of supply chain, SCM, and the perspective towards to industrial networks is discussed and clarified below.

To develop, produce and deliver supplies or services, or upgrade already delivered supplies, requires almost always a supply chain. A supply chain can be described as internal, dyadic, external, or as a network (Harland, 1997). In its simplest form it can be an internal chain, within the organisation, where someone produces raw material, someone produces the supply and finally someone transports it to the buyer. In reality, the supply chain is commonly a network of suppliers (Lambert, Cooper, et al., 1998). The most complex form of supply chains is probably to be found within the defence area. Complex equipment used by the armed forces has a physical life length of 30-50 years (e.g. The main battle tank centurion was in use in FM for 45 years), which requires long lasting supply chain relations (Johnsen, et al., 2009). The armed forces use a number of different services, consumables and equipment in their operations which require a complex network of suppliers. It is consequently more appropriate, in many cases, to talk about a network of supply chains. A producer will of course have more than one product in the portfolio. Most products will, concerning construction, be similar though, so the supply chains for different products will not differ much from each other, and the complexity of business relations will not increase so much when adding new products into the portfolio. A supply chains can be defined as a network that works together to enable a flow of supplies into the market (Aitken, Childerhouse, Christopher, & Towill, 2005).

2 The Peace Support Operation and its Logistics

The difference between a military and a business supply chain until the end of the Cold War can be described in the following way (McGinnis, 1992; Zinn & Bowersox, 1988):

The military supply chain stored the needed supplies as close as possible to the operating units that is the end customer. The business supply chain delayed the flow of the supplies upstream supply chain with postponement or just in time strategies. On the military side, these thoughts are outdated with the new requirements to reduce the logistic footprint⁹ and the requirement on being at least as flexible as the military units it supports (Tuttle Jr., 2005). These changes call for a new way to decide upon the logistics and understand the military supply chains.

In the military area two perspectives on the supply chain have often been used; either an internal perspective from national military warehouses to the end users, the soldiers or units, or an external perspective covering the supply chain from the raw material suppliers to the end users. The first group dominates in the military logistics literature (e.g. Barahona et al., 2007; Chappell & Peck, 2006; Tuttle Jr., 2005), while the second group has been relevant for homeland defence and for the reformation of military forces where they become more dependent on their suppliers (e.g. Cardinali, 2001; Griffin, 2008; Johnsen, et al., 2009). In the latter group the published research tends to focus on the dyadic relation between the armed forces and their suppliers on national level, which is between the procurement agency and the first tier suppliers. This limitation in the studies links to the definition presented by Mentzer et al.:

A supply chain is defined as a set of three or more entities directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer. (Mentzer et al., 2001, p. 4)

The definition of Mentzer, et al. does not require the holistic perspective from raw material to the finished goods; it is enough to talk about three different entities to have a supply chain perspective. Therefore the Mentzer et al. definition of the supply chains is used in this study. This study encompasses one or two tiers upstream of FM and at least two tiers internally within FM including the end-customer. Due to the fact that FM uses a large diversity of supplies, all the suppliers form a network when graphically presented. This network is the FM supply chain.

As the starting point for this study's perspective of SCM two definitions were used;

Mentzer, et al.:

⁹ Logistics footprint is in military operations measured in more than one way. Common in civilian applications is to use a CO2 measure, which also is usable in military applications (ref). But the CO2 measure must be complemented with how much physical space and how many resources (trucks and personnel) the logistics use in the area of operation (Tuttle Jr, 2005).

Supply chain management is defined as the systematic strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving long-term performance of the individual companies and the supply chain as a whole. (Mentzer, et al., 2001, p. 18)

The Council of Supply Chain Management Professionals (CSCMP) has a slightly different definition:

Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. Supply Chain Management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology. (CSCMP, 2010)

The main difference between the two definitions is the focus on functions in the first and activities in the second. Thereby it is a stronger emphasis on a strategic holistic perspective by Mentzer, et al. The CSCMP definition points at other important aspects as well, but these are not excluded in the Mentzer, et al. definition. For this thesis the Mentzer, et al. definition is interpreted into the specific situation of a small nation's defence forces, where the industrial network is argued to be a relevant description of the relations in the supply chain.

In relation to SCM, the industrial network perspective used in this study plays an important role. A network can be describe as a number of businesses linked together through physical flows, knowledge exchange, or personal relations (Ford, et al., 2003). When it comes to service providers, the number of different supply chains can grow drastically. The simplest service does not require that many supply chains while the complex services require many and complex supply chains. A military organisation can be viewed as a service provider of security or war. In and between military operations there are continuous changes in the environment and the threats which have to be met by technological development, modifications and support (Försvarmakten, 2007a). The need of new technology leads to a need to form of new relationships and that the network is slowly changing, even if it is stable in a larger perspective (Forsgren, Hägg, Håkansson, Johansson, & Mattsson, 1988).

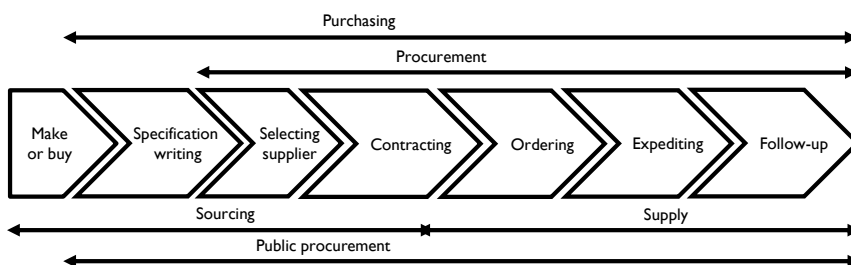
Even with a rather homogenous product portfolio, there are a number of different aspects to consider. According to Håkansson (1989) the coordination, even in a simple supply chain, is so complex that it has to be dealt with on

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continuous basis. On the day-to-day basis adaptations of routines, knowledge exchange, and strategies will occur. The supply chain for military operations require coordination with a large number of firms in several industrial sectors (Försvarsmakten, 2007a). As the basic idea of the industrial network approach entail that one organisation cannot control the whole network, this means that one organisation cannot control the whole supply chain (Ford, et al., 2003). This means that FM can only manage their own position in the supply chain by themselves. Management of other parts in the supply chain requires collaboration with other actors.

2.1.2 Sourcing and its relation to other terms

In the literature a number of different terms are used to describe the process of how an organisation obtains supplies. The objective with this paragraph is to define the term sourcing and to position it in relation to other terms in the field. There is no consensus among researchers or practitioners about the usage of the different terms, instead they are often found with similar but partially different definitions and interpretations (Lambert, Stock, & Ellram, 1998). When comparing different authors it is however possible to identify a pattern where some sort of dominating trend exists. In figure 2.2 one example of a sourcing process model with related concepts is presented.



Adopted from van Weele (2005 p.13)

Figure 2.2 sourcing process model and some related concepts

Purchasing

Van Weele (2005) did put together a thorough presentation of purchasing, procurement, supply and sourcing and how they relate to each other. He defined purchasing as:

The management of the company's external resources in such way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities is secured at the most favourable conditions. (van Weele, 2005, p. 12)

According to van Weele purchasing is the widest definition, being the interface between firm strategies and internal development and production processes. Important to note is that van Weele's definition excludes the decision between internal and external resources, to make or buy. Others have defined purchasing in a similar way (e.g. Axelsson, Rozemeijer, & Wynstra, 2005; Monczka, et al., 2010), which supports the use of the definition above.

Procurement

According to van Weele (2005, p. 14) procurement 'includes all activities required in order to get the product from the supplier to its final destination'. Compared to purchasing, the process step of specification writing is excluded. This perspective is also supported by others (e.g. Axelsson, et al., 2005; Chopra & Meindl, 2007). Axelsson, et al. and Chopra & Meindl mean that the important development introduced with procurement was the optimisation of flow and coordination of different needs.

Public procurement

The use of the term depends somewhat on the national traditions and organisational perspective. Lloyd & McCue (2004) conclude in their paper that it is not feasible to give one single definition. They point out the many different perspectives that exist; governmental definitions, international perspective definitions, organisational based definitions and legal based definitions. A typical example they put forward is the professional associations in the US who have purchasing, contract management and procurement in their official name, but work with the same type of questions. This means that the term might need a national amendment to be understood correctly. The Swedish Competition Authority defines public procurement as:

The activities performed by a procuring agency in order to award a contract or enter into a frame agreement concerning goods, services or construction work. (Konkurrensverket, 2012)

This definition is though so brief that it does not, in reality, give any advice on the scope of public procurement. It can of course be argued that this definition

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pinpoint the legal and administrative requirements. When studying FM and FMV one can definitely identify a wider perspective where military capability development and operational perspectives are included as well as other political objectives, e.g. environment, ethics and gender.

Prier & McCue (2009) also notes the inconsistency regarding the used terminology between different official agencies and the body of knowledge. They argue though that the underlying discussions are widely recognised and accepted and thereby it is reasonable to suggest a definition:

Public procurement is the designated legal authority to advise, plan, obtain, deliver and evaluate a government's expenditures on goods and services that are used to fulfil the stated objectives, obligations, and activities in pursuant of desired policy outcomes. (Prier & McCue, 2009, p. 329)

This definition is much more in line with the intentions of this study. Important is to notice that public procurement is not only administration, it is in the end about fulfilling political objectives, and to handle contradictory requirements deliberately. Thereby the specification of requirements becomes an important part of public procurement, which differ public procurement from the definition of procurement above.

Supply

According to van Weele (2005) supply is a term with different connotation in Europe and the US, but with a wider perspective it covers the practical and logistics oriented processes after a signed contract, to create efficient handling of deliveries and following up of the suppliers.

Sourcing

Sourcing has become increasingly popular. This term is probably the one that differ the most between different authors. One end of the view can be represented by van Weele (2005): 'Sourcing relates to developing the most appropriate supplier strategy.' A very different view is the one presented by Skjøtt-Larsen, Schary, Mikkola, & Kotzab (2007): 'Sourcing is the decision where to source (internally or externally) and procurement of the externally sourced material or products.' Similarly Chopra & Meindl (2007) define sourcing as: 'Sourcing is the set of business processes required to purchase goods and services.' They present the processes in terms of make or buy, number of suppliers, in case of multiple suppliers; the role of each supplier, definition of selection criteria and selection of suppliers, decision on contract type, and facilitation of the placement and delivery. This perspective is more or less the whole public procurement process plus the initial make or buy decision. According to Mookherjee (2008) most authors compare sourcing with strategic purchasing which relates to the business strategy and focus on: make or buy and supplier relations strategies. Building on this perspective Sourcing is the

strategic decision-making process that starts with a make or buy decision and ends with a signed contract. After the contract is signed the supply process comes into play. Especially worth noting is that sourcing handles one step that is not handled within the public procurement process and that is the make or buy decision.

Having defined the concepts of supply chain and SCM with an industrial network perspective and sourcing in relation to other commonly used terms, we now turn our focus towards PSO.

2.2 Phases in peace support operations

Already in the first lines of this chapter we could see, that a timeline exists in a PSO, where the activities seem to change radically as time passes by. These changes are believed to be important when studying logistics in PSOs. We will below discuss how these activities can be separated into phases for PSOs, which also suits the needs for the logistics. The military logistics literature does not consider PSOs, when it comes to the phases of the operation, instead it discusses general aspects of larger operations, but these can be applied on a PSO context.

The first identifiable phase is the capability creation phase, where the basic soldiers are trained and long lead-time items are procured (Försvarmakten, 2007a). The next phase is the Pre-deployment phase. Forces used for PSOs have often low preparedness and is not organised for PSOs so they normally need time to reorganise and update their equipment (Boutros-Ghali, 1992, 1995). It is also well known that any PSO is preceded by international negotiations and national decisions. These activities fit well into Tuttle Jr.'s (2005) thoughts about the pre-deployment phase. The next phase is preparation for movement (Foxton, 1994; Tuttle Jr., 2005). During this phase all the supplies are packed and transported to the area of debarkation. The next suggested phase is the deployment phase, which consists of the embarkation, the transport, and the debarkation activities including the staging where personnel and equipment are formed into operational units (Kress, 2002). The deployment is followed by the phase, that will sustain the operation for as long as it lasts (Henderson, 2008; Sarin, 2000). The last phase is liquidation of the operation which is by Pagonis (1992) argued to be one of the most complex phases to handle. Some authors use the redeployment instead of liquidation, but often with a more limited content. This would leave us the following 6 phases: capability creation, pre-deployment, preparation for movement, deployment, sustaining the operation and liquidation of the operation.

2.3 Peace creation and post-conflict development

Peacemaking and peacekeeping operations, to be truly successful, must come to include comprehensive efforts to identify and support structures which will tend to consolidate peace and advance a sense of confidence and well-being among people. (Boutros-Ghali, 1992)

All PSOs have two overarching goals in the end state in common, create security and contribute to a lasting peace (Boutros-Ghali, 1992, 1995; Försvarsmakten, 1997; JDCC, 2004; UN, 2008b). Occasionally other long-term goals may exist but the underlying problems are often the same. The goals of the operation in the Gulf of Aden (one of the operations in this study) are an example. It has as objective to protect World Food Program (WFP) transports and reduce piracy in the area, but the underlying factors are conflicts and instability in the region, especially in Somalia (UNSC, 2008b).

The civil side of peace-creation and post-conflict development are very closely related in research. It can be argued that the same situation exists between military and civil sides in peace-creation even if some researchers have ethical problems with this link. Peace-creation relates to activities to stop military conflicts and hinder violence against the civil population and post-conflict development relates to activities that support the endurance of the peace-development and building of a sustainable society after the end of a conflict. The aim with the discussion below is to give understanding how a military unit's logistics and choice of sourcing solution can affect the peace-creation process and the post conflict development.

But before we start this discussion it is necessary to briefly touch the question 'what is peace?' Peace can be discussed from many aspects. War can be said to exist without any or at least very limited bloodshed or physical hostile engagement in for example the Cold War. Peace can also be discussed in terms of democracy and equality (Oetzel, Westermann-Behaylo, Koerber, Fort, & Rivera, 2009). But here the simplest definition of peace is used: the avoidance of bloodshed and abuse of the civil population.

2.3.1 Military peace-building

Peace-building with international involvement requires, in most cases, engagement of military forces. In military terms, there are different levels of violence in PSOs; peace-enforcement or peacekeeping. Peace-enforcement is defined as the use of diplomacy and military power to the amount the situation requires, convincing the warranting parties to cease fire. Peacekeeping involves lower level of violence, in most cases, only self-protection of the military force or protection of civilians (UN, 2008b). With a military unit's perspective,

peacekeeping is about performing surveillance to make the area of operation secure to the civilian population and other actors supporting the peace-building effort. These actors can be governmental organisations, non-governmental organisations, and private companies. When performing a military PSO there are often two basic steps involved. To begin with it is important to, by using Chu Teh thoughts (lieutenant, close to Mao), confiscate all enemy property and encouragement of assistance of the masses (Vlasak, 2007). Having knowledge about guerrilla warfare is essential in order to successfully combat or disarm hostile parties in a PSO. Giving medical support to minefield victims can be an important step to get the local population to support an on-going PSO (Andersson, 2001). The second step in a PSO is about giving the population hope. Moshe (2001) argues that people who believe in the future will struggle for peace and cooperate with the peace support forces. In a PSO the local population is important informants about the situation and possible threats. By having them supporting the PSO and the existence of the foreign peace support units, they will help to stabilize the security situation in the area.

Ohlson (2008) explains the causes of peace and war with the Triple-R triangle (reasons, resources and resolve) and the Triple-M triangle (mutually hurting stalemate, mutually enticing opportunity, mutually obtained rewards). He argues that peace in the end is about a decision-making process and at some level cost-benefit analysis is the basis for warring parties to agree upon peace. Often the pressure that makes peace interesting is of non-military nature like embargoes, economic sanctions, or diplomatic pressure. It is important to keep the cost-benefit analysis in favour for peace over time otherwise there is an obvious danger that the belligerent parties will re-open the war again.

2.3.2 Civil peace-building

Peace-building is generally speaking all about how to rebuild the society after war. Often is and the peace weak and needs to be stabilised through different measures. There are many different aspects to include, for example; build state institutions, develop central and local governance, re-establish rule of law, reconstruct infrastructure, create business, reintegrate individual fighters into civilian life (Goodhand & Humle, 1999; Humphreys & Weinstein, 2007; Kaldor, 2003a). It is important to identify what the dominating factors are, to create a lasting peace. Korac (2006) argues:

...the need for long-term peace-building initiatives that should critically involve identifying and supporting local capacities for peace. (Korac, 2006, p. 518)

Unfortunately Non-Governmental Organisations' (NGO) funding for emergency assistance or disaster relief is only for a shorter time period and many NGOs have to withdraw long before the local government has the capabilities or funds for basic healthcare or education (Carter, 2008). Some

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researchers and practitioners argue that military can and should do more in complex emergencies in form of giving humanitarian aid when civil resources are limited (Gourlay, 2000; Hofmann & Hudson, 2009; Hubner & Ditzler, 2004; Jenkins, 2003). There are others (e.g. Barry & Jeffreys, 2002) with an opposite perspective, but the trend is that the international society accept and support military aid giving (UN, 2008a). Privatisation of public property is done to generate resources to an underfunded post-conflict government. According to Kamphuis (2005) the main problem with privatisation is that one of the largest parties that have capital to buy state owned property are the people that have prospered on the war-economy. A war-economy is dominated by theft, drug production and trade, sex trade, and security services. Criticism against the neo-liberal economic ideas that have dominated in peace-building operations is common among researchers (e.g. Kaldor, 2003a). Instead international private companies can make the difference in peace-building, by having the financial strength needed and the ambition to help based on both profit interest and ethics (Kidder, 2006; Oetzel, et al., 2009).

Kaldor (1999) argues that the reconstruction of a community must first begin with organising political institutions and governmental authorities, these issues must come hand in hand with the development of local businesses. The problems in the post conflict society are many, weak government, high unemployment rates (for example 65-75 % in Bosnia and Herzegovina (UNHCR, 1997)), demilitarisation of combats, destroyed infrastructure, and a war-economy only to mention a few. Marginalised groups of the population must take part and be accepted members of the new society (Moshe, 2001). A dialogue that involves everyone is crucial for the peace-development (Lederach, 2005). There is no single solution to all problems but the basic needs of humanity do not change and are important to take into consideration. In Kosovo, KFOR¹⁰ had as some of their main tasks to get factories opened and re-establishing the workforce, and to assist farmers with repairs for instance so that they could produce normal harvests (Andersson, 2001). By not being dependent on any party, private business can act more freely and both support the creation of micro businesses and start up establishments of their own (Kidder, 2006). Thereby private business involvement can speed up the peace-process.

Several scholars argue that the most important activities in post conflict development have the objective to secure the people needs; to get protection against criminals and to get jobs to support themselves (Stephens, 2000). People living on welfare will be less motivated to support a new political regime. The final step in Maslow's hierarchy of need is self-actualisation is also an important factor in a post-war society. To create business relations and give micro-loans, to support entrepreneurship are by many believed to be the sustainable development that will hinder future conflicts. These activities are

¹⁰ KFOR- The NATO peace-keeping force in Kosovo

called to support the grassroots economy (e.g. Korac, 2006). In turn, the grassroots economy creates dialogues among the population that are necessary for the peace-building (Lederach, 2005). The institute of global ethics (IGE) launched a campaign on promoting economic development in the Palestinian areas to promote peace. The campaign suggested 21 different activities which supported the development, for example to operate manufacturing facility, create micro-enterprise opportunities or help to create management skills (Kidder, 2006). Business engagement can be an important factor for the peace-building process, by introducing democratic ethics, contribute to the community building and fostering the economic development (Oetzel, et al., 2009).

Much can be done to support the peace-development, which is the long-term objective for logistics in PSO. But it is also important to hinder the society to become too dependent on aid. It is a commonly accepted view that foreign aid organisations, Non-Government Organisations (NGOs) and Peace-Support Units can hinder the peace-development. Groups of the restructured society get too large proportions of their income from the support to international military and aid organisations (Kaldor, 1999; Kamphuis, 2005; Macrae & Leader, 2000a, 2000b). They will therefore strive to keep the organisations in the former conflict area. The organisations can reduce these types of problems by spreading their needs towards many local suppliers and to hinder a certain supplier to become too dependent on the international organisations. Having private businesses to engage in the transition phase, and changing their supplier focus in the operational area from the military PSO organisations to other national and international customers, can also reduce the problems (Oetzel, et al., 2009).

2.3.3 Summary - peace building

Based on the discussion above it is reasonable to assume that PSOs can support the post conflict development in three ways: Firstly, to fulfil their main objective: provide security for the population and humanitarian organisations. Secondly, they can use some of the military logistics resources to provide support to the population, when civil resources are limited or unavailable. Thirdly, by sourcing some of their needs locally they can support the existing businesses, support the development of new businesses, or encourage existing global suppliers to start production or service facilities in the operational area.

It is also important to coordinate activities between different military and aid organisations to hinder suppliers from becoming dependent on aid.

2.4 Military operations

To understand the logistics requirements and create the means for PSOs or military operations in general, we will first consider some of the basic elements of the military theory. Much of modern military theory builds old classic writers, Sun Zi ~500 BC, von Clausewitz 1832-1834 and de Jomini 1838 (De Jomini, 1838/2007; von Clausewitz, 1832-34/1991; Zi, ~500 BC/1997). The most dominating thinker, for modern researchers and practitioners, is among many military theory researchers argued to be Clausewitz 1832-34 with his book, *On War*. Two central points of his thoughts about military strategy are also important for logistics: Centre of Gravity, and Friction.

Centre of Gravity is about what objectives need to be achieved to get the enemy/opponent to accept your will. This perspective could be interpreted in a much wider perspective than just state against state war. It could mean that military forces contain the capability of a terrorist network, or hinder criminals like warlords to prosper from a suffering population (Herberg-Rothe, 2007; Herberg-Rothe & Echevarria II, 2007). With an anticipated enemy Centre of Gravity, it is possible to create a operational and logistic planning.

Friction was used by Clausewitz to describe that even the simplest things are difficult in war. All unknown things that can happen in military operations, e.g. failure of major equipment or an enemy doing the unanticipated, will have consequences for the outcome of the war. For logistics, Friction means requirements on flexibility and contingency planning. Clausewitz built his theoretical thinking around the Napoleon wars, but his theories are still believed by many to be important for modern warfare.

Much has happened in warfare since the nineteenth century though, to a large degree driven by technological development. Two major technological steps have reformed warfare, firstly the mechanisation of the forces and secondly the development of the computer based information and communication technology (Alberts & Hayes, 2003; Liddell Hart, 1954/1991). These changes have to a large degree influenced the development of military theory to create an understanding and fulfilment of the needs in modern warfare. In modern warfare, two new theoretical aspects are believed to be more important for the logistics than other changes: the time element and the political decisions.

Firstly, the time element has turned much more important in modern operations. The technological development makes it possible to move units faster and to send information and orders faster throughout the organisation. The planning phase takes longer time in modern war in comparison to the effectuation. Achieving the objectives in military operations is to a large degree about being ahead of the enemy's planning, inside his decision circle e.g. the OODA-loop (Observe-Orient-Decide-Act). This can be achieved through higher speed in the OODA-loop than the enemy or being able to do many operational tasks in parallel (Boyd, 1987; Warden III, 1998). Achievement of

the operational tasks in a modern war requires higher speed and greater flexibility in the logistics system (Ferris & Keithly, 2001). The First Gulf War (Desert shield/Desert storm) was based on a massive build-up of resources, which was incredibly costly. The operation also used Cold War stocks (Pagonis, 1992). These high levels of resources in stock will not be available for future wars or PSOs. It can also be discussed if the build-up actually reduced the strategic and tactical alternatives in the operation, since it actually tied down transportation and guarding resources to the logistics stocks in the operational area. In the Second Gulf War (Iraqi Freedom) the coalition forces were equipped with lighter material and they operated with large movements over distant areas and with high degree of tactical changes in the activities (Donnelly, 2004). The change of the coalition strategy and tactics between the First and Second Gulf War required higher flexibility and speed in the logistics system. It was more carefully tailored, both of cost reasons and operational reasons (Wang, 2000). The change can be described as a move from a supply based logistics structure with stockpiling in the area of operation, to a distribution based logistics structure which is flexible and capable to redirect flows to where they are needed (Edwards, 2004).

Secondly the political decisions about where and to what purpose to use military units differ compared to the past. Today military forces must be prepared to engage in anything from humanitarian aid in natural catastrophes, to PSOs with a large humanitarian objective or to deploy in full scale wars both in the homeland and internationally (EU, 2004b). The doctrine development and strategic planning within armed forces are to a certain extent about how to meet the political objectives and requirements. The development of expeditionary forces, with a modular system to be tailored for the unique operation, is aimed to meet these requirements (Försvarsmakten, 2009a). The complexity and the number of unknown factors require that the military strategists work with risk assessment and contingency planning, and this of course has the consequence that logisticians have to do the same.

2.4.1 Needs in peace support operations

PSOs can range in the scale of conflict, from separating warring parties; peace-enforcement, to observing how the parties are following a peace-treaty; peacekeeping (Boutros-Ghali, 1992). The type of operation and the situation in the operational area put different requirements on what type of equipment and supplies are needed.

The management and design of the logistics system must be in line with the strategic planning (Ferris & Keithly, 2001). A military system in balance means that with a military operational capability an adherent logistics support capability must follow. For a small nation this functional relation can be a resource dilemma. The political will to participate in PSOs with different capabilities in different areas of the world and the generals' wish to fulfil the

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political will are not always in balance with the financial resources for the armed forces. It is not possible for a small nation to meet all international requirements and at the same time meet all homeland defence requirements within the budgetary restrictions. Strategies for available capabilities, readiness and sourcing are thereby very important for small countries. The strategies should be communicated and agreed between the armed forces and the government. These agreements are the baseline for the political commitment to participate in different international operations (Försvarsdepartementet, 2009; Utrikesdepartementet, 2008a).

Areas where PSOs are requested are almost always also in need of humanitarian assistance. These types of catastrophes are called complex emergencies (Van Wassenhove, 2006). In complex emergencies, many actors (military, governmental, and non-governmental organisations) share area in which they operate (Bessler & Seki, 2006; Eide, et al., 2005; Sebastiaan Joost Henrikus Rietjens, 2006). In PSOs military logistics should be prepared to both support the military units and the civil society with humanitarian aid (EU, 2004b; Pettit & Beresford, 2005; Sebastiaan J.H. Rietjens, Voordijk, & De Boer, 2007). Whenever possible the logistics system should strive to support the rebuilding of the society (see 2.3.3 above).

To summarise, the needs in PSOs are unique in every single operation and the logistics system needs to be tailored. On a general level the logistics must be in line with the operational strategic planning and be prepared to provide humanitarian assistance.

2.5 Military logistics in peace support operations

All PSOs emanate from the engagement of the international society. Therefore PSOs build on the participation from several nations, both small and large. For small nations' military forces this means that they will participate as a partner in large-scale operations. These operations vary both in location and in scope. The varying types of operations require a flexible and agile logistics system. But, since the armed forces are financed with taxpayers' money, there is also a strong requirement on a high degree of efficiency in the logistics system. Following the definition of military logistics, logistics carries just about all costs in the defence budget except for the salaries to the soldiers. Ferris and Keithly (2001) argue that the logistic system must be at least as flexible and dynamic as the military community it supports. Tatham (2005, 2006) discusses the requirement on being both flexible and efficient. He concludes that the logistics system needs to be agile in war and lean in peace. Below the logistics are discussed concerning basic principles, requirements, supplies and strategies for international operations in general and for PSOs in particular.

2.5.1 Logistics principles in international operations

The requirement on the logistics system is to create the means for and to support military operations, no matter if it is in the homeland or abroad. Historically military logistics has been based mainly on local sourcing; rob or buy from the local community what you need when you are passing. This was the main practise and philosophy until the Napoleon wars (Lynn, 1993; Van Crevald, 1977). Modern (1930-) logistics approaches have, partially due to technological development, presented two other possibilities; either carry what you need with you or send in the resources from the rear area¹¹ when needed (Kress, 2002). Practically, two mainstreams developed after the Second World War: The Warsaw Pact solution and the NATO solution (Foxton, 1994). The Warsaw Pact solution was based on the carry what you need principle, and the NATO solution was based on send the resources from the rear principle. The Warsaw Pact logistics was based on the idea that a unit was equipped with all it needed for a certain task. When this task was fulfilled and the unit ran out of resources, another unit took over and the first unit was pulled out from the combat area for reconstitution. The Warsaw-pact solution was based on an offensive war, while the NATO solution was based on a defensive or status quo war. A pure offensive solution is not applicable for a PSO, since the aim is to stabilize and secure a war-torn area. The practical consequence is that the military units have to be prepared to operate for a relatively long time in the same area. This leaves us with the NATO solution as the way forward to define a theoretical frame for PSOs. The NATO solution was built on the idea that one could not afford to pull out units for reconstitution, so the units needed to be supported during their performance of tasks by integrating support capacity at all levels in the organisation and sending new supplies to the war instead of moving in new units. After the end of the Cold War, the NATO solution has been the dominating theoretical idea for logistics principles among the different national armies. Large forces acting in international operations with the NATO solution as it was during the end of the Cold War is shown in figure 2.3.

The solution described is based on the large size of operations as e.g. US or UK forces during the first war in Iraq. It consists of five organisational levels of logistics with partially different objectives and capabilities. Each level has its own processes and timeline following the overall battle rhythm (Henderson, 2006, 2008). The first two levels are capabilities integrated in the operational units' organisations and support tactical needs. The third level contains resources that are too vulnerable, vital or too unwieldy to keep in the combat area, and is the main stock level for transporting materiel to the combat logistics units (Foxton, 1994). The fourth level is the disembarkation and deployment point for the armed forces. It is also the entrance and transfer area

¹¹ With rear or rear area is normally meant logistics resources that are brought in from outside of the operational area i.e. the resources in the homeland in international operations.

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for logistics resources to the operational area. The fifth level is the strategic base, from where the resources needed are produced or stored between operations. Military logistics is strongly interrelated with military strategy and tactics. At the first logistic line, the focus is to coordinate with tactics. The longer upstream in the logistics organisation you go, the more important the strategic aspects become.

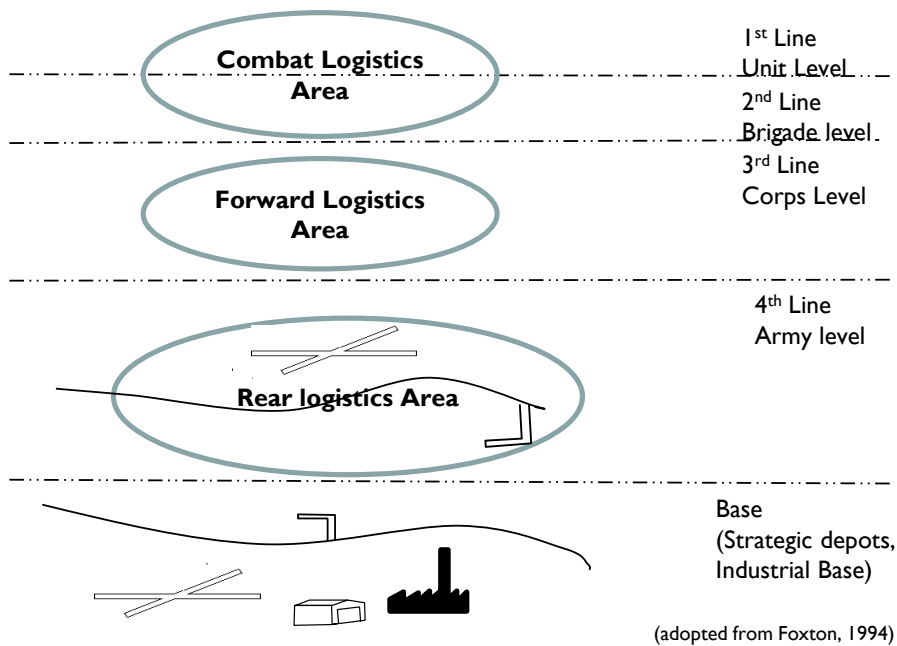


Figure 2.3 Logistics in international operations I 2

The NATO logistics main principle has not changed since the Cold War and is still based on the idea of sending resources from the rear (NATO, 2007). In reality in all operations, logistics is about tailoring a suitable combination of the three principles; bring what is needed, obtain locally, and send in from the rear or from outside (Kress, 2002; Tuttle Jr., 2005). The first NATO concept was built on the Cold War scenario in Europe. Modern warfare, after the first Iraqi War, has developed to higher speed on the tactical level and in the operational planning. Many argue that this requires a reduced logistics footprint with a

¹² Signs used:  airfield,  harbour,  warehouse,  industry.

leaner system to sustain the forces (Kallock & Williams, 2004; Mathaisel, 2008; Peltz, Halliday, Robbins, & Girardini, 2005; Peltz et al., 2005). Budget constraints in the aftermath of the first Iraqi War have also forced the US and GB to search for more agile and efficient logistics solutions. The trend has been to create logistics processes with fewer organisational levels and fewer process steps. In practise this means that the logistics tries to give the support or to send the supply directly from the factory to the foxhole. The new logistics solution has fewer levels and has been used in operations since the late 1990s. This new solution is shown in figure 2.4.

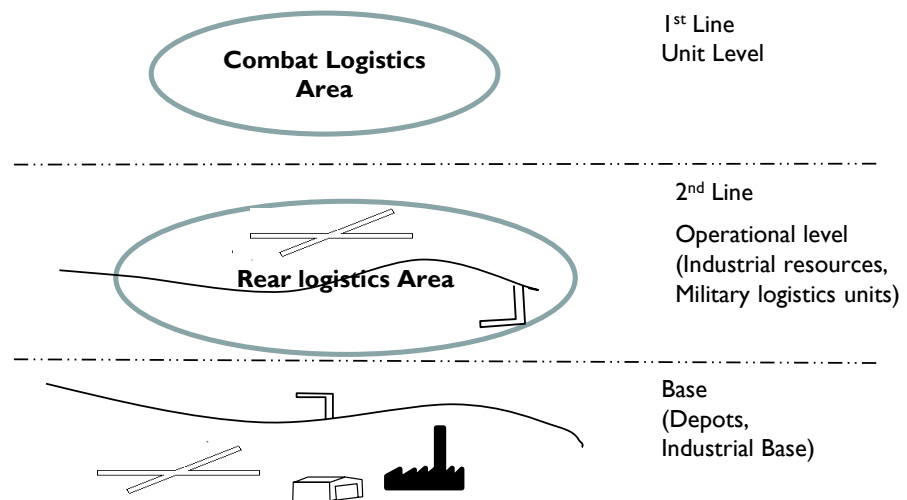


Figure 2.4 Logistics tiers in international operations since late 1990s

According to O’Konski (1999), the ambition has been to reduce the stock piles in the operational area (stockpile logistics) and to direct the flow of goods to where and when it is needed (flows logistics), and deletion of logistics process steps which do not add value to the unit or soldier (end customer). In the logistics planning, Private Military Companies (PMC) and the defence industry become increasingly more important (Kinsey, 2006). These actors use more commercial and less military considerations to engage local community into the logistics planning and support (Singer, 2008). Using suitable ways of contracting these actors becomes increasingly more important from a number of different perspectives. Their upstream supply chain relations with local suppliers can affect reliability of the supply chain, and also affect the Centre of Gravity in the military operation. The ethics of companies acting in the operational area will also affect not only the operation but the credibility of the military forces from a certain country (Alexandra, et al., 2008; Caparini, 2007).

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PSOs range from peace-enforcement in unstable areas with high levels of violence and the need of large forces with heavy equipment, to peacekeeping in relatively stable areas where only smaller forces with light equipment are needed. The old model for logistics tiers within the operational area (figure 2.3) above was basically designed for worst-case scenarios, i.e. it could be used in PSOs, where large-scale peace-enforcement is needed. But, as mentioned above the trend seems to move towards a reduction of levels in the operational area (Peltz, Halliday, et al., 2005; Peltz, Robbins, et al., 2005). Smaller nations rarely act in peace-enforcement operations. If they do, they are often fully integrated into the command and logistics structure of a larger force body in the operation. Normally smaller nations act in lower levels of threat and with national logistics solutions. In homeland defence operations, based on theoretical studies and modelling, FM planned for two and three levels. The two-level system was only a simplification of the three-level system. First and second lines are similar to the ones described above. The third level is more of a combination of the third line and the Base in figure 2.3 (Chefen_för_Armén, 1993, 2001). The Swedish model does though lack the important aspect of the rear logistics area in the large force model, since it was developed only for homeland defence. Logistics for Swedish participation in PSOs is not discussed to any larger extent in any literature, which lead to the question how a model for a PSO for a small¹³ force would look like? Is the large force model presented above applicable or does it need adjustment? Is the change in the US and UK with lean and agile aspects also relevant for a small nation's logistics model for PSOs? There are no arguments to be found in the literature that the large-scale force model with the adjustments to lean and agile would not also work for smaller nations' forces. Therefore the model in figure 2.4 is used as the baseline for this study.

2.5.2 Requirements on the logistics system in peace support operations

Thorpe (1917) identifies the strong link between military strategy and logistics. The development of the logistics system is therefore an iterative process between military strategy decisions and logistics solutions. In this process the logistics system depends mainly on two military strategy decisions (Berg, 2006):

- What level of readiness should the military units have? (Number of days allowed for deploying the unit.)
- What availability should the deployed unit, its personnel and equipment, have during the operational timeline?

¹³ Company-Battalion size unit, 100-2000 soldiers in total.

The answer to the first question defines the requirements on the logistics system in the homeland during the preparation phase. It defines how much of consumables and equipment must be prepositioned for possible future operations and how they have to be stored. The highest readiness level is that everything is stored ready to be loaded on a ship, an airplane or a train for transportation to an operational area. The construct of postponement and speculation can be used to further detail and discuss this aspect.

The answer to the second question gives the baseline for the requirements on the logistics system during the operation (Berg, 2006). These requirements will also affect the requirements in the preparation phase. Special training might be needed and supplier relations need to be established in advance to meet operational requirements. These aspects can be further detailed with the constructs of lean and agile supply chains.

In the end there is also a general requirement to create efficient and effective logistics solutions for PSOs, and to keep the consumption of funding on an acceptable level.

To evaluate if the logistics system fulfils the requirement the results also need to be monitored and analysed. The results from the analysis give guidelines for adjustments of the logistics system. The use of key performance indicators (KPIs) support the development of suitable logistics solutions and evaluate if the requirements are fulfilled (Parapob, Suthikarnnarunai, & Buranapraba, 2009). The logistics solution can be improved by modelling and measuring the KPI or by measuring KPI in actual operations (Davidson, 2006). Wouters, Anderson and Wynstra (2005) suggest another way of meeting the requirements by analysing the sourcing activities from a total cost of ownership or a total value creation. Combining the analyses with KPIs could lead to more efficient and effective use of the taxpayers' money.

Two basic requirements exist on PSO forces, readiness and availability (Berg, 2006). These requirements can be discussed using the constructs of postponement and speculation and lean and agile. No matter what theoretical construct used military logistics is such a complex operation that it requires systems to evaluate and follow up the development. Key performance indicators seem to be best suitable to meet these requirements.

2.5.3 Supplies enabling military operations

To support a Swedish company¹⁴ size operation, the logistics system has to handle more than 2000 main products and 50.000 different spare parts, not to mention all types of services required (Skoglund & Hertz, 2007). The supplies consist of a huge variety of supplies, from bottled drinking water to very complex military equipment, and services, including specialized medical or

¹⁴ Company - military unit with the size of 100-200 soldiers.

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technical support or basic maintenance of the camp area (Foxton, 1994). As already mentioned, military operations vary in many different aspects. There is a need to have supplies that can meet operationally planned conditions or that can be adjusted to the needs for a specific operation or operational area. The adaptability of the main equipment is essential for smaller nations' military capability to perform required tasks. For services this requirement relates to the ability to provide the service under all conditions in any possible operational area. For supplies it concerns the ability to meet different environmental conditions such as snow, sand storm, high humidity, high or low temperatures, in storage during transportation and in operation. This can put requirements that enable adaptations of the products and to adjust to new packaging requirements, before sending the supplies to the area of operation.

To plan, facilitate and support a military operation, the supplies have to be organised into groups to reduce the complexity of the analysis and planning. In business environment supplies can be divided into raw materials, components, investment goods, operating supplies, maintenance, repair, and investment services (van Weele, 2005). In military operations another way of dividing the supplies into different groups is more common. Besides the need to reduce complexity for planning and analysis of needs, the grouping of the supplies into certain classes also have other logistics reasons, for example custom regulations, fire and chemical regulations, and medical regulations.

Two ways of classify military supplies dominates the US classification and the NATO classification, see table 2.1 (Foxton, 1994; NATO, 2007). The US classification consists of 10 groups while in the NATO classification some of the US groups are put together creating a total of 5 groups. Both classification systems have their own advantages, but the US classification is often preferred since it gives more detailed information about each group. Both US and NATO classifications only talk about physical products, but the structure can also be used for services (Skoglund & Hertz, 2011).

In US armed forces risk analysis have been used to evaluate effect of potential loss of certain supplies to identify the importance for operational success (Walden, 2006). The two aspects studied are the criticality of an event or physical product and the probability that the event will occur or that the equipment will not function. This links back to the measuring discussion in the previous paragraph and shows the important relation between supplies and logistics performance in military operations. When it comes to international operations, logistics support are viewed as one of the most important aspects (Blanchard, 1992). Using the product structure is one way of solving structure for criticality analysis of problems with supplies and adherent services. The US military supply classes are divided in a way that facilitates the risk- and criticality analysis concerning supplies in a military operation, which in turn supports the development of the logistics solution for an operation (see 2.5.4 below)2.5.4.

Table 2.1. The US and NATO classification of supplies for military operations.

US classification			NATO classification		
Class	NATO ref Class		Class	US ref Class	
1	1	Sustenance and water	1	1	Sustenance and water
2	2 & 4	Individual clothing and equipment	2	2, 7, 8 & 9	Supplies for which allowances are established by tables of organisation
3	3	Petroleum, oils and lubricants	3	3	Petroleum, oils and lubricants
4	4	Field fortifications and supplies	4	2, 4, 6, 7, 8, 9, 10	Fortification and construction materials, additional quantities of class II, and other supplies
5	5	Ammunition, mines and explosives	5	5	Ammunition, explosives and chemical agents
6	4	Re-sale and personal items			
7	2 & 4	Major equipment			
8	2 & 4	Medical and dental			
9	2 & 4	Spare parts			
10	1 & 4	Aid to civilians			

(Foxton, 1994; NATO, 2007)

Aspects of supplies can be discussed in terms of first and second order. The first order supply aspects were discussed above, and concerned how to organise the supplies into groups to reduce the complexity of the analysis planning. Below the second order aspect is discussed. The second order aspects relate to the individual product. The second order aspects on supplies for the military perspective are about the supplies being effective and efficient for the military purpose, that is to create value for money (Försvarsmakten, 2007a; Tatham, 2005). With efficient is meant the ability to minimise the total costs for a product. With effective is meant to have the supplies available when needed and with a superior capability compared to the enemy in military operations.

Besides the huge variety of supplies that exists in a PSO, technological superiority and physical life length (many equipment stay in use for 30-50 years) are important product factors. These are factors that have close correlation to effectiveness and efficiency of the sourcing for PSO. The aspects of efficient or effective relate to where in the life cycle the product is. There are two types of life cycle perspectives which both are of importance; the product business life

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cycle (Bowersox & Closs, 1996) and the physical life cycle (Tysseland, 2008; Wouters, et al., 2005).

The product business life cycle can be divided into four phases for a product; introduction, growth, maturity, and decline (Bowersox & Closs, 1996). The requirement to be effective relates to have the right key capabilities when needed. In terms of effectiveness, the product business life cycle is important in both operational related aspects and production related aspects. Products in the early stages of the product business life cycle can create military operational advantages through technological superiority. The production capabilities change over the product business life cycle, which affect for example lead-times and the availability of spare parts (Blanchard, 1992). Kraljic (1983) introduces a portfolio categorisation of supplies into four different groups, leverage supplies, strategic supplies, standardised supplies and bottleneck supplies. Especially strategic products can be important in terms of effectiveness but also leverage products can meet this objective through adaptations. The objective of adaptation is to meet local operational conditions and to adapt to different threats or environmental requirements. The adaptations of product involve changes of the product and/or the packaging. The efficiency requirements relate to the sourcing and the adherent support. Kraljic's (1983) categorisation into different groups was to a degree about creating cost efficiency through competition, streamlined procurement methods or efficient supplier relations. Leverage supplies and standardised supplies are categorisations to support a competitive sourcing strategy for the supplies (Kraljic, 1983). Leverage products are normally complex but competition exists on a functional level on the military market (Markowski, et al., 2010). Standardised supplies are relative simple products with a detailed specification or just commodities (van Weele, 2005). They often have long product business life cycle and are easy to forecast in terms of demand (Fisher, 1997). Both these types of supplies have often reached the maturity stage in the product business life cycle.

The physical life cycle follows in most cases the bathtub curve¹⁵ in usage, with the adherent requirement of logistics support (Berg, 2006). In terms of effectiveness, the physical life cycle is thereby important for the operational integrated logistics aspects, that is how spare parts are supplied and how maintenance is planned (Blanchard, 1992). In efficiency terms the physical life cycle supports the decision-making when to replace worn out supplies.

When assessing a logistics solution (both sourcing and later on the adherent support) for a specific product it is important to know in which life cycle phase it is. The different aspects are more or less important depending on in which phase of the life cycle the product is (Berg, 2006). This relates to both types of life cycles.

¹⁵ The bathtub curve follows the failure frequency for the product, see e.g. (Blanchard, 1992)

Even if the products are important the supplier relational aspects and capabilities must also be considered (Dubois & Pedersen, 2002). Two types of suppliers engage in the development and production of two kinds of supplies. The first kind of suppliers develops and produces products which are a part of co-developed complex technical systems for military operations. The second kind of suppliers provides services which are specialized to support a military operation e.g. dedicated third part logistic firms (Skjøtt-Larsen, et al., 2007).

The ability of the supply chain to cope with different operational requirements can be viewed from one perspective by studying how different operational aspects are met by the supplies. Evaluating a single type of product is difficult and takes time, which often does not exist in a PSO. The consequences are that logistics strategies and solutions for PSOs need be done in an iterative top down manner starting with one strategy or solution for all supplies. In the following iterative process, a holistic system approach can be applied to understand if the supply groups make a difference/ are important or not, in order to be able to focus the effort on the more critical supplies.

2.5.4 Logistics key decisions for peace support operations

In the first chapter logistics in PSOs is introduced. The complexity and uncertainty of a PSO are discussed and consequently the need for a logistics system that is flexible and robust enough to meet the operational requirements. The use and need of logistics strategies are briefly discussed. Four key decisions that are important constituents for the formulation of a logistics strategy are presented. To create a logistics strategy many different aspects need to be considered, but the ambition of this study is only to cover these four key decisions. As is mentioned in the first chapter, in the literature discussing military logistics four concepts often turn up: The Basic Supply Decision; bring supplies, obtain supplies in the operational area or get supplies from outside, Stockpile Decision that is postpone or speculate, The balance Decision between being efficient or effective i.e. lean or agile, and Sourcing Decision (e.g. Lyon, 2006; Mathaisel, 2008; Peltz, Halliday, et al., 2005; Sarin, 2000; Tatham, 2009; Taylor & Tatham, 2008; Tuttle Jr., 2005). It is reasonable to assume that important parts of a logistics strategy can be developed based on these issues.

NATO uses a functional structure on their logistics strategy; Supply and services, Maintenance and repair, Movement and transportation, Infrastructure, Medical, Contracting, and Funding (NATO, 2003). The NATO strategy aims to suit all member countries, and thereby also has less focus on aspects that can be classified as only of national interest. FM builds their logistics concept on five pillars; Holistic solutions, Demand driven logistics, Efficiency, Adjustable availability, Interoperability of logistics systems (Försvarmakten, 2007a). Even if the NATO and FM doctrines have very different layouts, they tend to end up in discussions about where to get the supplies, which preparedness is required

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and what flexibility is needed to handle changes in requirements and finally how sourcing and acquisition are carried out. These aspects do coincide with the four key questions. The choice of the four decisions is further clarified in the discussion below.

The first key decision is about the three basic choices to support a PSO, discussed above in paragraph 2.5.1. This decision has always been a key element in military logistics planning and decision-making according to several authors (Foxton, 1994; Kress, 2002; Peppers Jr., 1988; Skoglund & Hertz, 2011; Tuttle Jr., 2005; Van Crevald, 1977). A military unit has three basic supply alternatives concerning both materiel and personnel; bring supplies, obtain supplies in the area of operation, or get supplies from outside the area of operation (Kress, 2002). All three alternatives coexist in the logistics model presented above (paragraph 2.5.1), but the importance of each supply solution differs between operations. Every operation requires a detailed solution for many different logistic areas as transportation, storage, information handling, and sourcing. These solutions will be a result of the development of the military logistics strategy for an operation.

The second key decision concerns stockpiling and relates to the requirement on readiness and availability discussed in paragraph 2.5.2. The decision on stockpiling has strong theoretical links to the theoretical concepts of postponement and speculation. Stockpiling builds on the idea of Speculation. Stockpiling has since the beginning of the Cold War been a major ingredient in the logistics strategy (Howard, 2001; Peppers Jr., 1988). Stewardship were developed to maintain the equipment, especially nuclear capability (Levine, 2006), but also the Swedish development of MVIF (regulations for maintaining materiel) and the adherent support organisation (Chefen_för_Armén, 1993). Lately, the speculation approach has slowly changed towards postponement of several different logistics activities, including reductions of stock levels. This change has occurred in several western countries due to budget restrictions (Wither, 2005). Consequences of decisions in this area are of special interest due to the changes that have occurred after the end of the Cold War. Postponement and speculation from business theory is a useable concept to describe the changes in military logistics that has occurred during the last decade (Dorn, Nysten, & Skoglund, 2009). With a high degree of speculation, much of the needed supplies will be prepositioned in stores just in case a PSO is decided upon, and the deployed units will have a high level of inherent sustainability. If a postponement oriented strategy is chosen, the relations in the supply chains are more important with requirements on fast and reliable deliveries, only long lead items will be stored for the total needs in a PSO and the deployed units will have a lower level of inherent sustainability.

The third key decision concerns how to balance between long-term efficiency and short-term effectiveness. The decision relates mainly to creating the basic means for homeland defence and at the same time being flexible enough to meet new demands in a PSO with limited funding (paragraphs 2.4

and 2.5.2). The principles of lean and agile to meet these requirements have been conceptually discussed by several authors. They have not been studied in any wider sense for small nations' military logistics and especially not in PSOs, though. Business approaches to supply chains are believed to be valid also in the military supply chains. The development that has been happening in US the last fifteen years, was first defined in the concept Revolution of Military Logistics and is a turning of logistics to search for a new solution which is both lean and agile (Piggee, 2002). Studies of lean and agile concepts in US military supply chain have proven to reduce costs and shorten lead-times (Mathaisel, 2008). With high requirements on flexible forces which are able to act in different operational scenarios the logistics must be agile and much of the sourcing must be postponed further upstream in the supply chain (Christopher, 2000; Christopher & Towill, 2001; Towill & Christopher, 2002). A lean orientation requires stable operational strategies with a limited number of alternatives (Goldsby, Griffis, & Roath, 2006; Womack, Jones, & Roos, 1990). The arguments used are: the forces should focus on core competences, the combination of military and private firms can allocate more resources when needed and act both more agile and lean (Cardinali, 2001; Kallock & Williams, 2004). Many have discussed the balance between lean and agile. Some have suggested a leagile approach instead to combine the two aspects of lean and agile (Mason-Jones, Naylor, & Towill, 2000a, 2000b). Others have argued that lean and agile solutions can be combined (Hines, Holweg, & Rich, 2004; Naylor, Naim, & Berry, 1999; Stratton & Warburton, 2003).

Much of the increase of the private component in the military logistics supply chain is about becoming more flexible and efficient, and to reduce the logistic footprint. Tatham (2005) argues that the logistics has to be lean in peace but agile in war. He proposes that minimising costs in peacetime is of central importance while in war the logistics should have the capability to meet sudden changes in demand. This does not hinder the use of a lean approach also in war, but the focus shifts towards agile thinking (Tatham & Worrell, 2010).

The fourth key decision concerns how to source needed supplies for a PSO. The sourcing builds on the supply categories discussed in paragraph 2.5.3. The sourcing as such is based on the definition in the first chapter one and is of the major aspects of logistics. Thus sourcing can also be discussed from many different perspectives. The perspectives for this study are presented in paragraph 1.2 in the previous chapter. Several authors discuss outsourcing of the military logistics (Mathaisel, 2008; Singer, 2008; Verkuil, 2007). This makes the sourcing even more important for the future. Parts of the military supply chain have always been both private and military. Eccles (1959) divides military logistics into producer logistics (private) and consumer logistics (military). The trend since the late 90s is to have more of the private component further down the supply chains. Future military logistic planning expects contractors to be supporting in the battle field (Kinsey, 2006; Mathaisel, 2008; Singer, 2008).

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The definition of military logistics is discussed in terms of processes in the first chapter. It is also identified that FM works with logistics processes to support the planning of international operations, and earlier in this chapter the different phases of PSO are discussed which pointed to the need of a process perspective. The four key decisions are part of a larger process to create a logistics strategy and logistics plan for PSO. Decision-making in general is always part of a process. Common for complex processes is that they are often done in an iterative way. Process oriented iterative decision-making has dominated western military planning for many decades as in e.g. NATO GOP (guidelines for operational planning) or the Swedish PUT (planning under time pressure) (Thunholm, 2005). Following the military process approach and putting the four questions into a simple process model mean that:

- The four logistics key decisions need to start with a basic idea for the whole operation.
- By gradual iterations the logistics key decisions become more detailed for different supplies or types of supplies.
- The four logistics key decisions are dependent on each other but they have also different time or process related perspectives.

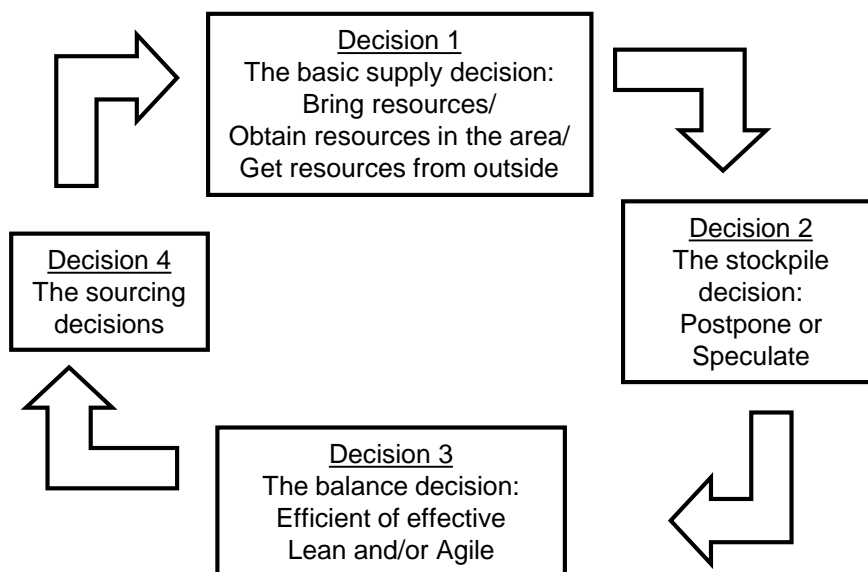


Figure 2.5. The iterative process for the key decision for military logistics in PSO

The suggested model is presented in figure 2.5 is therefore an iterative process for the four logistics key decisions proposed. The process starts with a basic

idea for the whole operation, the decision to bring or obtain or to get resources from outside. The reason to have this as the first question is the link back to the historical military logistics development where the length of the operation and the transportation capacity gave the first principle direction on how to supply the operating unit (Van Crevald, 1977). The second decision in the process is about stockpiling and the adherent constructs of postponement and speculation. It refers mainly to the requirement on readiness and operational availability the military organisation is required to have (Berg, 2006). The two first decisions interpret the operational requirements into a logistics orientation in the form of a strategy or plan. The third decision is about how efficient and effective the solutions need to be to meet budget requirements and operational requirements (Tatham, 2005). The concept of lean and agile represents a way to balance the needs and budget requirements. With these three decisions in place, the last step, the sourcing, can be decided upon. The sourcing decisions bring together all other requirements to fulfil all operational and financial requirements. The iterative process uses the military logistics supply structure to, step by step, become more detailed (table 2.1).

A natural question is if this is the only way to do the decision-making? Of course other models can be applied, e.g. where each set of decisions go through several iterative rounds, where reality and ambition meet. The model used follows a sequential timeline oriented decision-making where the last step the sourcing decision is where logistics planning meets reality. The model thereby also supports the needs for the research questions by linking sourcing decisions to other military logistics decisions. Theories supporting the four different decisions are discussed in detail below.

Bring, obtain in the area or get resources from outside

The first decision in the model (figure 2.5) has already been discussed above. In military operations three basic logistics alternatives exists (Kress, 2002): The military units bring all they need for the operation when being deployed. The units obtain all they need from local suppliers in the area of the operation. The units get all they need from outside the area of operation. This is the first basic choice the logisticians in military operations have to decide upon. It is almost always a mixture of the three alternatives. The first alternative is dominating when the operation only lasts for a short period (weeks). The second alternative can contribute to a lasting peace and it can be important when transports are difficult and/or costly to handle. The third alternative is normally dominating in a longer operation (lasting more than 6 months).

To create trust a number of different supply routes are necessary, it is not always the simplest or shortest that is the best in an area of war (Vlasak, 2007). Modern thoughts support older studies as the interdependence of strategy, tactics and logistics and the importance of preparedness and planning, but they also point to new important principles as the advantage with a minimised

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logistics footprint in the area of operation and the battle rhythm¹⁶ (Henderson, 2008; Peppers Jr., 1988; Tuttle Jr., 2005).

The aim with minimising the logistics footprint is to avoid carrying things that will not be needed (Tuttle Jr., 2005). Minimised footprints increase strategic and tactical mobility of the units. But it requires that the supply chain works fast enough, otherwise the mobility gained by a smaller logistics footprint will be lost by delayed deliveries or backorders.

In order to reduce the logistics footprint, the operating units must trust the logistics system's capability to deliver supplies when needed. Crucial to create this trust is to measure the logistics performance and feedback the results to the units (Bakken & Vamraak, 2003).

With mistrust to the logistics system ability, the operating units will bring as much as possible during the deployment phase. After the deployment the unit will try to get supplies from both behind and locally. By parallel activities, ordering from home bases, international suppliers and local purchasing, they will risk getting too much and requiring the logistics system to handle multiple deliveries (GAO, 1991). Instead of creating a reduced logistics footprint mistrust can create chaos in a flexible system. This decision relates to the autonomy when establishing subsidiary through a greenfield venture. Psychic distance and previous experiences are important factors in the decision-making (Drogendijk & Slangen, 2006; Evans & Bridson, 2005). There is a tendency among multinationals to plan for bringing supplies from outside in the starting phase, and then slowly approach the local supplier market.

The strategic choice to bring, obtain locally or to get from the outside provides the necessary information to produce the first draft of a military logistics plan, which in the end is the outcome of the logistics strategy.

Stockpile - Postponement or Speculation

In a military perspective, speculation is strongly linked to the thoughts of just-in-case and the stockpiling principle NATO used during the Cold War. Postponement on the other hand relates to the thinking which has evolved in US logistics principles after the first Gulf War (Wang, 2000). Both postponement and speculation relate to the requirement on readiness for PSOs. Readiness affects both the need to speculate and to postpone. High readiness means speculation but it also puts restriction on the ability to meet certain needs which can be fulfilled with a postponement principle.

Postponement and speculation have their origins in marketing theory, and have been used in SCM approaches (Alderson, 1950; Boone, Craighead, & Hanna, 2007; Bucklin, 1965; Yang & Burns, 2003). Postponement and

¹⁶ Battle rhythm is by Henderson (2008) described as the information flow that goes upstream, which causes logistics action. This flow normally consists of reports/requests which are sent periodically (every 12 hour/ daily or every second day depending on the organisational level). The main logistics transports will go in the other direction with the same periodicity.

speculation are each other's opposites. Postponement refers to delayed decision-making concerning value adding steps in the supply chain, while speculation is the supply chain solution for prejudged decisions.

Postponement was originally proposed for delayed product differentiation, changes in inventory location, and elimination of manufacturing steps (Alderson, 1950). The objective of postponement is to avoid a mismatch between orders and inventory on hand. The idea is to delay differentiation in form and identity to the latest possible point in the production flow and/or to postpone distribution of inventory to the latest possible point in time (Alderson, 1950; Rietze, 2006; van Hoek, 1998). The whole supply chain, from production of raw material to finished products, cannot be postponed, otherwise would the lead-times from order to delivery be too long (Bucklin, 1965). It would be absurd to tell a farmer to grow wheat when a person asks for a loaf of bread in the bakery.

Postponement can be divided into product development, purchasing, production, and logistics postponement (Yang, Burns, & Backhouse, 2004b). In product development, techniques like concurrent engineering and delayed critical design freeze are used. In military systems this can be used for tactical and environmental adjustments. This type of postponement is discussed under the theory of agile supply chains below. Purchasing postponement is used to achieve just-in-time solutions. Since much of the military materials have been bought just in case, purchasing postponement can reduce cost. By production postponement the supply chain strive to delay highly value adding steps in the production to the latest possible time. By logistics postponement labelling, packaging and transportation are delayed. International military operations can require unique packaging depending on local regulations and environmental factors in the area of the operation. Postponement delays the activities within the supply chain until the latest possible moment (Yang & Burns, 2003). This would minimise uncertainty, both from producer and consumer perspective.

Speculation is referred to as the traditional way of acting in building inventories and storages with predefined supplies on expected demands from the customer. This was the main principle during the Cold War and was called the just-in-case principle. The speculation principle holds that changes in form and the movement of goods to forward inventories should be made at the earliest possible time in the supply chain in order to reduce cost (Bucklin, 1965). It makes it possible to use economy of scale in production and to minimise the risk of stock-outs. The strategy makes it possible to minimise the cost of marketing since the form of the product is known. The distribution systems include storages close/closer to the customer. The strategy is often applied when short lead-time is vital to win an order (Pagh & Cooper, 1998). Transferred to the military system this means the military capabilities and limitations are well known to the generals and politicians. It also means that the military units are capable to deploy into the operational area with a minimum of preparations.

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In reality almost all operations are different combinations of postponement and speculation. The combination can be explained by:

The combine principle of postponement-speculation may be stated as follows: A speculative inventory will appear at each point in a distribution channel whenever its costs are less than the net savings to both buyer and seller from postponement. (Bucklin, 1965, p. 28)

Bucklin also describes the phenomena by saying that seller postponement increased when the requirement on the delivery time was reduced or buyer postponement increased when the delivery time was reduced. Cost reductions in combination with time requirements are driving forces for applying postponement principles (García-Dastugue & Lambert, 2007). The implementation of postponement has resulted in lower inventory costs, quicker response time, better forecasts, better customer/end user service and coordination between the different functions incorporated in the supply chain (Rietze, 2006). The postponement and speculation principle will cause inventories to exist somewhere in the supply chain. Production and lead-time will not meet the delivery requirement for a full postponement strategy (Bucklin, 1965). That is why the combined strategy is applied. Somewhere in the supply chain, the principle will change from speculation to postponement. This position is called the decoupling point. It is where the lead-time from order to delivery meets the customer's demands. The important difference between time based and design based (agile supply chains) postponement is that time based postponement also include logistics postponement (García-Dastugue & Lambert, 2007). Logistics postponement concerns to have a strategy to avoid having the goods transported wrong in time and to the wrong place in the wrong package (Yang, Burns, & Backhouse, 2004a).

Three features of the product will influence the decision-making. These features are; product business life cycle¹⁷, monetary density and value/cost profile, and product design characteristics (Dorn, et al., 2009; Pagh & Cooper, 1998).

The product business life cycle describes in which phase the product is; introduction, growth, maturation or decline (Bowersox & Closs, 1996). In the early stages of the product business life cycle a speculation strategy is important both for marketing needs and customer services. In the later stages of the product's business life cycle a speculation strategy will cause higher financial risks from a seller's perspective. From a military customer's perspective postponement strategies are beneficial in both ends of a product business life cycle, in some perspectives. In the early phase there is a risk of high total cost of ownership due to both high purchase price and modification and

¹⁷ Note that we discuss the products business life cycle, while important for military equipment is also the products physical life cycle. The physical life cycle affects e.g. upgrades, support and disposal of the product

maintenance costs. In the late phase there is a risk that the equipment becomes unusable due to higher technological capabilities within the enemy forces.

The second feature consists of two parts. Monetary density is described as the ratio between value and weight or volume. High monetary density means that it is expensive to store the product but relative inexpensive to move the same (Kotler, Armstrong, Saunders, & Wong, 2001). The value profile is related to how the value increases with each step in the product's value chain. If there are certain steps late in the chain that increase the value significantly, it can be beneficial to postpone those. Downstream, the value profile factor can be questioned as a suitability factor. Instead a cost profiles and funding, processes seem to be more relevant for the military/public context (Dorn, et al., 2009). Too large costs are difficult to handle with short notice.

The third basic feature is the design characteristics (Zinn & Bowersox, 1988). A standard product is generally a low risk supply, for a producer not too problematic to speculate with and for a customer to postpone. For complex or customised equipment it is generally beneficial to postpone some steps in the value chain (Pagh & Cooper, 1998).

In military operations postponement or speculation can be discussed in principles of stockpiling of supplies (e.g. first Iraqi War, massive build-up of resources) and flow of supplies (e.g. second Iraqi War, from-factory-to-foxhole). The most important factors to decide on postponement or speculation in the military supply chains are the units' needs of materiel and support (Dorn, et al., 2009). The armed forces do not and cannot use the same type of strategy with all supplies, so unique strategies for groups of supplies or even in some cases for individual equipment, are necessary. Pagh & Cooper (1998) discuss three factors; relative delivery time, relative delivery frequency, and demands uncertainty. The relative delivery time is the relation between production time and delivery time. The relative delivery frequency is the time relation between production batches and delivery batches. Concerning the demand, it could be functional, with low uncertainty and long business life cycle or innovative with high demand uncertainty and short business life cycle. In military operations short business life cycle means high demand uncertainty, due to the simple fact that it might not be any operation on-going during the products business life cycle.

Two areas that are related to postponement and speculation are power and risks in the supplier relations. Power positions in the supply chain will influence the possibility to develop a postponement strategy (Mitra, Rice, & LeMay, 1997). By having power in the supply chain the speculation strategy can be moved up or downstream from the power-holder's position. Risk exposure and power will to a large degree decide the level postponement applied in a whole supply chain or in a firm within the supply chain. Risk exposure is an important denominator for military planning. Long-term relations in partnership forms, with interdependencies are believed to give better possibilities to act according to a postponement strategy, since it reduces the risk exposure (Håkansson &

Snehota, 1989). Power, risks and supplier relations are discussed in more detail in the next chapter.

Table 2.2 Indicators for postponement or speculation strategies for military operations

Area\Strategy	Postponement	Speculation
Baseline for the strategy	New political or unit demands	planned operations
Production	Make to order	Make to inventory
Inventories	Lower level	Higher level
Distribution system	Unique for the product	Centralized
Production lead-time	Short and crucial	Long lead items
Ordering unit	Deploying/-ed military unit	Central military stores

(adopted from Dorn, et al., 2009)

In table 2.2 identifiers for postponement and speculation strategy in international military operations are summarised. To analyse the degree of matching between the military unit's situation and strategy a number of determinants can be studied, the table does not intend to cover all or the most important indicators, but it cover different areas of a logistics strategy to give a broad picture. The baseline for the strategy can be planned operations, which are being practised in advance or new contingencies where the planning and preparations have been limited. The production of both services and physical products can be made to order or to inventory (services to inventory, is contracted personnel standing prepared and trained for the assignment). In military systems some supplies must always exist in inventory for national defence and training needs, which indicate the lower level. The distribution system for planned operations is also planned and organised by the operational headquarters. Postponed distribution is organised case by case. Production lead-time is critical to the choice of strategy. The lead-time cannot be longer than the time requirements on the delivery of the military service if postponement is chosen. When a contingency operation is released, the operating unit makes the new plan and the needs assessment for the logistics in cooperation with the NSE, which also put orders for needed supplies. In planned operations, the operational headquarters prepare the operation in cooperation with the central military warehouse organisation, which in turn put the orders for new needed supplies.

Table 2.3 is created to summarise the discussions above. The table presents decision determinants on product level for the choice of a postponement or a speculation strategy. The decisions determinants when choosing and apply

postponement or speculation strategy on a product level are; Product business life cycle, Monetary density, Cost profile, Product design characteristics, Relative delivery time, Relative frequency of delivery, Demand uncertainty, Power position and Risk exposure. The areas are discussed above. In the end postponement or speculation in military supply chains are about lead-times between order and delivery and the risk of not having the supplies when needed (Dorn, et al., 2009).

Table 2.3 Decisions determinants for postponement or speculation strategies on product level for military operations

Area\Strategy	Postponement	Speculation
Product business life cycle	Short	Long
Monetary density	High	Low
Cost profiles	Low	High
Product design characteristics	Standardised	Complex
Relative delivery time	Low	High
Relative frequency of delivery	Low	High
Demand uncertainty	High	Low
Power position	High	Low
Risk exposure	Low	High

After the literature review of Boone et al. (2007), there have only been a few but for this research important published papers in the area of postponement and speculation, some with focus on military logistics (e.g. Listou, 2008). In the business literature the focus has instead turned towards design/build/adapt/pack to order. These streams of research give of course more detailed insight in the consequences when choosing a certain type of postponement. This research focuses on the understanding of to what degree FM has changed from a stockpiling philosophy towards postponement no matter which type.

Efficient or Effective - Lean and Agile

FM is facing two requirements from the government: to be efficient with the taxpayers' money to create a basic readiness for homeland defence or PSOs,

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and to be effective in terms of being able to deploy and operate in PSOs with new objectives with short notice (Försvarsdepartementet, 2009; Utrikesdepartementet, 2008a). The first requirement to be efficient can be discussed in terms of a lean perspective, since much of a lean approach is about creating customer value through minimisation of waste and adding new valuable functions or services (Hines, et al., 2004). The second requirement to be effective relates to having a supply chain flexible enough to meet changes in demand within a short time frame can be discussed in terms of an agile perspective, since the agile approach is about identifying decoupling points in the supply chain where development, production or logistics are postponed until the operational needs are identified (Christopher, 2000).

The concepts of lean and agile are both about creating customer value but with partially different perspectives. Customer value for FM was during the Cold War been to receive supplies that contribute to the capability to defend the homeland. With the new focus on PSOs the customer value relates to the ability to have the right type of equipment, supplies and support delivered to the right place when needed. In other words, there is an aspect of time, configuration, quality, quantity and service in the customer value for the FM. The operational change of focus between an on-going PSO and training in the homeland indicates that the needs change over time and also the requirements between being effective or efficient, and thereby it is also possible to identify changes in between lean and agile perspectives.

With the changes after the Cold War, practitioners and researchers have recognised that military logistics must reform itself to meet new budget and operational requirements (Agrisino, Cathcart, & Mathaisel, 2002). When the thoughts of huge stockpiles just in case were gone, new thinking was needed to be efficient and effective with government funding. The Toyota production system (Ohno, 1988) and lean thinking were applied with mixed results in the US (Mathaisel, 2008). Criticism against these and other military lean projects was that they did not apply lean thinking but just merely introduced isolated processes (Tatham & Worrell, 2010). The same types of problems have also been documented in private businesses (Hines, et al., 2004).

Researchers studying military logistics argue that it needs to be both lean and agile or in other words efficient and effective (Piggee, 2002; Tatham, 2005). The origin of lean thinking was based on a relatively steady demand while the agile principle was flexible and was easier to adapt to changes in customer demands (Christopher, 2000). Tatham (2005) argues for a lean solution in peace and an agile solution in war. Most military thinkers argue that what you do in war you must practise in peace, this can of course question the idea of changing between peace and war. This would lead to that military supply chains should strive for being both lean and agile at the same time, to find a balance between the two concepts. Lean principles have been adopted by US military to modernise their depot/repair shop supply chain and the UK has used lean thinking in Iraq (Mathaisel, 2008; Tatham & Worrell, 2010). These have either

been local initiatives or been handling a relative stable production, though. Neither have they been analysed from an agile perspective so no results exist whether or not it actually has been a combination of the two principles or if it only has been a lean approach. Towill and Christopher (2002) mean that these two principles are not mutually exclusive, depending on the market situation one can choose to either adopt one of the two or both. In the military area it is plausible that both lean and agile approaches are used to different degrees. As discussed above the decision on application of lean and/or agile partially depend on the decision to postpone or speculate. Interesting to note is also that lean and agile approaches can be viewed to be normative (Godsell, Diefenbach, Clemmow, Towill, & Christopher, 2011). The reason to look on the aspects of lean and agile does not have a normative objective in this study. Instead the objective is to understand how efficiency and effectiveness are balanced against each other and if the perspective changes over time. Further it is interesting because lean and agile approaches are product driven but also affect the organisational culture and inter-organisational relations (Godsell, et al., 2011). It is therefore necessary to first discuss the underpinning of lean and agile in order to see how these concepts can meet the requirements of efficiency and effectiveness.

Both the concepts of lean and agile have evolved over time (Godsell, et al., 2011; Hines, et al., 2004). Even if there exists many different interpretations about lean and agile, in this study the Christopher and Towill (2001) perspective is used:

At its simplest the lean paradigm is most powerful when the winning criterion is cost; however when service and customer value enhancement are prime requirements for marketing winning then the likelihood is that agility will become the critical dimension. (Christopher & Towill, 2001, p. 237)

The use of this perspective clearly offers the possibility of adjusting the operation of the supply chain in order to meet needs that lie between the two extremes of stable and unpredictable demand.

The concept of lean started with the Toyota production model and seven types of waste to eliminate: from overproduction, of waiting time, transportation waste, inventory waste, processing waste, of motion, and for product defects (Ohno, 1988). Lean had its major breakthrough in industry with the book *The machine that changed the world*, which introduced lean production (Womack, et al., 1990). Since the concept of lean was first introduced, it has gone through four development stages; awareness (floor-shop practises), quality (best practises), quality cost and delivery (value stream thinking), and value system (coordination of capabilities on system level) (Hines, et al., 2004). The first three stages have very much firm internal focus, starting with manufacturing aspects and moving towards order fulfilment aspects, and not until the fourth stage does it bring in different aspects of the external supply chain (Hines, et al., 2004). In the fourth step lean thinking is

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applied both on strategic and operational level and integrated in the whole supply chain (Jones, Hines, & Rich, 1997). The objective of lean thinking today is that process steps should create additional value for the customer. This can be done by reducing waist and/or by adding new functions or services (Hines, et al., 2004). The basis for lean thinking is to involve everyone to reduce waste (if the price is reduced when waste is eliminated it increases the customer value) and improve customer value, in a pull and value oriented flow production (Hines, et al., 2004; Skjøtt-Larsen, et al., 2007). In military settings lack of trust in the supply chain has been a major obstacle to achieve flow and pull principles (Mathaisel, 2008). Even if later research tries to show that the lean concept can be combined with agile principles (Hines, et al., 2004; Towill & Christopher, 2002) the basic principle is still to be efficient, and mainly developed for larger production volumes. In most military supply chains the product volumes are relatively small and changes in the configuration are frequent, which makes it difficult to fully adopt lean principles (Christopher, 2000). FM has annual budget for materiel acquisition. FM solution to this is buying inventory. It could be discussed if buying inventory really is a lean approach (inventory creates waste). But in the military case, the production of inventory is a way to produce operational readiness, which can be an operational requirement, thereby inventory is of value instead of waste. Instead one can argue that inventory becomes waste when it has to be liquidated for some reason. This means that lean for FM is to minimise waste within this limitation and at the same time add value for the user.

In contrast to the basic principles of lean, which accomplish efficient value creation, agile principles strive to accomplish flexible and effective supply chains. Christopher (2000) defines agility as:

...the ability of an organization to respond rapidly to changes in demand both in terms of volume and variety. (p. 38)

While a lean approach makes the low cost in the supply chain the market winner, in the agile supply chain the service level is found to be the main criterion (Mason-Jones, et al., 2000b). In the military supply chain this can be viewed in terms of an acute need of spare parts, urgent upgrading of equipment or requirement to meet new environmental conditions (Tatham, 2009).

Agile supply chains can be discussed in terms of; agile human resources, agile technologies, value chain integration, concurrent engineering, knowledge management and flexible manufacturing (Vázquez-Bustelo, Avella, & Fernández, 2007). Christopher (2000) argues that it is two aspects of agile that have a leveraging effect on the supply chain, supplier relations and reduced product complexity. Reduced product complexity can be achieved by modularisation of the design, which also meets the military requirement of upgrading during the products' life length. Agile supply chains require close relations to be effective, arm's length or adversarial relations are direct hinders to achieve agile supply chains (Christopher & Lee, 2004; Fawcett, Magnan, &

McCarter, 2008). They must work to simplify the product, standardizing components, increase variation and allow rapid change on a continuous basis. Essential for an agile supply chain is an effective flow of information upstream the supply chain. In the military environment this requirement can be complicated due to two aspects, firstly the information in many military information systems is classified. Secondly, demands on complex and costly equipment can be delayed due to decision processes on the customer's side (Mathaisel, 2008). The decoupling point exist also within agile supply chains (Christopher, 2000). The decoupling point within speculation has a stronger focus on customer value compared to the decoupling point within postponement (discussed above), which has a focus on functionality and availability requirements. The basic thought with an agile supply chain is to be flexible and to meet changes in customer requirements, or in other words design based postponement. Mason-Jones, et al. (2000a) called this a leagile supply chain. The more demand-driven and flexible a supply chain is the longer upstream in the chain is the decoupling point. The decoupling point in the agile supply chain will depend on how flexible the chain is from design to order, to assembly to order. In terms of lean and agile, the production on speculation should be lean while the postponed production in based on the agile principles. Upstream is the chain lean and downstream agile (Christopher, 2000; Mason-Jones, et al., 2000a). The decoupling point, where real demand reaches upstream the supply chain should also be where the chain changes from lean to agile.

A different perspective of the leagile concept is presented by Naylor, et al. (1999). They suggest combining lean and agile manufacturing paradigm processes to fit the operation. Their suggestion to leagile approach is production oriented, where a part of the production is lean and the other part is agile. This approach can be divided into three main streams; Pareto 80/20 rule with the purport 80% lean and 20 % agile, having temporary capacity (agile) to handle peaks, and using form postponement, delaying the final form until an order is received (Goldsby, et al., 2006). This type of differentiation can be of importance to create the needed flexibility for war.

In reality most strategies are hybrid solutions, to be both efficient and effective, both the agile and lean concepts should be adopted by the supply chain to create a leagile supply chain.

As the table 2.4 shows, the military supply chain is not similar to any one of the two concepts lean or agile in business supply chains. The military supply chain can be said to be leagile and differentiated depending on the product, the relations in the supply chain and if it works under peace or war conditions. This explains the large variances in the military column. In the military supply chain the supplies vary from very simple to very complex. The demand during certain activities is easy to predict, while in operations the demand is both dependent on the tactical planning of military operations and hostile activities, which makes the demand unpredictable.

Table 2.4. Comparison of military supply chain with lean and agile supply chains

Attribute	Lean	Agile	Military
Typical products	Commodities	Fashion	Low- High tech
Demand	Predictable	Volatile	Predictable-Unpredictable
Product variety	Low	High	Low-Continuous upgrading
Product business life cycle	Long	Short	Long or short
Customer drivers	Cost	Availability	Cost in training Availability in PSO
Supplier Profit margin	Low	High	Low and stable
Stock out	Long-term problem	Immediate-volatile	Life critical
Purchasing policy	Buy goods	Assign capacity	Buy in peace, Assign capacity for PSO
Supplier relation	Market transactions	Partnership	Whole scale
Market winner	Cost	Service level	Cost in training, Service level in war
Forecasting	Algorithmic	Consultative	Simulation

(Adopted from Mason-Jones et al., 2000.)

Military organisations try to standardise most supplies, but most equipment within armed forces needs to be at least as lethal and capable as the enemies' equipment. This requires continuous upgrading of the weapon systems. This has also effect on the product business life cycle, on subsystem level the life cycle is short but the platform itself can live for many years (e.g. the Swedish version of the centurion main battle tank, stayed in service for 45 year before the last one was taken out of service.) For the military the cost is the main driver during peacetime, and the availability is the driver during wartime. A large portion of the military procurement is done with a long-term perspective and with competitive thinking, which creates a low but stable profit for the industry. If the suppliers run out of stock during a war situation, it can be the difference between winning or losing a battle and causing more causality among the soldiers. In peacetime the purchasing policy is based on what is needed,

while in war the policy is to create safeguards for contingency planning. The relations in military supply chains can be of both arm's length and partnership type. In military supply chains cost is the driver for the market winner. This situation is caused by the relatively long periods of peace compared with short periods of war. In countries where war dominates, the service level becomes more important. The forecasting in the military is done by the customer and they use simulation models.

In table 2.5 parameters discussed in the text above are put together to illustrate decision parameters for military organisations. In the end also for PSOs exaggerated lean or agile solutions do not work. Some sort of leagile solutions should probably be chosen to meet the internal and external demands and in many cases this needs to be applied on product level.

Table 2.5 Decision parameters for lean or agile strategies for military operations

Area\Strategy	Lean	Agile
Main driver	Cost	Avaliability
Bstrategy baseline	Planned operations	New political or unit demands
Production	Make to inventory	Make to order
Stock out	Reduced capability	Life critical
Production lead-time	Long lead items	Short and crucial
Order	Central military stores	Operating unit
Forecasting	Capability planning	Simulation

Even if the FM supply chain does not use lean and agile principles to the full extent, these principles are still important in order to understand how the efficiency and effectiveness requirements are handled within the supply chain. Womack and Jones (2005) present aspects of importance for the customer; make sure that goods and services work together, do not waste the customer's time, provide what is needed where it is needed and when it is needed. This is of course what FM wants for inventory, training and PSOs.

Sourcing

After the decision process of lean and agile FM needs to turn the focus on sourcing, to identify how and where to get the needed supplies. Above we discussed the large variation of supplies used in a peacekeeping operation (2.5.3). It covers thereby also a broad range of suppliers and industries from

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civil retailers and producers to defence industry and private military companies. A strategy that handles the complexity in the supply chains needs to be assessed. Key decisions that constitute important aspects of a sourcing strategy were identified in the first chapter. To get all the goods and services for the operations FM needs a network of supply chains. The complexity of the network require differentiated relations, mainly due to the fact that the managerial resources will not be available to support all relations in the same way. (Ford, et al., 2003).

Sourcing has become more and more strategically important, since many firms focus on core competences and resources (King, 2001). This trend started within production industry but has spread into the service industry (Kotabe & Murray, 2001). In military logistics, sourcing has played an important role for many hundred years, for example the earliest ancestor to FMV (the defence procurement agency) in Sweden, was formed after the loss of the Royal Warship *Wasa* in 1628. In modern military organisations the sourcing of services has increased in importance during the last decade due to budget cuts and reduction of stocks (O'Hanlon, 2009).

The key sourcing decisions were presented in the previous chapter:

- Make or buy decision
- Geographical market decision - Domestic, global, regional or local
- Channel decision - Number of suppliers for the supply or supply group
- Type of relationship with the suppliers

Two main arguments were presented in the first chapter to explain why these four decisions were chosen. They are common in the logistics literature when it comes to sourcing and sourcing strategies (Cousins, et al., 2008; Freytag & Mikkelsen, 2007; Gadde & Håkansson, 2001; Håkansson, 1982; Monczka, et al., 2010; Skjøtt-Larsen, et al., 2007; Trent & Monczka, 2003a; van Weele, 2005; Åkesson, et al., 2007). To give an overview of the different authors' used key issues see table 2.6. Notable is that several of the authors do not explicitly discuss the choice of market, but it often appear under another heading. In defence procurement the market plays an especially important role. It often influences both the homeland defence capability and the outcome of PSOs (Markowski, et al., 2010; Skoglund & Hertz, 2011). In the table one can also identify the different uses of terms with similar meaning, which is discussed in the definition of sourcing in paragraph 2.1.2.

Table 2.6 Overview of different authors' aspects on sourcing

Authors	Used Term	Sourcing Aspects
Håkansson, 1982	Purchasing strategy	Supplier relations, Development of supplier structure, Make or buy and transfer, Direct and indirect costs
Gadde & Håkansson, 2001	Supply strategies	Boundaries of the firm, relationships with the supplier, Designing supply networks, Efficiency in the network
Trent & Monczka, 2003	Global sourcing	Strategic perspective, Managing cost, Personnel skills, Information availability, Supplier relations, Coordination of needs, Top management engagement
van Weele, 2005	Sourcing strategy	Number of suppliers, Global versus local sourcing, Supplier relations, Price or performance agreement
Freytag & Mikkelsen, 2007	Sourcing	Internal or external sourcing, Number of suppliers, Type of relationship with the suppliers, Type and content of contract
Skjøtt-Larsen, et al., 2007	Strategic procurement	Make or buy, number of suppliers, supplier relationship
Åkesson, Jonsson, & Edanius-Hällås, 2007	Sourcing strategy	Make or buy, Choice of market, Number of supply channels, Relations, Locations, Quick response practises, Own organisation characteristics, Supplier performance
Cousins, Lamming, Lawson, & Squire, 2008	Supply strategy	Organisational structure, Performance measurement, Personnel skills, Cost/benefit analysis, Relationships
Monczka, Handfield, Giunipero, Patterson, & Waters, 2010	Purchasing strategy	Make or buy, Number of suppliers, Supplier relationship, Geographical market

All four decisions are important to study because they have impact on military logistics in PSOs. The make or buy decision has grown in importance for military supply chains. Previously internal production facilities and services were outsourced to the defence industry or Third Party Logistics firms (TPL)

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with the aim to concentrate their own resources on the core production (Audretsch, Link, & Scott, 2002; Cardinali, 2001; Ferris & Keithly, 2001; Johnsen, et al., 2009; Mathaisel, 2008). The market decision is of special interest for Swedish logistics in PSOs. The government strongly encourages the use of the global market through the legislation in the act of public procurement. The military has both a homeland defence perspective with an interest to support the defence industry and operational perspective where the local market is important. The regional market is often used for efficiency reasons, but bilateral state to state agreements can also influence the use. The channel decision has the same type of conflict in interest as one can see in the market decision. The government pushes for a multiple channels in the bidding process through the legislation, FM on the other hand has a long relation with a number of suppliers and these single sourcing relations are by practitioners believed to be important when FM has requirements to be effective in PSOs. The importance of the relationship has always been a theme for discussion. Many argue that close relationships are of crucial importance for PSOs. Others argue that all efficiency aspects are lost with close buyer supplier relationship. These two standpoints make the decision interesting to study.

The Swedish defence industry context as it looks today has its roots in the aftermath of World War II. The development of the Swedish defence industry built on consensus politics and mutual understanding between the political leadership and the defence industry owners. It built on the planning that Sweden should be able to supply all major systems from national suppliers. Budget limitations and other restrictions limited the number of suppliers to basically be sole suppliers for each supply area, though. Even if there is a basic understanding between the Swedish defence industry and the defence, where profit margins have stayed on mutually accepted levels, things have happened over the years, which have changed the industrial map. But one cannot say that anyone of the players controls this map (Håkansson & Snehota, 1989). The view taken thereby, for the understanding of the sourcing decisions in the defence area, is an industrial network perspective, even though some aspects from transaction cost economics and resource-based view must also be taken into consideration to understand and discuss the nature of the defence supply chains. The elements of the sourcing decisions are further discussed in the next chapter.

2.6 Summary

The chapter started with some key definitions. SCM was defined as the systematic strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving long-term performance of the individual companies and the supply chain as a whole, and

the external coordination can only be done in collaboration with other actors (adopted from Mentzer, et al., 2001).

Sourcing was defined as the first phases of the process to allocate supplies to the end customer. It starts with a make or buy decision, and ends when a contract is signed with an external supplier.

This chapter has created the framework to support the analysis to answer the first research question:

- **What theoretical concepts could be generated about military logistics in PSOs?**

Below are a number of questions formulated to support the construction of theoretical constructs. The areas presented below constitute a baseline for the search of relevant data to develop the new theoretical concepts.

Can a PSO be divided into different phases?

Based on military operations in general a phase structure was identified, containing 6 phases: capability creation, pre-deployment, preparation for movement, deployment, sustaining the operation, and liquidation of the operation. Names of the phases and detailed content in each phase are discussed further in chapter 7.

How can military logistics contribute to the operational goals?

The operational goals are often two, create security and to contribute to a lasting peace. Logistics resources can support the fulfilment of the goals by: Providing support to the population when civil resources are limited or unavailable and source some of the needs locally and thereby support the restructuring of the local business life.

How can military logistics meet the operating unit's needs?

The needs in PSOs are unique for every single operation and the logistics system needs to be tailored. On a general level the logistics must be in line with the operational strategic planning and be prepared to provide humanitarian assistance. This means that the logistics system should be flexible enough to meet different political requirements as well as the unit's needs for the next task.

What are the important theoretical constructs for military logistics in PSOs?

The baseline of all theory building in military logistics relates to the three basic choices; bring resources for the whole operation, obtain resources in the operational area, or get resources from the outside of the operational area. Modern military forces use a combination of all these three. The logistics system for modern military forces, has reduced the number of levels from five and builds today on three level system with some variances depending on size

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and specific national requirements. Military units use many different types of supplies. A structure of first and second order supply categorisation was presented. The first order discussed relevant groups for logistics. The second order discussed different life cycle related aspects for a unique product. Both the first and second order categorisations are the baseline for logistics decisions (and strategy) and sourcing decisions (and strategy) for PSOs.

What are the requirements on military logistics in PSOs?

The requirements on military logistics mainly end up with two military strategy aspects, requirements on readiness and availability of the deployable units. But also some general aspects exist. Logistics should be efficient and effective, which relates to a careful usage of the taxpayers' money and at the same time meet operational requirements. Other requirements relate to reducing the logistic footprint, both physically and environmental. Requirements and measurements of logistics performance were discussed. Some of the problems in creating comparative measures between operations were mentioned.

What are the key decisions for military logistics in PSOs?

Four key decisions were identified: 1. Bring/Obtain locally/Get from outside, 2. Postponement or Speculation, 3. Lean and/or Agile, 4. Sourcing decisions. The first decision concerned the overall principle for the logistics in the operation. The second decision related mainly to requirements on readiness. The third decision related mainly to requirements on availability and efficiency. The fourth decision concerned how to source all needed supplies for a PSO. The fourth decision was already discussed in terms four different 'sub-decisions' in the first chapter; these were further motivated and discussed. This fourth decision is a key aspect of this thesis. It needs therefore to be further discussed in order to grasp the details of each sub-decision and how they can affect the overall logistics outcome. This is done in the next chapter.

3. The sourcing decisions and their elements

In the previous chapter the logistics for PSOs is discussed. Sourcing is presented as one of the logistics key decisions. The supplies that the logistics deliver to the operating units, both physical products and services, create the means for PSOs. The purpose with this research is to study the impact FM's sourcing decisions have on military logistics in PSO (see chapter 1). To understand the impact of the sourcing decisions it is also necessary to understand what elements the decisions consist of, why they are important in sourcing for PSOs and finally how they contribute to logistics achievements.

To support the purpose of this study three research questions are developed. In this chapter the framework for the second and third question is developed. To address the second question (What are the outcomes of the key sourcing decision process?), the key sourcing decisions are discussed and operationalised and a model is created for the analysis of the outcome of the sourcing decision. Thereafter the third question (How can the outcome of the key sourcing decisions impact on fulfilment of the logistics objectives in PSOs?) is discussed, and a frame for the analysis proposed.

But before we go into the discussion on the key sourcing decisions, the chapter starts with a discussion about public procurement and its aspects on the key sourcing decisions.

Thereafter the chapter discusses first each one of the four sourcing decisions individually. Having discussed the details of the sourcing decisions, the chapter then discusses the relation between the sourcing decisions and links them back to the logistics. Finally the chapter is ended with a summary.

3.1 Public Procurement

Sourcing for military forces is to a large extent about public procurement aspects. In PSOs the situation is often less regulated than for the regular defence capability production even if the regulations cannot be totally overlooked. The urgency to get needed supplies in PSOs opens up the regulations for public procurement. This paragraph introduces some general aspects of public procurement, followed by a discussion concerning the customer supplier relations in public procurement. It is based on the Prier and McCue (2009) definition from the second chapter.

3 The Sourcing Decisions and Their Elements

Public procurement of military supplies is of course an important economic factor within the EU. Based on *Stockholm International Peace Research Institute (SIPRI) database*, the military expenditure is estimated to be around 230 billion € 2010 (SIPRI, 2011). It is argued that 70% (160 billion €) of the expenditure is estimated to be spent through public procurement. Many of these supplies consist of complicated equipment. High technology goods require high professional capacity and integrity among the procuring organisations (Pashev, 2011).

Typical for public procurement in relation to private purchasing is a stricter jurisdiction to protect bidders and prevent corruption (Lindskog, Brege, & Brehmer, 2010). Within the EU this generally means that all decision-making must be done before the request for quotation is published. The defence area has exception from these requirements under certain circumstances according to EU and Swedish regulations, which can be applied during PSOs. According to Gelderman, Ghijsen and Schoonen (2010) the compliance with the EU directives seems to depend more on economic gains than threats of legal action. The changes of the EU directives in 2004 that allowed competitive dialogue opened up the strict procurement regulations which previously almost required arm's-length relations with the suppliers (Losch, 2007).

Public procurement discussions have for several years been dominated by the thoughts about legal aspects, competition, corruption, transparency and efficiency (Alexandersson & Hultén, 2007; Arrowsmith, 1998; Engelbrekt, 2011; Ganuza, 2007; Tabish & Jha, 2011). Lately some new trends have emerged, fulfilment of political objectives and effectiveness with a wider perspective on value for money have started to attract interest (Burger & Hawkesworth, 2011; Erridge, 2007; Morgan & Sonnino, 2007; Palmujoki, Parikka-Alhola, & Ekroos, 2010).

As mentioned above corruption has been one of the main focuses of research on public procurement. Preventing corruption is mainly about preventing irregularities. Tabish and Jha (2011) divide irregularities into; transparency, fairness, procedural, contract monitoring and regulation, and professional standards. They are of the opinion that transparency is the most important factor against corruption, but professional standard among the procuring officials is also important. But even if these two can be considered to be the most important the others are relevant as well to achieve any real improvement to reduce corruption. Corruption is often defined as: abuse of contract awarding power for private gain (Pashev, 2011, p. 411). According to Pashev there is a trend that corruption goes upward in the decision hierarchies, while the control function goes the other way when implementing EU procurement regulations. He suggests that issues of ethics and integrity must be raised. Total transparency may not be the best solution to avoid corruption and achieve effectiveness in military procurement in all cases. Total transparency is also impossible in some defence related areas due to requirements of military

secrecy. The use of an effective audit and control capability in combination with defined and agreed levels of ethics might be even more suitable.

Another important stream of research discusses efficiency and effectiveness. Burger and Hawkesworth (2011) define value for money as maximisation of outcomes with respect to output effectiveness and efficiency for the recipient and taxpayer. With other political goals, such as a green sustainable society or a redistribution of the welfare, the measure becomes even more complicated. According to Erridge (2007) the definition and measurement could benefit much by using a public value instead of focusing on the individual. Important factors to consider is e.g. green or environmental performance which has been a part of the EU regulations for many years but not that clearly stated (Palmujoki, et al., 2010). These requirements open up the procurement not only to consider price, but it does not mean any considerable change to the process and to the arm's-length relation with the suppliers, even though it makes the procurements more complex which requires a closer dialogue. In the PSO case the value have many different aspects, foreign affairs for participating nations, peace for the local population, and a decent situation for the operating units. It definitely complicates the measures but it certainly needs to be considered.

3.1.1 The Swedish Public Procurement Act

Public procurement is regulated by The Swedish Public Procurement Act (LOU, Lagen om Offentlig Upphandling) (SFS 2007:1091)¹⁸. The main purpose of the Act when it was first introduced in 1992 was to increase the level of competition in public procurement. Other interests have been clarified through development of the Act over time, the most important being the protection of the tenderers' interest, in terms of not being discriminated. For defence procurement, the first chapter §2 is one of the most important regulations.

§2 regulates that only chapters 15 and 16 are used concerning public procurement in the defence area, regarding physical products or services contained in Article 346 of the Lisbon-Treaty or concerning classified information or other limitations related to the security of the nation.

Chapter 15 procurements are still based on the same principles about competition, but with simplified rules.

Nonetheless, there exist some general exceptions, including a special exception that can be used if needed in the defence area. The more general important rules are procurements connected to exclusive rights, which is especially important in the field of aviation safety regulations. These issues have an impact on the procurement of spares and technical support. The unique rule for the defence area is chapter 15 §22 where the government can make

¹⁸ The Act has undergone a number of revisions since it was introduced and will have more changes in the near future that affect the defence area. The details presented here from the Act are from the version valid in the spring 2010.

exceptions from the rules in chapter 15. Based on the same paragraph FMV has the right to do similar exceptions if it is, a supplement to a previously government decision on a procurement, a between states joint procurement, or a procurement below 25,000,000 SEK. FM has the right to do exceptions below 5,000,000 SEK.

3.1.2 Relations in public procurement

The fundamentals of the regulations of public procurement aim at arm's-length relations, to avoid corruption and obtain efficiency based on neo classical believes on the markets efficiency. But several studies have criticised this perspective and initiatives exist to find other procurement methods to meet the impartially requirements and at the same time have a fruitful dialogue with the suppliers for example the Dutch performance-based approach (Ang, Groosman, & Scholten, 2005) or the performance-based procurement system in Wyoming (Kashiwagi & Al-Sharmani, 1997). In the military area the requirement on effectiveness plays an important role, which requires a dialogue with the suppliers. Much military equipment has a long physical life cycle requiring support for 30 years or more, which also requires a long-term relation. So in other words there exist many ex post contract considerations to do, similar to argumentations in the construction area (Waara, 2008). Both the long physical life length of military equipment and changes of procurement regulations have had consequences for the development of the relation between FM and its suppliers. Different types of relations exist; from arm's-length to partnerships. The discussion in the business-to-business literature articulates different perspectives of these types of relations and the paragraphs below will therefore be based on that literature.

3.2 Make or Buy

The make or buy decision is about where to be a part of the overall value adding process. This decision depends on the relative importance in the supply chain and is about the upstream and downstream positioning (Cousins, et al., 2008). Depending on perspective the decision could be about cost minimisation (transaction cost perspective), resource and capability optimisation (resourced based view) or value optimisation (supply chain management). What has changed over time is the will to outsource activities which is not part of the core business, that is core competencies or the critical success factors (King, 2001).

The first make or buy question: Outsourcing can be done in areas where the organisation is not competitive or in areas which does not seem to be critical to organisation (van Weele, 2005). Core competency can be identified by three

factors (Prahalad & Hamel, 1990): Firstly, it gives access to other markets than the ones the firm is established in. Secondly, the core competence should create significant value to the end-customer of the product. And thirdly, it should be difficult to imitate. Linked to core business and core competence are the critical success factors (CSF) for the organisation. CSF are the limited number of areas (3-6) which will ensure competitiveness if being prioritised (Rockart, 1979). The CSF is rather vague in its construct, but it can be said to handle firm internal aspect as optimal mixture of staff, quality systems or efficient processes. In the perspective of the armed forces neither core competency nor CSF is difficult to identify.

The second make or buy decision is about products or services which are not viewed as core competency or CSF. For these products or services other factors come into play, as high specialised investments, high level of innovation, demand uncertainty, limited capacity (Kotabe & Murray, 2001) or, in case of more standardised products, quality price, delivery capability or cost reduction capability (Talluri & Narasimhan, 2005).

Table 3.1 Decisions parameters for make or buy

Make	Make with free capacity	Buy
Core competence	Non critical	Own organisation is not competitive
Specialised investment	Low investment	High investments with possible economies of scale
Limited external capacity or high requirements on security of supply	Limited external capacity	Cost reduction capability and higher levels of standardisation

If we focus on the defence sector other aspects also come into play. Some of the products needed in defence operations are required to be produced in-country (Hall, Markowski, & Wylie, 2010). These researchers argue that some of these products can preferably be produced in-house while other products can more efficiently be produced by external suppliers who can benefit from the dual use of the production resources. Much of the decision about what to have as in-house production is linked to requirements on responsiveness and security of supply. In practice many of the in-house production facilities have problems with efficiency, which reduces the value of the benefits (Hall, et al., 2010; Mathaisel, 2008; Tatham, 2006). Practical guidelines often exist in national defence industry policies, for example *UK Ministry of Defence, Defence Industrial Strategy – Defence White Paper* (MoD, 2005). According to Hall, et al. (2010) defence industry policies focus on the sustainable industry capabilities required, to secure cost efficient delivery capabilities of needed products. They

also claim that barriers to entry or exit are important in the make or buy decision. One possible halfway solution is public owned companies, which can prioritise defence production but at the same time avoid the disadvantages with in-house production. In table 3.1 the discussion above is summarised into three different alternatives. The table presents parameters used in the make or buy decision-making.

3.3 Geographical market decision - domestic, international or local sourcing

A PSO can be compared to the situation existing when firms go international and start a temporary Greenfield venture (Skoglund & Hertz, 2011).

When a firm goes international with its operations, it has several geographically different markets to approach when purchasing needed products. They can use the domestic market, the international market, the regional market in the part of the world where the new venture is placed, or the local market in the area of the new venture. A similar choice appears for sourcing of a PSO.

Going back to the Greenfield venture and the firm, at first it can use the domestic market in the homeland of the head office or main operation. The use of the domestic market is a way of securing quality and commonality with other supplies delivered by the firm. Then, the firm can use the international market to find suppliers, who are interested in delivering to the new area of operation. The objective with entering the global market can be to either to access new technologies, or to achieve supplier competition (Trent & Monczka, 2005). Finally, the firm can use the regional or local market in the area of the new operation (Steinle & Schiele, 2008). The sourcing from the local market can be chosen for proximity aspects which creates flexibility in the supply and reduces transportation costs (Gullander & Larsson, 2000). It can also be a way to create interest in the products of the firm (Steinle & Schiele, 2008). In PSOs this can be a way to create public support to the presence of foreign forces (Moshe, 2001).

The choice of market in military operations is not only about efficiency, effectiveness or proximity; it is also about homeland defence and peace development.

In the military area unique or important aspects exist for the choice of market geography. Therefore, the focus below is on defence markets, supplier locations, aspects of internationalisation, and limitations of international suppliers. Finally the choice of domestic, global or local sourcing is discussed.

3.3.1 Defence markets

In the defence area, depending to a degree on the supply type, there normally exist two types of markets. For the supplies, which have both civil and military use, there exist a competitive market with many suppliers and many buyers both on the domestic and international arena. But, for supplies that have only military use, especially complex equipment, the international market is commonly a bilateral oligopoly (Markowski, et al., 2010). On the suppliers' side characterised by heterogeneous oligopoly and on the buyers' side oligopsony. Heterogeneous oligopoly exists when there are few suppliers with differentiated products and oligopsony exists when there are few buyers which are aware of each other and collectively gain power towards the supplier (van Weele, 2005). On a domestic level in a small nation, most military supplies exist on a monopoly market with one supplier and one buyer (Markowski, et al., 2010). The local market in the area of operation is often an emerging oligopoly market, where the procurer normally has a large power advantage due to the difference in size (Skoglund & Hertz, 2011).

In the defence sector, the suppliers on the domestic market can be viewed as a part of the national security system (Markowski, et al., 2010). They argue that if this is the case some of the sourcing will be directed towards that industry. Their argumentation has the consequence that the decision-making should begin with a decision whether the domestic should be used, due to national security reasons. The second market to address is the local market in the area of the operation. The importance of the local market for the peace building process has already been discussed above (paragraph 2.3). The third decision is about if the whole global market should be addressed or if any limitations are in place. The decision can be based on legal requirement (act of public procurement), technology requirements, location or previous experience. The regional market can be viewed as a special case of the global market in military sourcing. The regional market is mainly chosen to reduce transportation cost and to shorten lead-times.

The relevance of the national industry for the national security is a complex matter, requiring a large study. The same is valid for the legal requirements. These two aspects will not be discussed in any detail in this thesis, but is a subject for future research.

3.3.2 Geographical supplier location

In the defence area the location of a supplier can have several aspects. Transportation, capability to give support and service, political, and armament export control are viewed to be important aspects to consider when choosing a supplier (Hagelin, 2010). Accepting a supplier's location is mainly about accepting the lead-time and the capability to give support and service. The other aspects might be more of showstoppers, where e.g. the potential supplier

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is hindered by their national authorities to deliver to the customer¹⁹. The location of the supplier can be relative to the transportation hub in Sweden or it can be in relation to the National Support Element (NSE) in the area of the PSO. The transit of the goods can be delayed or, in the worst case, hindered.

In uncertain situations, unknown demands or limited supply possibilities, the location of the supplier is important (Håkansson & Wootz, 1975). The higher uncertainty the closer should the supplier be to the purchaser. Small distances between suppliers and responding customers are beneficial both for lead-time and service (Kalfakakou & Tsouros, 2001). Very important for the location is the availability of transportation infrastructure and the lead-times connected to that structure (Klier, 2005). In military operation the level of uncertainty is high, risks involved often require quick response. The more distant the supplier is the more important is the transportation infrastructure in order to meet the time requirements. Bilateral agreements tend also to be important to avoid export restrictions.

3.3.3 Aspects on Internationalisation

Internationalisation can be viewed as processes which aim to increase involvement in operations across national borders (Welch & Luostarinen, 1988). The requirements to internationalise the military supply chains within the European countries are strong (EU, 2004a). Important aspects on internationalisation for the defence area can be sorted into three groups; behavioural, transaction cost and knowledge/technology.

Behavioural internationalisation models have focused on learning and knowledge accumulation (Blomstermo, Eriksson, & Sharma, 2004). The Uppsala model (Johanson & Vahlne, 1977) incorporated with the concept of psychic (Hallen & Wiedershiem-Paul, 1982) distance and the industrial network approach (Johanson & Vahlne, 1990, 2003, 2009) describes a dynamic incremental growth of the international engagement of the firm.

The Uppsala-model is based on four cornerstones: market knowledge, market commitment, commitment decisions, and current activities. The two first are looked upon as static aspects and the second two are dynamic aspects (Johanson & Vahlne, 1977). Market knowledge is based on Penrose (1959/1995), where she divides knowledge into objective and experiential. The experiential knowledge is country specific, and needs to be obtained at the location. Market commitment is the amount of resources used for a certain market and the difficulty to move them to another market. Commitment decisions concern commitment of resources to the foreign operation. The decisions are connected to opportunities and potential problems with the new

¹⁹ Small nations like Sweden have more than once experienced, that suppliers are hindered by their own government to export equipment or spare parts during an on-going engagement, due to national security reasons.

operation. Current activities explain the interaction with other firms by the integration of the industrial network approach into the Uppsala-model. The Uppsala-model explains two patterns; firstly how the engagement in a new market develops, and secondly entrance to new markets with successively larger psychic distance. The Uppsala model has been criticised for being incremental and slow in its internationalisation process, not taking care of the entrepreneurial internationalisation force that exists in many new firms (Autio, Sapienza, & Almeida, 2000; McDougall, Shane, & Oviatt, 1994; Oesterle, 1997). In the defence area this criticism can be valid for smaller firms developing new technique. But for the defence forces and the main contractors, which have existed for many years and where the internationalisation process is slow, the model is believed to be relevant and valid. Also, with the purchasing perspective the knowledge accumulation and processes can be expected to work in a similar way as in marketing for which the Uppsala-model was developed (Matthyssens, Quintens, & Faes, 2003; Meyer & Gelbuda, 2006).

Psychic distance on organizational level is defined as the difference in perceptions between buyer and seller regarding either needs or offers. The concept of psychic distance on organisational level is formed by three determinants on personal level; trust, experience, and cultural affinity. (Hallen & Wiedershiem-Paul, 1982).

Trust is discussed in more detail below (3.4.4 Interdependence and Trust). For psychic distance trust in personal relations is anticipated to be of high importance.

Experience on individual level causes preconceptions regarding the suppliers in the foreign country. This will affect the executive level decisions when formulating long-term sourcing directives and short-term decisions concerning local sourcing in a military operation. It will also affect the operational level when supplier contacts are taken.

Cultural affinity expresses the effects of differences in different aspects such as legal environment, business habits, language, and cultural environment. The magnitudes of these aspects are anticipated to be somewhat different from normal business practise. For the individual operation, you have soldiers that are motivated and well informed about the area they are going to. In business with armament there are many different obstacles to solve of legal aspects for example custom handling.

The relevance of psychic distance as a concept has been questioned (e.g. Stöttinger & Schlegelmilch, 1998). It cannot alone explain differences in performance, but it has proved to be a helpful predictor of corporate performance (Evans, Treadgold, & Mavondo, 2000). Swift (1999) chooses to look at the issue in the opposite direction, and talks instead about psychic or cultural closeness. He points at finding personnel with cultural similarity, pre-training should focus on similarities, and finally the personnel should be made aware of important cultural differences. Psychic distance can be of much larger magnitude than one could expect, and it is therefore always of importance to

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analyse the parameters before entering a new market (O'Grady & Lane, 1996). The concept describes the situation concerning local sourcing in PSOs and contributes to the understanding of the possibilities to develop local sourcing in a unique operation (Skoglund & Hertz, 2011).

The transaction cost model is derived from Williamson (1975, 1985). The model focuses on how the cost affects the choice of market and mode of entry. The firm should select a location where the transaction cost is minimised (Osarenkhoe, 2008, 2009). Osarenkhoe argues that the cost should be divided in cost for getting market information, negotiating cost, and monitoring cost. But, also the traditional transaction cost variables play an important role; transaction frequency, asset specificity, uncertainty, bounded rationality and opportunism (Nordin, 2008). Critics of the transaction cost approach argue that it only seeks short-term gains and that strategic sourcing requires integration of different perspectives (Murray, 2001; Trent & Monczka, 2003a, 2003b). But, transaction cost aspects are also relevant for technological and behavioural models. Uncertainty and bounded rationality are underlying assumptions for the Uppsala-model (Johanson & Vahlne, 2009).

Knowledge intensity in firms was defined by Autio, et al. (2000 p. 913) as: 'the extent to which a firm depends on the knowledge inherent in its activities and outputs as a source of competitive advantage'. Military equipment is in many cases the front edge of the technology, just for the simple reason to have an advantage upon the enemy in case of a war. When a product has become common goods, is it already obsolete for the edge industry and the military organisations with front-end materiel. In the defence area there are reasons from both the supplier side and the procurer side to use global technology sourcing, to go international to benefit from superior knowledge and front edge technology on the international market (Steinle & Schiele, 2008; Trent & Monczka, 2005). New product and process technology reduces prices and introduces international competition to the domestic market (Trent & Monczka, 1998). In the end, decision to source internationally can be termed to depend on three forces, need, opportunity or external pressure (Agndal, 2006). In the defence area, there is a political pressure in several countries to search for international competition, especially within the EU (EU, 2004a).

3.3.4 Limitations of international suppliers

Many researchers argue that firms can over-source internationally the same way as outsourcing has gone too far in some firms (Dankbaar, 2007; Porter, 1990; Steinle & Schiele, 2008). Being a part of a cluster with a geographic proximity supports innovativeness and productivity (Molina-Morales & Martinez-Fernaández, 2003). Suppliers from local or national network are valuable resources (Steinle & Schiele, 2008). In the defence, this can be both from the perspective of a resource for the national defence and technology development for new military equipment, meeting specific national requirements. Products

developed in foreign cultures are not as useable as locally developed and produced products (Gertler, 1993). Especially important is the man-machine interface. With international suppliers the risk of dependency is higher compared with local suppliers (Steinle & Schiele, 2008). In the defence sector small countries are small buyers and the power balance is weak in the relation to the international suppliers (Markowski, et al., 2010). On the national level in an industrial network the national defence has a good position to be classified as the preferred customer (Steinle & Schiele, 2008).

3.3.5 Decision parameters

When deciding on where to source it is mainly to take what is discussed above into account. But to help the reader to structure the information and to support the analysis presented below in chapter 8, a model in three steps is suggested in table 3.2. The model builds on the discussions in the paragraphs above.

Table 3.2. The market decision process

Step 1 Domestic sourcing	Step 2 Local sourcing	Step 3 International sourcing
National defence requirements	Support of peace building	Cultural closeness in business
Are national suppliers competitive?	Delivery lead-time	Power and dependence in relation
Are the products important for nation to nation exchange?	Customs regulations	Man machine interface
Are there any requirements on proximity or flexibility?	Hostile actions	Life cycle support

The first step in the decision process about which market to look for, is to evaluate if there are reasons to source from the domestic market. Important factors for the domestic market are the capability and competitiveness of domestic suppliers, the importance of the product for the national defence, the importance of the suppliers' capability for the national defence, and the strategic importance of the supplier relations for international contacts and exchange. The physical distance can also play an important role for not going international. Physical distance affects the deliveries of product and services, e.g. time difference, transportation cost, or the climate for which the product originally was developed (Agndal, 2006).

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The second step is to decide on local sourcing. The military logistics organisation in the area of the PSO should strive for local sourcing when it supports the peace building process. Other reasons to source locally also exist but they differ between operations and have to be decided upon in every single operation. Important aspects to consider are: available entrances to the area, delivery lead-times from national resources or international suppliers, customs and transport regulations through transit nations and into the area of operation, access to transport capacity, and risk to encounter hostile actions.

The third step is to decide on which international market may be relevant to source from. Cultural aspects play an important role both for the business relation as such, and for the technology used in the products. Military products have a life span from less than one year up to more than fifty years. The international supplier must have the ability to meet the expected product lifetime with support, maintenance and upgrading. Expected relational aspects such as power and dependency must be taken into account (see 3.5.1). The regional market can be viewed as a subset of the international market with relatively short lead-times.

3.4 Channel decision - number of suppliers

Historically it was common that firms had large supplier bases, for example the car industry (Womack, et al., 1990). The trend and ideas following of lean manufacturing (Hines, et al., 2004), and Toyota subcontractor relations (Womack, et al., 1990), is the reduction in the supplier base and the creation of supplier base networks (Holmen, Pedersen, & Jansen, 2007). When reducing the supplier base the maximum reduction is to a single source. In this case only one supplier delivers a product or a product group. The dominating arguments for having a single source are: better quality, stronger and more durable relationships, higher commitment and effort, better communication, economies of scale, better cooperation on development and services (Skjøtt-Larsen, et al., 2007). Some suppliers are strategically important for the end product; a close cooperation with these suppliers reduces transaction costs, and supports future product development.

It is also important to identify the difference between single and sole sourcing. Single sourcing is when one supplier is selected by the purchasing organisation and sole sourcing is when there is only one possible supplier who has a monopoly (Treleven & Bergman Schweikhart, 1988). If sourcing in the domestic market is chosen by the defence procurement agencies in small countries, sole sourcing would normally be the case for complex equipment. One of the major problems identified with sole sourcing is imbalance of power (Treleven & Bergman Schweikhart, 1988). But in the case of small nations' defence industry, the industry is also dependent on one customer, the national defence forces, which makes the relation balanced in this perspective

(Markowski, et al., 2010). The strongest criticism against single sourcing in the defence area or the public area in general is that single sourcing is prone to the risk of corruption (Pyman, Wilson, & Scott, 2009). Another important aspect is the requirement on transparency when spending public money (Tabish & Jha, 2011). Inderst (2008) suggests though, based on commercial considerations, defence procurement should rely on few suppliers and large lots.

Many companies have reduced the supplier base but not all has gone so far as to a single sourcing, for example Toyota has 2-3 suppliers for every component or component area (Liker & Choi, 2004). Through this they can keep a certain degree of competition between the suppliers. At the same time they encourage the suppliers to cooperate to achieve better and faster improvements in both development and production. US defence procurement used second sourcing to achieve competition in the production phase of defence supply as early as the 1970s (Anton & Yao, 1987). The aim was then solely to create cost reductions. Nowadays, many firms have to manage long and complex supply chains, where the risks of delayed deliveries are high (Kouvelis & Li, 2008). They argue that firms, to match this increased risk, create emergency response strategies with backup suppliers or dual sourcing solutions. The other way to handle the problem with delays, has been safety lead-times, where the buyer develops a strategy with backup inventory (Chopra & Meindl, 2007).

The multiple supplier relation is based on assumption, that there are many suppliers who can deliver the required products, and that arm's-length adverse relationship is the most effective way to manage these suppliers.

Longitudinal research studying changes in the supply base cannot show that going from multiple sourcing to single sourcing, is better than the other way around (Faes & Matthyssens, 2009). Much seems to be contextual and depend upon how the environment changes where fast changing markets benefit from multiple sourcing while more stable markets where e.g. quality is important have advantages with single sourcing.

3.4.1 Number of Suppliers for Peace Support Operations

When deciding on how large the supplier base should be for PSOs the practitioner needs to consider three questions. These questions handle the uncertainty aspects of military operations, the risk the suppliers are willing to take, and if the suppliers can affect the operation negatively (Alexandra, et al., 2008; Ohlson, 2008; von Clausewitz, 1832-34/1991). The first question to ask is: which type of sourcing, single dual or multiple, of a given supply can be agile enough to support all the needs of the nation's PSO? Military operations often need technical support for the equipment in use, which implies the second question: are the suppliers willing to meet the requirements of product support in a war-zone? This might be difficult if the equipment are based on multiple sourcing decisions. The third question: How can deliveries be secured to

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military units in a conflict area? Problems with deliveries can arise due to the conflict. This can affect both deliveries from outside and from local suppliers in the operational area, but probably not at the same time. So, having both local suppliers and suppliers from outside the operational area is an important risk reduction (Skoglund & Hertz, 2011). In table 3.3 the discussion above is summarised. Important parameters for each type of decision are presented.

Table 3.3 decision parameters for the choice of number of suppliers

Single sourcing	Sole sourcing	Dual Sourcing	Multiple sourcing
Main equipment and related services	Only available supplier	When local suppliers are used	Standard supplies
Agile supplier	High asset specificity	Capability redundancy	Efficiency requirements
Support in a war-zone	Requirement on homeland defence		

3.5 Supplier relationship

A basic premise for understanding the buyer-supplier relationship is the perspective on supply chains. Below, we will therefore start to discuss general aspects of supply chains followed by different types of buyer-supplier relationships in supply chains. Different types of buyer-supplier relationships can be identified by a number of parameters. In the defence, as in every other sector, some parameters are believed to be more important than others. No previous research has discussed or graded the importance of different relation parameters in the defence, the choice therefore relies to a degree on personal experience of these relations. The first parameters discussed below are power and dependence. They reflect the situation in the defence area. Normally it consists of few suppliers, few buyers and a political interest/involvement. The situation with few players in triangular complex relations tends to create a power dependency game between one another. The next parameters discussed are trust and interdependence. These two factors are believed to be the most important factors when it comes to long-lasting partnerships. Military equipment stays in operation up to more than 50 years. In order to be able to support and upgrade the equipment long-lasting supplier relationships can be important in many aspects. In the defence industry many employees have a former career in the military, which makes supplier and buyer capable of talking the same language. This is a factor that affects trust and dependence in the

buyer-supplier relation. Both these pairs of parameters also relate to the introduction of the Act of Public Procurement. It has caused an adverse view on public procurement, while at the same time there has been a long tradition of cooperation within the defence. Finally, willingness is discussed. Willingness is about the desire from the buyer's or the supplier's perspective to have a business relation with the other. This factor, in the defence, is a combination of two elements; risk assessment and ethics. Arms-trade is about the risk to lose employees in war and the ability to deliver during wartime. Another side of the coin is the risk of getting a damaged reputation due to poor ethical behaviour of the supplier/buyer.

3.5.1 Supplier relationship in the supply chain

To develop, produce and deliver a physical product or a service, or upgrade an already delivered physical product, requires a supply chain. Menzer, et al. (2001) definition is adopted for this study (see chapter 2): 'A supply chain is defined as a set of three or more entities directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.'

The most complex form of a supply chain is probably to be found within the defence. The armed forces use a number of different services, consumables and equipment in their operations which requires a complex network of suppliers and many equipment are complex with a physical life length of more than 50 years, which requires long-lasting supply chain relations (Johnsen, et al., 2009). When it comes to service providers, the number of different suppliers can grow drastically. Simple services do not require that many suppliers while complex services require a complex supply chain. A military organisation is a service provider of security or war. In military operations there are continuous changes in environment and threats which have to be met by technological development, modifications and support (Försvarmakten, 2007a). This means also that the supply chain is slowly changing with new relationships, even if it is stable in a larger perspective (Forsgren, et al., 1988).

Even with a rather homogenous product portfolio, there are a number of different aspects to consider. The coordination even in a simple supply chain is so complex that it has to be dealt with on a continuous basis (Håkansson, 1989). On the day-to-day basis adaptations of routines, knowledge exchange and strategies will occur. The supply chain for military operations requires coordination with a large number of firms in several industrial sectors (Hagelin, 2010; Sarin, 2000).

3.5.2 Differentiated supplier relationships

As discussed above, armed forces in military operations have many suppliers with many types of supplies. This indicates that it is neither possible nor efficient to do all purchases with the same methodology, and consequently the supplier relations will also differ.

Many aspects can be considered when describing buyer-supplier relations. They can be divided into product related or process related aspects (Kraljic, 1983; Lakemond, 2001). They can be divided into first and second order. Whereas in a process oriented perspective the first order can be exemplified by adverse transactions or strategic partnerships, the second order can be exemplified by trust, interdependency or power.

There are two aspects that probably are more important than others when describing buyer-supplier relationship in general. Firstly, depending on industry/business field, there are differences in the tradition and the maturity in the way business is done (Axelsson, et al., 2005). Secondly, some products and services are more critical than others and some are larger cost drivers than others. The buyer will, due to effectiveness and efficiency reasons, prioritise his own resources towards the suppliers of these products (Tatham, 2005). These aspects are also believed to be typical for PSOs.

Sourcing can be divided into different stages depending on the maturity of the business unit, corporation or industry (Trent & Monczka, 2005; van Weele, 2005). Since the defence sector concerns more than one industry and more than one business unit, the maturity will be expected to differ to some degree. Van Weele (2005) suggests six levels: transactional orientation, commercial orientation, purchasing orientation, internal integration, external integration, and value chain integration. Individual businesses or industries normally have one stage orientation depending on the tradition and maturity (Axelsson, et al., 2005). In PSOs, due to the complexity, one can expect to find purchases that are handled just as clerical order processing, the lowest stage on the maturity scale, and other sourcing where a totally integrated buyer-supplier relation exists with supplier driven activities, and development. If an organisation is capable to do work in a value chain integration mode, it does not mean that all purchases have to be done with closely integrated relations. For some purchases transactional relations are more appropriate due to the efficiency requirements. The important conclusion to be drawn is that as long as the organisation has started to reach the level internal integration one can expect to find some business relations that are typical for all maturity levels.

The supply relationships are also based on the key dimensions in the supply base: number of suppliers, differentiation among them, and the level of interrelationship between the suppliers (Choi & Krause, 2006). Choi and Krause suggest that it exists an optimal size of the supply base that is different for each firm and industry. In order to understand more about the relationship

studies, a complementary perspective can be applied, where the number of suppliers, degree of cooperation, and differentiation are analysed.

Another perspective is to base the view on the type of relation that exists between buyer and supplier. A number of different descriptions have been used to identify different types of relations. Among the most commonly used words describing the interactions are: clerical order processing, e-market, competitive ordering, arm's-length relationship, durable competition, and adversarial relation, long-term power based relationship, partnership, cooperative partnership, strategic partnership, joint venture, strategic alliances and complete ownership (Axelsson, et al., 2005; Dubois & Wynstra, 2005; Dyer, Cho, & Chu, 1998; Ford, et al., 2003; van Weele, 2005). Each one of these supplier relationships has a unique set of identifiers. In some cases the identifiers are overlapping since the supplier relationships are somewhat overlapping. Some of the definitions do not just relate to a static situation, but also to the development of the purchasing function within the firm. Using all definitions create a complex pattern which is both difficult to analyse and understand. Bäckstrand (2007) suggests a simpler model with three levels of relationships: transaction, collaboration and integration. Transaction relations are commonly based on the thoughts described in transaction cost economics (Williamson, 1985), and focuses on minimising the cost for the transaction. The aim is to safeguard the purchase against bounded rationality and opportunism. The basic principle is to view every single transaction as an isolated event, and not take future or previous business into account. Collaboration relationships are often described in the opposite terms adversarial relationship or partnership. The relationship can also often be described by terms used in transaction cost economics or in industrial network approach. Transaction cost economics is described by asset specificity, bounded rationality, and opportunism, and industrial network approach is described by actors, resources, and activities (Håkansson, 1989; Williamson, 1985). Typical identifiers for the both perspectives are power-dependence and adversarial interaction used in transaction cost economics and interdependence-trust and collaboration used in industrial network approach. Integration in this view includes joint ventures, strategic alliances, joint ownership, in-sourcing, and horizontal integration.

PSOs can always expect to identify needs that only happen once. Therefore short-term transactions will always be one of the supply methods used. This type of relations can be called short-term arm's-length relations. In the other end, equipment exists which will be used by the military units for 30-50 years. To support and upgrade this equipment, long-term supplier relationships will exist, which can be of an adverse or partner form. They will below be called supplier dependent relationship or partnerships. In between these types of supplies there also exist products which are available on the international market from many suppliers who need replenishment on more regular basis. In these areas some suppliers have received renewal of their contract many times,

based on performance and price. These relations are called durable arm's length relationships.

Below a number of second order aspects of relationships will be discussed, which are considered to be central for the military environment. The aspects will also be compared in the four types of supplier relationships.

3.5.3 *Power and dependence*

Power and dependence are often viewed as each other's opposite (Cox, 2004a; Emerson, 1962). The sources of power that can be used on the opponent are the reasons to become dependent in a relation. It is reasonable to anticipate that the firm's or government agency's power or dependence position in the supply chain will affect the business relations.

Research about power has a history of more than 50 years, and there has been a long debate on how to define power. One of the early definitions was presented by Dahl (1957). He defines power as 'A has power over B to the extent that he can get B to do something that B would not otherwise do.' Essential to Dahl is the possibility to measure power, which made an important influence on his definition. Gaski (1984) summarises earlier research, '...power is the ability to cause someone to do something he/she would not have done otherwise'. Looking upon supply chain Stannack (1996) suggests for supply chain management power "the capacity to optimize the behaviour of suppliers and subcontractors in accordance with desired performance objectives". Stannack only discusses an upstream perspective, but the same must be relevant in a downstream perspective.

With no general accepted definition on power it is appropriate to identify the adjustments to the special circumstances that exist within the research field. In this the case adopting power upon the supply chain to facilitate and support PSOs. There are some important differences from the normal supply chain management power (Stannack, 1996) that must be considered. The PSOs of small countries, which the supply chain is supposed to support, are not a number of continuous PSOs. For periods of time it is possible that there is no PSO going on. Each single PSO will in some perspective differ from the others. Therefore a unique combination of actors will be involved for every single PSO. For a certain supplier there might be long periods without any engagement in any on-going PSO. It is not just about to use power to optimise an on-going PSO. It actually has two more objectives to take care of: Firstly the suppliers should not change their ways of doing things during periods of no on-going PSO in a way so they will have problems meeting the demands when the next PSO starts that they will be engaged in. Secondly the actors should work with optimisation of the supply chain between on-going PSOs. Trying to combine Dahl's (1957) simplicity, Gaski's (1984) influencing the decision process and Stannack's (1996) supply chain management approach with the special requirements of this case, the following definition will be appropriate:

A has power over B to the extent that A can influence B's decision variables to get B to optimise the supply chains network, also during periods when B's supply role is deactivated.

French and Raven (1959) present a number of bases of power on individual level, which several researchers have built their studies on (Beier & Stern, 1969; El-Ansary & Stern, 1972; Etgar, 1976; Hunt & Nevin, 1974; Mintzberg, 1983). French and Raven define the power bases as reward power, coercive power, legitimate power, referent power and expert power.

Reward power has its base in giving something of value for a wished behaviour. In an organisational level this could be incentives for example.

Coercive power on the other hand has the basis in punishment, French and Raven believe that it is fundamental to separate the two because reward power tends to increase the attraction between the parties and the coercive power to do the opposite. With reward power there is also a tendency that the effect remains, but with punishment the effect will go away as fast as the punisher looks the other way.

Legitimate power is by French and Raven: "...as that power which stems from internalized values in P which dictate that O has a legitimate right to influence P and that P has an obligation to accept this influence." It can be a formal authority, but it does not have to be that, it can be just a simple promise to follow. They continue to say that there are three types of bases for legitimate power, cultural values, social structure and designation by a legitimising agent.

Referent power has the basis in the identification of the influenced with the power holder, and he wants to become associated with the power holder.

Expert power is based on knowledge the power holder has in a certain field. According to French and Raven the field of expert power is more delimited than with legitimate power. In both cases, will the effect on the possibilities to exercise power however be negatively affected if the power is tried to be used outside the limits of the power range.

There are many ways to evaluate a power situation. Below, absolute power and countervailing power is used. Absolute power is the sum of the five different bases of power presented above. The influenced will also have an absolute power situation, which can be denominated as countervailing-power, so to identify what power the power holder really has, one must find the balanced power (Etgar, 1976; Galbraith, 1957/1997). Formally countervailing-power is not B's power upon A, but B's ability to resist A's power. In practical terms B's countervailing-power and power upon A coincide in their practical tools to be used and can therefore be handled as one power (Gaski, 1984).

If we go back to the definition of power, we find that it is based on how B acts. For having B to act in a certain, not otherwise planned, way, he must perceive some power upon him. Perceived power is that part of the absolute power of A that is visible to B (Beier & Stern, 1969; El-Ansary & Stern, 1972; Gaski, 1984; Hunt & Nevin, 1974). The difference between the two powers,

3 The Sourcing Decisions and Their Elements

perceived power and own power, will form the balanced power that B will act upon. In the defence bilateral monopoly market, supplier or customer has just more possibilities to utilize coercive and reward power, due to the fact that there is in a short-term perspective no one else to do business with. According to Emerson (1962) a balanced situation does not hinder firms to use the power tools, but it will change the power situation.

There have been several attempts to measure power, but it has proved to be difficult to operationalise power for quantitative studies (El-Ansary & Stern, 1972; Hunt & Nevin, 1974). It is not practically possible to put figures on the different power sources and calculate a value for the balancing power, so evaluating the power situation has to be based on a more qualitative reasoning (e.g. Cox, Watson, Lonsdale, & Sanderson, 2004). Low level of power, also means low level of dependence, or one will rather have a situation of independence (Cox, 2004b).

If we turn our perspective to the supply chain for FM's PSOs, we find a number of monopoly industries among the suppliers and one monopoly customer, FM. This situation will give both parties a large power toolbox. Another perspective is that much of the power in the toolbox can be viewed as interdependencies. This will end up in a strategic choice of adverse (use of power) or cooperative (based on trust) business relationship.

3.5.4 Interdependence and trust

Interdependence is mentioned above as the result of large power toolboxes. But this should not be viewed as the whole truth. Interdependence is also something which evolves in a long-term relationship (Håkansson & Snehota, 1995). Interdependencies can be the result of interaction in a long-term and important business relation, or it can be an active act by the parties to show each other trust and interest to continue the cooperation.

In long-term relations a number of adaptations occur. In product development the skills slowly becomes complementary. Processes and routines are known to both parties. The information exchange functions smoothly. Performance and effectiveness become dependent on both the own firm and the partners. The interdependencies exist between activities, resources and actors (Håkansson & Snehota, 1989).

Dubois, Hulthén & Pedersen (2004) apply a network perspective on interdependence in supply chains (i.e. the supply chain definition in this thesis). They base their analysis on Thompson's (1967) definition of three types of interdependence: pooled, sequential and reciprocal interdependence. Pooled Interdependence refers to when different parts contribute to the whole, and all parts are needed to make the whole. Sequential interdependence is just what it says, it is sequential; process steps or tasks which need to be done in a certain order. Reciprocal interdependence exists when an output of one task becomes input for other tasks. Thompson (Thompson, 1967) discusses internal

interdependencies, while Dubois, et al. (2004) use the concept for external relations. They argue that pooled interdependencies are about achieving economies of scale through joint utilisation of resources. Reciprocal and sequential interdependencies concern meeting between firms and adapting and mutually adjusting plans and products to one another. Firms have to cooperate in many different supply chains and the supply chains are interdependent on one another in a network of firms.

It is an important difference between dependence and interdependence. Dependence is generally directed only in one way. Dependence is a situation which everyone tries to avoid. Interdependence in turn is directed in at least two ways. Interdependence is in most cases the result of conscious acts where you lock yourself in, in a relation which is anticipated to last for some time.

Trust is a very complex and multifaceted concept. From the older research can one see two directions: emotional and cognitive. The cognitive direction has its roots in Deutsch's (1958) thoughts, and concerns a more calculative and rational aspect, which has been questioned if it really can be labelled as trust. These aspects of trust can be viewed as calculative acts to minimise cost in a transaction (Williamson, 1993). The emotional direction has a number of examples of different ingredients for example benevolence (Strickland, 1956), confidence (Kwant, 1965), altruism (Frost, Stimpson, & Maughan, 1978). Dyer and Chu (2000, p. 260) define: 'trust as one party's confidence that the other party in the exchange relationship will not exploit its vulnerabilities'. Young (2006, p. 439) suggests that trust: 'is an interacting set of emotions and assessments that develop and change over time'. Trust can be viewed as a combination of emotional and contextual aspects, and that these will influence each other (Young & Daniel, 2003). The more important the emotional aspect of trust is the less is the risk assessment of the relation (Young, 2006). Huemer (2004) discusses the implication of trust for stability and variety. A passive view of trust supports stability. It is possible to trust the partner based on institutionalised behaviours, which creates the stability. On the other hand, an active view of trust supports variety in that you give freedom to someone you trust, which gives him possibilities to act in alternative ways. In this way trust supports both stability and change which is an important aspect of the supply chain. Developing acceptance through legitimacy and trust is essential to develop relations in the supply chain. Thereby trust and interdependency go hand in hand, creating interdependencies in a way to both show someone trust and receive trust from someone (Claro, de Oliveira Claro, & Hagelaar, 2006; Svensson, 2004). In the same way as it is difficult to measure power, it is difficult to measure trust. Swan, Trawick & Silva (1985) operationalise trust into; dependability/reliability, honesty, competence, customer orientation, and friendliness. Claro, et al. (2006) use; honesty, sincerity, and no deliberate damage under any circumstance. Trust is also strongly related to how contracts are handled, in relationship with large elements of trust the contracts are used to support coordination but with low levels of trust contracts are used for

3 The Sourcing Decisions and Their Elements

control and as a power tool (Mellewigt, Madhok, & Weibeld, 2007). But in the end a strong relationship with much trust does not mean that the customer should leave the supplier by himself. A trustful strong relationship requires that the customer monitors and supports the supplier's achievements (Liker & Choi, 2004). Only then will the suppliers be competitive, which is required for a lasting partnership.

3.5.5 Willingness

Willingness concerns the purchaser's interest of using a certain supplier or the supplier's interest in selling to a certain customer. The concept willingness is viewed as a combination of two elements, risk evaluation and ethics. In military procurement, this is an important aspect. The term willingness seems not to have been discussed or studied in previous military purchase, even if some literature on PMC has touched the subject (Alexandra, et al., 2008; Byrne, 2007; Caparini, 2007).

Risk evaluation from a customer's perspective is mainly based on trust. Huemer (2004) points out that many believe that risk is the other side of the coin when you study trust. In the discussion on trust above the approach is rather general, in this situation is it very specific: Will the supplier deliver anywhere and under all circumstances? If the customer has any doubts about the supplier's intention, it will have large consequences for the logistic system. Equipment, spare parts and materiel have to be stored and services have to be in-sourced.

From a supplier's perspective risk is associated with political instability, unpredictable demands, and possible risk of bad publicity if something goes wrong with the military operation. These are risks that are beyond the customers influence to a degree, but are of large importance for a supplier's willingness to involve himself into long-term partnership.

The aspects of ethics (or corporate social responsibility) are similar for both the supplier and the purchaser. There is a fast growing body of research on ethics, and there are a few minor differences on how to view ethics, but most views can be summarised by the broad definition of Michelson, Wailes, van der Laan, and Frost (2004, p. 1): '...the integration of personal values and social considerations and economic factors into investment decisions'. There is a slight difference though to discuss ethic investments or ethic businesses. Then it is also relevant to take economic considerations in to account. There are very few that do all investments or all the trade just on personal values or social considerations. According to Michelson, et al. (2004) the ethic part of the business is a long-term ambition to make a change. Corporate ethical codes play an important role for setting an ethic agenda within a firm (Stevens, 2008). The ethical codes differ from the operation description by elucidating the value system by which the operation should be performed. The interest concerning ethics among suppliers grows, and the importance of supplier ethics in the

customers' supplier evaluations increases in relation to other measures (Lee, 2008).

The value system of major importance in this research concerns, of course, arms trade. What ethical aspects that might exist with arms trade can be discussed for ever. But without going into general aspects of arms trade, there are some important ethical limits also for the defence industry. Firstly, let us just accept that some firms have an ethical code which means that they will not involve themselves with arms industry or military operations, no matter what type it is. Secondly, there are corrupt firms with engagement in activities ranging from smuggling weapons to blacklisted dictators of warlords with child soldiers, to bribery (Byrne, 2007; Mahmudi-Azer, 2006). Thirdly there are national cultural differences, which affects both the legislative aspects on arms trade and differences in ethic codes (Hofstede, 2001).

The social consideration which needs to be evaluated is twofold. Firstly, a soldier confined as a prisoner of war has a certain protection by international law. While a civilian is in a more exposed position, where he/she can be judged as war criminals and sentenced to death. Secondly, with the danger of getting injured or killed there is a need for a system to take care of injured personnel and close relatives.

All parties are expected to evaluate their willingness, which means risk assessment and ethics evaluation, before entering a business relation. This can cause limitations of the possibilities to cooperate and in some cases prevent the supplier or customer to enter the business relation.

3.5.6 Supplier relationship, first and second order aspects

To identify and understand supplier relations a number of first and second order aspects are used in the discussions above. The focus has been on aspects that are believed to help the identification and categorisation of different types of supplier relations for logistics in PSOs.

The different aspects of the supply relations discussed above are summarised in table 3.4.

In the first column the first-order constructs are presented. In the first row the second-order constructs are presented. In the boxes below the second order constructs, the appearance of the second order constructs in the first order relationship is presented.

Table 3.4 Supplier relations, first and second order aspects.

\ Second First \	Power & Dependence	Trust & Inter- dependence	Willingness
Short-term arm's length relationship	Apparent in contract and execution of transaction	Trust can exist	A limited willingness must always exist to conduct a transaction
Durable Arm's length Relationship	Exists in the relation but is only in limited use	Trust exists, interdependence can exist	Basis for going into long-term transaction
Supplier Dependent Relationship	Apparent in contract and execution of transaction	Both can exist but opposite is also possible	Can cause large problems for the customer
Partnership	Exists in the relation but it is not used	Both are apparent in the execution of a transaction and in long-term contact	Basis for going into long-term cooperation

3.6 Analysing the sourcing and its effect in military supply chain

In the beginning of this chapter it is pointed to the need for a framework for the second research question: What are the outcomes of the key sourcing decision process?

When operationalising the sourcing decisions into their elements above, they appear to depend on the context. The choices made in the operationalisation relate to the military needs in PSOs and industry that supply the armed forces. The make or buy decision depends on where most value for money is produced. But in the defence area aspects such as security of supply and business entry barriers also play an important role. The market decision is done in three steps: Should only the national market be used? Can the sourcing be done in the local market of the PSO? Is the international market is beneficial to use? The channel decision depends on risk evaluation and agility requirements. Finally the supplier relationship is partially dependent on all previous decisions but also on the power, trust, and willingness in the supplier relation. To

summarise the discussion table 3.5 is developed. In the table the four decisions are presented in the first column. In the remaining columns different possible outcomes are presented.

Table 3.5 Operators to categorise and identify key decisions of the sourcing strategy.

Sourcing Decisions	Decision outcome			
Make or Buy	Make	Make with free capacity	Buy	
Market	National	Local	International	
Channel	Single	Sole	Dual	Multiple
Supplier Relationship	Short-term arm's length relationship	Durable arm's length relationship	Supplier dependent relationship	Partnership

This table can then be used to identify the sourcing key decisions which can also be visualised according to the suggested figure 3.1.

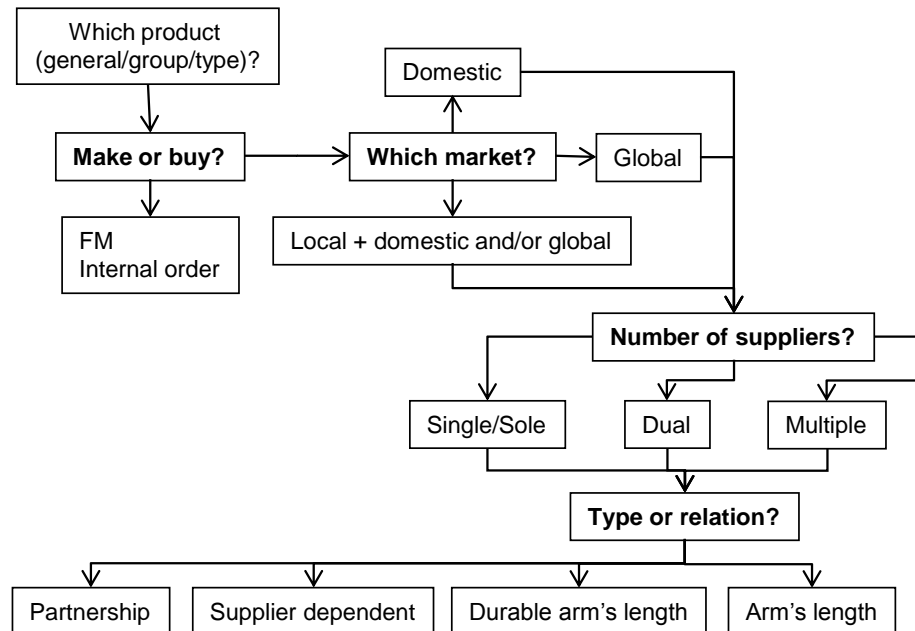


Figure 3.1 Key decisions for sourcing

3 The Sourcing Decisions and Their Elements

Since the sourcing decision is one of the logistics key decisions, the starting point in figure 3.1 coincides with the detailed level in the logistics key decisions presented in figure 2.5 (from a first assumption with iterative improvements over supply groups, down to individual product or service).

The objective for logistics in PSOs is considered to be two-fold. The prime objective for the logistics is to provide support to the military operations. The secondary objective is to support the local society, both concerning peace-building activities and to give humanitarian assistance. Ways of measuring the logistics performance are not well developed. Problems with classified information in military organisations in combination with little research, make methodologies to measure logistics performance rare and complicated. Parapob, Suthikarnnarunai and Buranaprappa (2009) discuss the development of key performance indicators, on the national defence logistics, but no studies are identified for PSOs. Therefore only qualitative analytical discussions, based on practitioners' expectations and logistics solutions, are possible to conduct when it comes to the logistics performance in the cases discussed in this thesis. The difference in logistics performance depending on the sourcing strategy can thereby only be done in qualitative manners.

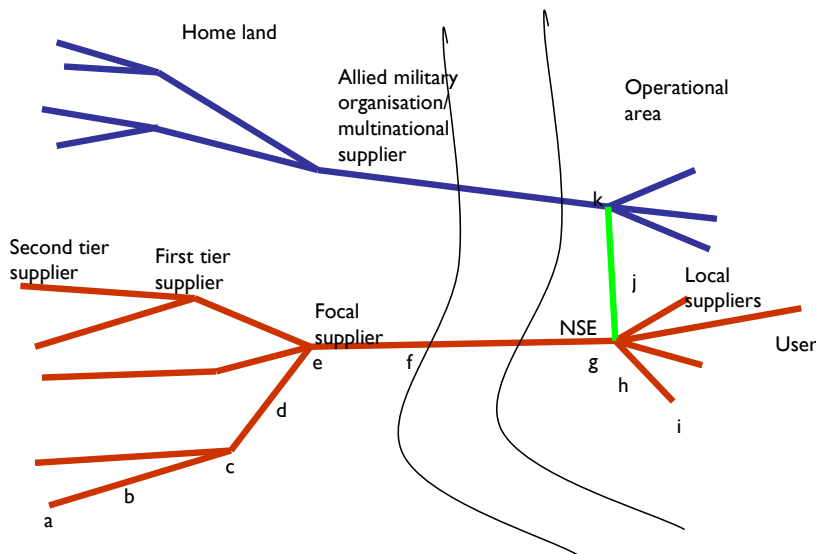


Figure 3.2 The supply chain in PSOs

The previous chapter discusses the outline of the logistics solution for Swedish PSOs. This theoretically developed solution can be analysed and updated based on the cases studied. By combining the military logistics operational solution presented in figure 2.4 with a general supply chain structure, figure 3.2 is constructed. In figure 3.2, a simplified picture of the supply chain for a PSO is

displayed. The nodes (a, c, e, g, i, l) can be described as production, storage and decision centres. The lines (b, d, f, h, j, k) between the nodes are to be viewed as flow facilitators of physical products, personnel, services, information and finances. In this type of structure it is possible to identify the actors' role in the network and their effect on the end-user/customer. The focal supplier (e) is to view the military organisation in the homeland that supports the National Support Element (NSE).

3.7 Summary

In this chapter the sourcing decisions and their elements are discussed. The chapter begins with a discussion about public procurement in order to create an understanding how it influenced the sourcing decisions. It is apparent that EU regulations of public procurement also put limitations on the sourcing of PSOs. The requirement on transparency and competition hampers the logistics system in PSOs. In the first chapter the research aim is presented and developed into three research questions. Below are two of these questions used to summarise the theoretical framework presented in this chapter.

- **What are the outcomes of the key sourcing decision process?**

In order to be able to answer this question at the end of the thesis it is first necessary to understand what the key questions are about. The four sourcing decisions; Make or Buy, Geographical Market, Number of Channels, and Supplier relationship, have been discussed from a theoretical perspective and the possible different decision outcomes are summarised in table 3.5. The operationalisation of the four decisions has been done with the specific situation for military logistics in PSOs in mind, e.g. supplies that open up for ethical discussions or the limited amount of customers and suppliers.

- **How can the outcome of the key sourcing decisions impact the fulfilment of the logistics objectives in PSOs?**

The problems with measuring the impact of the sourcing on the ability to perform the logistics have been discussed. Little experience exists and no models or methods are in place in FM. Even if statistics and key performance indicators are excellent measurement methods, for this research other methods had to be used, since no data for this existed. This analysis was done based on sourcing activities and logistics outcome in the studied operations and experienced personnel's knowledge about the consequences if another sourcing solution had been chosen for the PSO.

4. Methodology

The ambition with this chapter is twofold: Firstly I would like to explain my thoughts concerning methodology and how my thoughts have influenced this research in particular. Secondly this chapter explains how the study was conducted.

Doing research or formulating the research question, design the research, putting together the theoretical framework, collecting empirical data and writing a thesis, are all activities based on a belief about what science is, that is ontological and epistemological standpoint. With a defined ontological and epistemological standpoint on the knowledge creation and the theory creation are the craftsmanship performed by the researcher, that is, the choice of research methods, the collection of empirical data and the analysis. One way to present and discuss methodology is to use three levels of knowledge generation, a meta-level, a discipline level and practise level (Stentoft Arlbjørn & Halldorsson, 2002). At the meta-level ontology and epistemology are discussed and developed. At the discipline level, theories and methods are discussed and developed. At the third level, the practice level, the observable reality exists. In logistics research this means observable processes or behaviour like information flow in a supply chain or buyer-supplier relations

In the first paragraph (4.1) of the chapter, the meta-level is presented. The research paradigms in logistics in general and in military science in particular are discussed. The researcher's role is discussed, and my own perspectives are presented. In the second paragraph (4.2), the discipline level is discussed. Knowledge creation, the outline of the research, and its quality are dealt with. In the third paragraph (4.3), the practise level is presented. The outline of the case studied and how the analysis is performed is presented. Finally, the chapter ends with a summary of the most important aspects of this study (4.4).

4.1 The Meta-level

4.1.1 *Research paradigms*

In the business area, logistics is a rather new research field (Vafidis, 2007). In military logistics the first real research was done by De Jomini (1838/2007) already in 1838. So, the field military logistics is old from a formal perspective. But, in reality modern research has been limited and the focus has been on supporting large forces in large operations (mainly US and UK forces). The

field has not stabilised in any paradigmatic perspective. In business logistics and supply chain management the field grew to a discipline in the 1960s (Kovács & Spens, 2005). Typical for a new research field is the lack of a dominating common paradigm (Vafidis, 2007). In the field of business logistics and supply chain management it has however been a dominance of positivistic approach in the research (Mentzer & Kahn, 1995; Stentoft Arlbjørn & Halldorsson, 2002). The positivistic approach has been dominated by US researchers, while European researchers have been more diverse, with a number of dissertations applying for example a hermeneutic approach (Vafidis, 2007). The diversification of approaches is important, as is the understanding of the span of approaches between the relativistic and positivistic stances. Kovács and Spens (2005) argue that the logistic field needs theory development and they argue that an abductive approach is a possible way forward, which indicates that a pragmatic or critical realist perspective would be suitable.

An abductive approach is an important tool used under the paradigm of critical realism (Danermark, Ekström, Jakobsen, & Karlsson, 2003), but it is also used under other related paradigms as for example pragmatism. In his thesis, Seldén (2005) gives an overview of the ontological and epistemological differences between positivism, relativism and critical realism. Seldén’s work is complemented with a pragmatic perspective in table 4.1 (Haack, 2009; Lincoln & Guba, 2003).

Table 4.1. Basic beliefs of paradigms

(Haack, 2009; Lincoln & Guba, 2003; Seldén, 2005)

	Positivism	Critical Realism	Pragmatism	Relativism
Ontology-issues about what is	What you can observe is real (Naïve realism)	“reality” is real, but consist of one observable part (explicit) and one not observable part (implicit)	The reality is locally real (explicit) but it exist an external reality which is not observable (implicit)	The reality is relative – it is locally constructed, in time and space (Naïve relativism)
Epistemology-issues about what we know about what is	What you observe is the truth	You observe an “open system” ²⁰ , and because of the implicit reality, what you see does not have to be the truth	What you observe is the truth for the local reality in time and space. But because of the implicit reality another theoretical level can exist.	What you observe is the truth for the local reality in time and space, but you cannot draw any further conclusions of what you observe

²⁰ The opposite of a closed system, where all parameters are known, the ideal situation for experiments are to have closed systems. In other words in an open system you do not know all parameters and some can even change during an observation, without being noticed since it is not possible to measure, or see in other ways.

4 Methodology

The pragmatists argue that there is a real world, which is not always possible to see or understand, therefore there is also a need for relativistic theories (Hammersley, 1990; Hultman, 2007). Both critical realism and pragmatism discuss the interplay between theory and data. Every research cannot start from the beginning and try to build new theory. The idea is to appreciate the existing theories as the relativity of the epistemology and the mission as a researcher is to improve theories (Seldén, 2005).

There is of course no right or wrong when adopting a paradigm for a research. But trying to force yourself to adopt a paradigm that you do not believe in will make it more difficult to perform research with a coherent approach. The area of military logistics is not dominated by any paradigm and is thereby open to the researcher's belief. Both the critical realist and the pragmatic perspectives have influenced my work during this study. But as the study revealed itself in terms of empirical findings the more clear it became to me that the pragmatic perspective influenced my work to a greater extent, because I found it difficult to reach a level of knowledge where implicit theories were developed according to the critical realism thinking.

4.1.2 *My role in this research*

Theory and concepts depend on the researcher's background and tradition in the field (Stentoft Arlbjørn & Halldorsson, 2002). Vafidis (2007) suggests a framework to describe the personal role in the research process. The framework consists of one backward and one forward perspective. The researcher's theoretical and practical background influences his motives future career, self-development and area of interest. The methodological choice will depend on how significant the research is perceived to be and the career consequences this will have. In this paragraph a backward and a forward perspective are applied on me as a researcher and the consequences on the study are discussed.

Since I joined the Swedish Armed Forces in 1983 I have mainly been working with logistics in different aspects, including 10 years on management levels in procurement projects. My background has helped me in many ways in this project. First of all it has helped me to gain access to the respondents and information that was classified. Secondly it helped me in the analysis of the data. I am of the opinion that my understanding should be used in the analysis of the data, partially because I do not believe it is possible to do otherwise and partly because I think it improves the analysis.

Turning to the forward perspective, my choice of military logistics as the research area is of course based on my interest in these questions. The self-development was in the early phases much connected to the fact me performing research and not so much a matter of subject or paradigm stances. During the last two years of my study I was given the chance to form a master program in military logistics, which I hope to be able to continue with. This

gave me even further insight in the need to develop the knowledge for this area and my possibilities to contribute to this. In this way the subject and paradigm stances become more important not only to place this study into a certain research paradigm but also to think through the paradigm of my own thoughts beyond this thesis.

It is also important to make clear for whom I write and where I like to make a contribution.

For me, writing is a process to gain understanding, so I do actually write for my own eagerness to learn more about the subject. Writing is a way to structure thoughts and to understand what I learned. My prime audience, which I hope to reach with the content in this thesis, is researchers within the area of military sciences. I also hope to catch the interest of a few but important practitioners who are engaged in military undergraduate education or in future development of defence procurement and logistics in international operations. Finally, I hope that my combined use of military and business logistics and supply chain management theory can give ideas to both the business and humanitarian logistics researchers.

4.2 The discipline level

Below is the theory creation process, the outline of the research and its quality discussed. As stated in the title of this thesis this is a case study. In the development of a new area cases play an important role of strong examples (Stuart, McCutcheon, Handfield, McLachlin, & Samson, 2002). The formation of the case gives also the baseline for the theory development (Dubois & Araujo, 2007). In this study I had the choice to see the three operations studied as one FM PSO case or as three separate cases. I decided to see the operations as one case to get a wider perspective on FM's logistics in PSOs. How I ended up with the decision about one case and why FM was chosen is discussed in paragraph 4.2.2. But first I will discuss the perspectives on theory creation in this study.

4.2.1 Theory creation

Central to research is to create knowledge. Stentoft Arlbjørn and Halldorsson (2002) suggest four quadrants (figure 4.1) for knowledge creation based on empirical research. In the first (I) quadrant, research is based on loose theory, i.e. not well-established concepts often introduced by consultants for example Six Sigma. A researcher's ambition might be to test the concepts and make them into more solid theories.

	Theory Test	Theory development
Loose Theory Base	I Storytelling and/or quantitative test of known concepts	II Generating New concepts
Solid Theory Base	III Refining the existing knowledge base	IV Expanding the knowledge base

(Stentoft Arlbjörn & Halldorsson, 2002)

Figure 4.1 Approaches to knowledge generation

In the second (II) quadrant, new thoughts are introduced, for example supply chain management. These thoughts are difficult to relate to an existing specific theory though, for example the resource based view. The risk is that the researchers only re-label existing knowledge and practise. In the third (III) quadrant solid theories, for example the resource based view, are tested, for confirmation or refinement. In the fourth (IV) quadrant the ambition is to expand the knowledge base. This can be done by looking at a phenomenon from another perspective e.g. going from a micro to a macro perspective. In the ambition to create new knowledge, the research presented in this thesis spans from storytelling to expanding the knowledge base. An important perspective is the theoretical framework developed for this research. The main focus is on the generation of new concepts and expanding the knowledge base. This might seem to be a little too ambitious at a first glance, but it can be explained by the theoretical situation in the area of military logistics. Every single story about military logistics increases knowledge in an area that presently lacks strong stories. New constructs need to be generated, in order to fill theoretical gaps in the area and in the end to fulfil the aim of this research. In some bits of the area, a solid theory base exists. Parts of this base need to be confirmed and others can be refined. Since only few published studies exist, many perspectives that belong to the core of military logistics have never been discussed. My assessment of this study is that it is mainly positioned in the second quadrant but that it also has some important parts in both the first and fourth quadrant.

Basically we talk about three different ways of creating knowledge, induction, deduction, abduction (Alvesson & Sköldbberg, 2008; Kovács & Spens, 2007). The inductive approach starts with observations of reality which are interpreted into general laws i.e. theory (Alvesson & Sköldbberg, 2008). Induction has for many years been criticised for being educated guessing. The deductive approach starts with an established theory. The theory is applied to a

specific case or context, where it is tested (Popper, 1959/2010). Deduction is efficient when it comes to theory testing, but is of limited use for theory generation (Kovács & Spens, 2007). The abductive research process is presented in figure 4.2. It starts with an established theory. The theory is matched with empirical data in iterative steps. Finally a new possible theoretical explanation is derived (Danermark, et al., 2003; Järvensivu & Törnroos, 2010; Kovács & Spens, 2005). When it came to the theory generation in this study, the intention was mainly to use an abductive approach. Some parts in the analysis have of course had both inductive and deductive reasoning, as discussed by Järvensivu & Törnroos (2010).

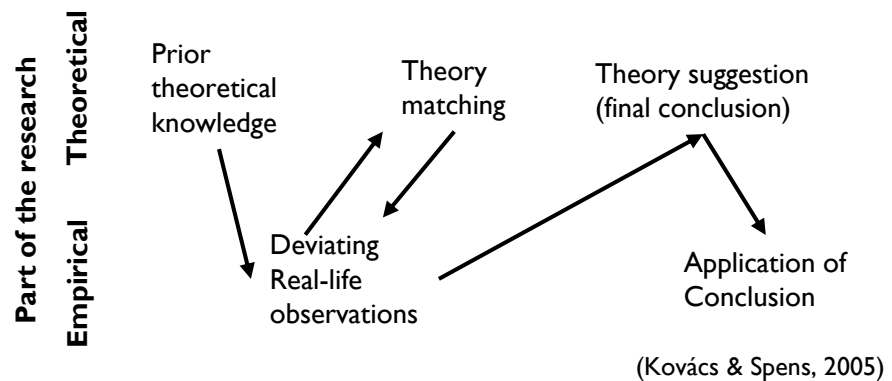


Figure 4.2 The abductive research process

4.2.2 Research design

During the first drafts of this study when beginning to formulate the research purpose different research designs were considered. The design of the research and the initial development of the purpose followed hand in hand. The first decision concerning the purpose, which also related to the research design, was the decision to study only Swedish PSOs. This decision was based on the knowledge about the difficulties to access information and respondents in other nations' forces due to the classification of some data. When having formulated a preliminary purpose, two facts were considered: There was a lack of descriptive cases concerning military logistics for small nation's participation in PSO and there was a very small amount of theory written about logistics in military operations. Thereby, the research purpose to describe and analyse is suitable in order to create descriptive material and to develop new theory. Case study as a method is suitable if the objectives are to describe and analyse (Ellram, 1996). A case study was thereby considered as the only suitable way to fulfil the needs of this study, and so it was decided.

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The case research logic relies on finding causal relationships within each case rather than by selecting, measuring and comparing a number of attributes on each case. ...To convince the reader of the relevance and theoretical contribution of a case study, the intellectual journey needs description and reflection. (Dubois & Araujo, 2007, pp. 175,178)

So the different research design alternatives concerned different approaches to do a case study. Basically two research approaches were considered. The first thought was to build the study on induction with a grounded theory approach as suggested by Glaser and Strauss (1967). This design idea was based on the awareness that only limited amounts of publications existed. The other alternative was to do a case study built on interviews with abductive reasoning. One important reason to perform a case study with abductive reasoning was an interest in the methodological approach to bring in theory from business logistics and supply chain management to develop theories for military logistics. Another factor in choosing that made me rule out the grounded approach was that I questioned the epistemological stance and if I really could use a grounded approach with all the knowledge I had about the subject. I also believed it was important to relate to the existing literature in the field of military logistics. Having decided this far, one major question remained: What should the case study look like?

As the subtitle of this thesis indicates, this research is a single but large case study. But this was not totally clear from the beginning. The data collection begun with interviews concerning the logistics operation²¹ in Liberia. Having done the first interviews, the data made me realise that it was not suitable to make every single operation into a separate case. The supply chain upstream of the operational area was more or less the same for all operations. Many suppliers did not even know to which operation they delivered. The HQ supply chain management was independent and logistic reforms were independent of the on-going operations. Also many other HQ processes that related to logistics for PSOs were of a general character and not possible to separate between operations, e.g. the dialogue with the government. It has also been argued that comparative studies of supply chains are complicated to perform (Halinen & Törnroos, 2005). One possibility could of course have been to form all empirical data collection around one operation. There were mainly two arguments against that; firstly it was interesting to see if the results differed between military branches, and secondly it was an organisational change going on within FM and it was interesting to see if these changes affected the result. Halinen and Törnros (2005), mean that four aspects are especially important for this type of case studies; boundaries, complexity, time, and comparison. I came to the conclusion that the most suitable way to meet the purpose with the study was a focal actor perspective over a fixed time period. The boundary of

²¹ In UN nomenclature operations are called missions, which was the case in the UN led mission in Liberia.

the network was set to the suppliers with which FM or FMV had relations. The ambition was never to identify or interview all the suppliers within the supply chain but many enough to be able to draw conclusions in the analysis. The study had a process perspective indicating that things change over time and also between different on-going PSOs. It was therefore important to study different operations over time to see if time played a crucial role or if it was possible to identify time stable theoretical aspects. Data was by these reasons collected from different operations during different time periods. The data collected covers parts of FM PSOs between the years 2002-2010. According to Yin (1981) many case studies begin with the naive assumption that everything is relevant, but this approach is only relevant in a pre-study to scale down the research questions. But it was not the ambition to collect data about everything or to cover all on-going operations during the studied time period. This would not have been possible to for one person, too many activities and operations were going on at the same time. The ambition has been to use every studied operation and every interview to enrich the case. It has never been an ambition to compare the operations. Instead the ambition has been to compare activities both within operations, between operation and the HQ processes to achieve a better understanding of PSOs. This also created the abductive approach to the study as the data from each operation was used to update and modify the analysis and the analysis in turn modified the search for data in each operation (figure 4.3).

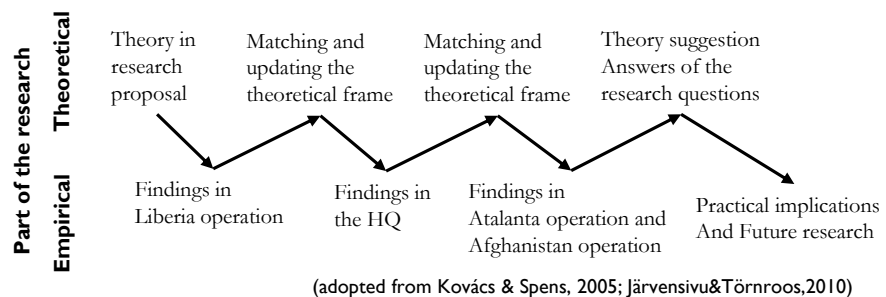


Figure 4.3 Research design of the case study

The case is large with many different aspects. As all research, it required a strict tailoring to reduce the data collection to a relevant level, where I as a researcher felt confident with my results. In this research the collection of data was done in steps with the main focus at one issue at the time. This does not mean that the other issues were left out; it only means that the amount of collected data was greater for certain aspects in each step. In the Liberia operation the main focus was on FM internal logistics activities and organisational structure. In the Gulf of Aden operation the focus was on logistic outcome and supplier relations. The political decision process, the end state and the requirements on

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the logistic system and HQ logistic processes were discussed with executive management and expert groups (in FM:HQ and FMV). The Afghanistan operation was used to gather complementary information to strengthen the data in several areas.

The analysis was carried out on two levels: organisational and individual. When studying the logistics in the operations and the logistic outcome in the operations only an organisational perspective was used. When studying the sourcing aspects the collection of data and the analysis were done on two levels both an organisational level and an individual level. The relations and outputs can be expected to be found on both levels (Ford, et al., 2003).

4.2.3 Research quality

One of the cornerstones in good research is design quality. Designing the research can to a certain degree be separated from the meta-level position, where quality aspects from both positivistic and relativistic theory support developing good research practice (Seale, 1999).

According to a positivistic perspective there are five aspects to consider: construct validity, external validity, internal validity, objectivity, and reliability (Ellram, 1996; Lincoln & Guba, 2003; Seale, 1999). Golicic, Davis, McCarthy & Mentzer (2002), discuss two more aspects to evaluate: objectivity and utilization, of which objectivity is very similar in explanation to Ellram's (1996) construct validity. Lincoln and Guba (2003) suggest an alternative way to create research quality from a social constructive perspective. They recommend researchers to use credibility, transferability, dependability, confirmability and authenticity for achieving research quality. Hammersley (1990), being a post positivist, accepts thought from both sides as reliability or dependability, internal validity or credibility. He rejects the thoughts of transferability or external validity, though. It is up to the researcher studying another area to decide on if the theory is relevant for that area. He also emphasises the importance of truth. If a finding is of core value for the research, the requirements on empirical support are higher compared with the support for peripheral findings. Danemark et al. (2003) argue that in order to be able to generalise results from a critical realist perspective, one must be able to study the results on several different levels. I do not see a contradiction in the positions of Danemark et al. (2003) and Hammersley (1990). What Danemark et al. (2003) discuss is to find the real truth, and what Hammersley (1990) discusses is if the real truth applies on another area. Generalisation is an analytical process in case studies, combining the theoretical framework and the case to get to a deeper level of knowledge (Dubois & Araujo, 2007). But even with a chain of evidence in the analytical process it is not possible to draw certain conclusions about another area.

In this research the reliability and the truth value have been the main focus, which is mentioned by Hammersley (1990) as key factors for good research.

The concept of reliability from a positivist perspective is about being able to replicate the study. I argue that it is not possible to replicate a qualitative study. Reliability turns instead into to having good order in the research. Data is documented and stored in a traceable way, where links between data and the case description can be found. Important is also that the empirical parts of the thesis is read by personnel with practical experience to comment and validate the case description. The truth-value means that I emphasise to find more than one source to triangulate data in order to answer of my research questions. The data has been triangulated in several steps: First off all information from different respondents were compared. Secondly, the respondents' information was compared with secondary data. Thirdly, sets of data from the different operations were compared. The descriptive parts, which FM asked for, were based on different parts from different operations. These were only triangulated with the first two steps. These parts have more of a narrative character and should be view as peripheral research results. The chain of evidence is important, starting with the creation of the theoretical framework, continued with the data collection and writing empirical descriptions moving over to the theory development, revisiting the empirical data based on the developed theories to identify new theoretical relations.

4.3 The practice level

I intend to describe my research in this paragraph. This study started with my own interest in getting a better theoretical understanding of sourcing for logistics in PSOs. This interest was also supported by FM. They asked for a descriptive presentation of logistics in PSOs and possible practical implications for future developments of sourcing and logistics.

The study did not build on a straightforward plan with a well-defined research question and an adherent research plan. It rather started with a joint effort by a small group, consisting of my tutor, a few persons from FM and FMV and myself, to do a first attempt to identify a suitable research question based on my interest and the underlying needs of relevant knowledge for the Swedish defence area. Early in the discussions a need to describe logistics in PSOs was identified. The next step was to identify previous research in the area, realising that very little was written in the military area and a search for relevant theory in business logistics was needed to create a first outline of a useful theoretical framework. The limitations in theory and lack of descriptions called for an in depth case study with the ambition to enrich the area with descriptive material. Based on these identified needs a methodology based on a combination of different available sources was established. Data was collected through open-ended interviews, a field visit in Liberia, expert group interviews and documents e.g. field experience reports. I collected a first batch of empirical material on the PSO in Liberia, and did the first preliminary analyses,

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realizing that I had to rework the research question, search for additional theory, re-evaluate some methodology issues, and so on. Among the more important problems I encountered were:

- The limited amount of research presented in academic journals, made it difficult to create a solid theoretical framework based on military logistics findings.
- Every single set of data, interviews or documents, required some additional research, and I tried to find new ways to delimit the research purpose both concerning scope and ambition.
- Working with military operations also includes some specific problems, related to security issues and availability to respondents in the operational area; during the data collection phase I was not able to visit the operational area in Afghanistan.
- Some empirical material was difficult to get due to uncertainty concerning military classification. This was more or less avoided due to the final choice of the research question and decisions to avoid to perform deep analyses of certain areas, for example ammunition or ballistic protection.
- Some respondents in the industry were reluctant to go deep into some aspects in the relations between themselves and FMV/FM.

Many of the obstacles I ran into were probably a part of the general learning process for me as a researcher, but some were unique problems for the defence area. The accessibility of data in the defence has been high but it often took a long time to get formal access to some of the data. The data collection required thorough preparation and timing. Some mistakes were done and the visit in Afghanistan was in the end delayed so much that it was not possible to handle within the time frame of this study.

4.3.1 *The data collection*

As mentioned above, data was collected from three operations. It was early on decided to start the collection of data from the operation in Liberia. The data from the Liberia operations had the main focus from HQ and downstream to the NSE and the operational unit. The second operation to be studied was the operation in the Gulf of Aden. The data from this operation had a stronger focus on supplier relations. To complement the results from these two operations some additional data was collected from the operation in Afghanistan. Data collected from the Afghanistan operation concerned mainly postponement, speculation and sourcing. Several aspects were not possible to illuminate when focusing only on these three operations. The government and HQ processes for operations, operational logistics planning and development required a more open approach where the respondents could reply without

quoting a certain operation. The data was collected on aspects as end state, logistics planning, and HQ requirements on logistics in the operational area. These sets of data are described in greater detail below.

The whole data collection process was carefully monitored in order to avoid too much data but enough to support the research questions. During the data collection 65 interviews were conducted. The longest interview continued for more than 10 hours divided into five different occasions, while the shortest lasted for 10 minutes on the telephone. Almost all interviews were conducted in Swedish, only a few respondents preferred to use English or Norwegian. Every single approached possible respondent accepted the request to give an interview. Several of the respondents requested anonymity, therefore and because of the sensitivity of some of the data I decided to treat all respondents the same way, so all are anonymous. Generally all respondents were open in their replies, also from the suppliers side. The only limitation in this area was some respondents representing the supplier of main equipment, who stated that some aspects were not to be discussed. But also from this group I received enough data to draw the conclusions needed for the study.

The only problem in the collection of data that occurred was with one of the group interviews concerning general logistics requirements. During the day of and the day before the interview a number of the respondents announced impediments that had showed up late. The interview was decided to be carried out anyway, and it brought only limited additional information compared to the first group interview. Therefore it was decided that a third group interview was not necessary. Two thirds of the interviews were recorded and transcribed. During the third set of interviews notes were taken. The interviews were not sent for proof reading, instead I chose to double check if any contradictions existed within or between interviews and other secondary data. In the few instances where contradictions were found the questions were clarified through follow-up questions. All data was in a first step sorted into three different categories; Operation oriented logistics, HQ logistics process, and Sourcing processes. Additionally data was gathered through observations during one week in Liberia. And finally several different documents were collected and studied to enrich the case. Below each set of data is described in greater detail.

Liberia

The data collection from the Liberia operation started 2004. The collection of data was focused on actions within the operational headquarters in Sweden and the local activities in Liberia where a field visit was done to observe and interview during on-going operations. All interviews conducted were open-ended with very few prepared questions. Respondents were selected based on their position in the logistics organisation, where they in one way or another supported the Liberia operation. The interviews started at HQ and new respondents were contacted, as their positions in Liberia organisation were identified. The field visit was the last main activity in the collection of data from

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the Liberia operation. The ambition with the interviews was to gently encourage the respondent to tell his/her experience concerning the logistics and sourcing in the Liberia operation. Therefore every interview built on only a few predefined questions. The focus in the data collection was to understand how the logistics worked internally within FM.

Several interviews was done with the responsible officer at OHQ:G4²². During more than 10 hours divided into five different occasions, he told the story about logistics in multinational PSOs under UN leadership, the details of the planning of the Liberia operation, and the conduct of the operations during the first year. The head of the National Support Element²³ (NSE), the logistics officer, and the technical officer were interviewed during the debriefing week after the homecoming from Liberia. During that week I attended one experience seminar. Supplies and maintenance problems were discussed during that meeting. Later, during the autumn 2004, personnel from HQ and FMV were interviewed about planning and sourcing of needed products for the first period of the operation. Totally six persons were interviewed for 30-60 minutes each. During the autumn 2005 the NSE in Liberia was visited for one week. Logistics activities were followed. Observations were done during meetings. The officers and soldiers were observed in their work, and interviews and informal discussions were held with many of them on several occasions during the week. During the stay in Liberia two local suppliers was visited and interviewed. One military partner was interviewed: the head of the NSE for the Irish battalion. One interview was conducted with the UN police force and its cooperation with the Swedish unit concerning logistic aspects. Two suppliers of camp support were interviewed. One additional informal interview was conducted on the flight back from Liberia and concerned international transportation of military materiel, issues both in general and specifically for Liberia. Totally, 19 interviews were conducted during 30 hours. Secondary data from the Liberia operation was collected in form of official documents, both Swedish and UN, working documents and debriefing reports.

Atalanta (Gulf of Aden, ME01)

Collection of data from the Atalanta operation started in the spring 2009 but was mainly conducted after the operation was finished during the autumn 2009. The main objective was to get a better understanding of the sourcing including supplier relations between FM and their suppliers. Important was also to identify how the sourcing affected the operation. All interviews conducted were open-ended but with more prepared questions compared to the interviews about the Liberia operation. There were three dominating reasons for the being more structured: During the interviews it was important to find similarities and

²² OHQ:G4 - Operational headquarter logistics for ground operations.

²³ During the Liberia operation the NSE was called CSE (Contingent Support Element).

differences compared to the Liberia operation. Secondly, the theoretical framework was used to create interview questions. Thirdly, it was important to identify outcomes of the logistic activities. The first respondent was selected at FM/FMV. He presented most names in the inner circle of the Atalanta operations. Based on his list a first set of respondents was contacted, and in each interview the respondent was asked to present his/her contacts. In this way the number of suitable respondents grew. In the Atalanta operation, interviews were held with captains and chiefs on the ships and the head of the LogCell²⁴ concerning both operational availability and logistic performance. In total there were four interviews lasting for about two hours each. Interviews were conducted with FM logistics organisation in Sweden about the logistics for the operation. Four interviews were held with personnel at different positions in FM. Concerning supplier relations seven interviews were conducted with persons in procurement positions (30-60 minutes). On the suppliers' side, the main supplier was interviewed (2 persons 60 minutes), subsystem suppliers (four companies, one representative for each company, 1-2 hours for each interview), suppliers of consumables four interviews (15-20 minutes each). On both the customer's and the suppliers' side the spare parts sourcing is divided between many persons. In this area a first set of two interviews were done to understand how it was organised. To grasp how the suppliers were contacted and to understand the relations between the procurer and supplier, a simple questionnaire requiring only short answers was used. The replies gave rather homogenous answers, and it was decided not to contact the spare part suppliers. It was assessed that these supplier contacts would be of limited value for this thesis. Totally, 24 interviews were conducted during 24 hours.

Afghanistan

The operation in Afghanistan was used to complement the other two operations. The ambition has not been to describe the logistics operation but to get additional support to findings in the other operations or to get new information on subjects where the information was not available in the other two operations. During the collection of data for the Atalanta operation, the respondents also working with Afghanistan were asked to supplement their Atalanta information with complementary information on the Afghanistan operation. The new respondents for the Afghanistan operation were selected based on information collected in the two previous sets of interviews. The additional information collected from the operation in Afghanistan consists of seven interviews. Six interviews were conducted with personnel within FM (30-60 minutes each), the focus in these interviews were on the logistics strategy

²⁴ The LogCell was similar to the NSE in the Liberia operation. The difference is discussed in detail when the case is presented in the next chapter.

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and to some degree on supplier relations (spare parts and ammunition). Two interviews with suppliers were conducted, one supplier of camp systems (20 min), and one supplier of spare parts (15 minutes). Totally, 8 interviews were conducted during 5 hours.

Central processes

Two sets of issues that were viewed as important were difficult to relate to a certain operation. One of these related to the interrelation between FM and the government (end state), and the general capability planning for international operations. 12 interviews were conducted with FM top management on these aspects (including the Supreme Commander and Deputy General Director at FMV). These respondents were selected with the assistance by FM high ranked officer's personal career planning coach. The other issue concerned requirements on logistics in PSOs. Suitable names for these interviews were identified with support of three logistics officers with different positions within FM. The collection of data was in this area collected through two group interviews (6 respondents in the first interview which lasted for 3 hours, and 2 respondents in the second interview which lasted for 2 hours). Totally, 14 interviews were conducted during 17 hours.

Secondary data

The sources for secondary data were many. Basically it was divided into four different sets in the same way as the interviews. The secondary data was more important in order to understand the central processes, though. The web was used to collect information both from the UN and NATO. The UN has all Security Council resolutions available on the Internet. UNMIL in Liberia has a homepage with many formal and informal documents. Much information concerning the ISAF operation in Afghanistan is available on NATO's homepage. Secondary data was obtained from government documents and FM publications. All Swedish contingents write general and functional reports on logistics for the operations as a part of the debriefing activity, these reports have been studied for the Afghanistan, Atalanta and Liberia operations. Several documents have also been written in the preparation and the conduct of the operations. Information concerning Swedish participation in the different operations is available in government propositions and decisions. Contracts and strategy decisions have been evaluated. Several different reports and spreadsheets have been studied concerning materiel for the units. Functional requirement documents e.g. health hazards, have also been sources of information. Another form of secondary data that have proved to be important is corridor chats, having access to other FM/FMV employees during the study allowed me to ask for a second opinion on issues where the results seemed strange. This helped me to search for more information or to understand the data.

4.3.2 Trustworthiness and Credibility of the Data

The data was collected partially to be able to do a certain degree of triangulation. For each operation both interviews and secondary data have been used. The secondary data collected has been government documents and different types of written reports from the operations. The operations have been compared and when differences have been found special attention has been given to find reasons behind and explanations. Finally the empirical chapter has been read and commented on by both officers and procurers at FM/FMV (three persons). During the writing of this thesis I have been having an office at FMV, this have several times given me the opportunity to ventilate questions and issues relevant both for the choice of theory and aspects of empirical data and suitable respondents.

4.3.3 Categorisation and Analysis of Data

All data was in a first step sorted into three different categories; Operation oriented logistics, HQ logistics process, and Sourcing processes. The operation oriented data was categorised into the three operations studied; Liberia Atalanta and Afghanistan (the data concerning Afghanistan was limited and only used as secondary data to support findings in the other two operations). In a second step the data was categorised into different operational phases. Data concerning central processes was divided into dialogue with the government, requirements on logistics in PSOs, and planning activities. The sourcing data was first categorised into supplier or customer perspective. Both these categories were then coded into a matrix with the four key sourcing decisions on one axis and the type of supplier on the other axis. The analysis was done with the data in the original language from the interviews. When writhing the thesis the data was freely translated by the author into English.

Yin (2003a, 2003b) suggests three general strategies for analysing case study evidence; relying on theoretical propositions, thinking about rival explanations, or developing a case description. This study uses basically these approaches analysing the data. It relies on the theories developed in chapter 2. It considers different possible explanations of the data discussed in the analysis chapters. It creates a case description of Swedish military logistics in PSOs. In the military logistics area some strong theoretical constructs exist, based on these the military logistics theory has been further developed with the support of the case. In the sourcing strategy area theories for business supply chains have been used to analyse data from the military supply chains, both to validate theory from the business area and to create new knowledge relevant for the defence area.

As discussed above, this study builds on abductive reasoning. Järvensivu and Törnroos (2010) suggest that different phases of a case study have different focus; deductive, inductive or abductive. In the area of military logistics in

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PSOs the study was mainly abductive during the whole study, going back and forth between interviews and the theoretical framework. While in the sourcing area the study was more similar to the description by Järvensivu and Törnroos (2010) of an abductive approach, started deductive, became abductive, slowly moved towards inductive, and finally becoming deductive again when discussing practical implications.

4.4 Summary

In the beginning of this chapter ontology, epistemology and the researcher's role, were discussed. Especially, my own role as an officer in FM was discussed. My opinion is that I have had an advantage in trying to understand this research area due to my military background. Literature in the area is rare and somewhat difficult to apply due to different circumstances in smaller countries compared to US and UK forces, which the majority of research is based on. It was followed by a section discussing theory development and research outline. Arguments were put forward why an abductive approach was chosen and the study should be viewed as one large case. It was difficult to separate the operations upstream in the supply chain and to a certain degree it was the same organisation and personnel that worked with all operations and they used the same processes. Finally, the case outline and the collection of data were presented. Totally, 63 interviews were conducted during 76 hours.

This chapter has discussed methodological issues and presented the case outline. The limitations of the theoretical framework call for reflexive thinking concerning many issues which otherwise could have been taken for truth. By to a greater extent presenting a descriptive case, the data supports the theoretical framework or identifies weakness within the theories. Areas where the theory is weak the study is instead supported by rich case descriptions.

5. FM in peace support operations

In this and the next chapter, the FM PSO case is presented. The objectives with these chapters are twofold: The first is to provide empirical data for the analysis of the research questions. The second objective is to give a descriptive presentation of FM logistics in PSOs. The lack of previous research in the area explains why.

Logistics in PSOs is complex in many different ways. As time passes by, PSOs go through different phases where activities, objectives and stakeholders' interests change. The supply chains in PSOs are complex with many actors both internally and externally. The main reasons to the complex structure of the supply chains are the large number of different suppliers engaged to provide the needed supplies and the need to have alternative supply possibilities, which also underlines the importance of the sourcing decisions in this study. In the second chapter, a lack of a solid theory for small nations' logistics in PSOs is identified. It is also stated that no performance data existed from the Swedish PSOs. In order to understand the impact that the sourcing decisions made, it is important to understand how logistics in the operations are organised. To understand how the logistics is organised two perspectives must be looked upon. It is necessary to both understand what objectives, requirements and strategies form the logistics, and to get a holistic picture of the logistics in the different phases of the operations.

(5.1) FM in Peace Support Operations Fact and Figures	(5.2) Phases in Swedish Peace Support Operations	(5.3) The process to create of objectives for Peace Support Operations	
(5.4) FM Logistics Strategy for Peace Support Operations	(5.5) FM guidelines and rules for Logistics in Peace Support Operations	(5.6) Logistics performed in Peace Support Operations Liberia and Atalanta	
(5.7) Summary - Logistics in Swedish Peace Support Operations			
(6.1) Supplying the NSE in Peace Support Operations	(6.2) The Act on Public Procurement	(6.3) FM Sourcing Decisions	(6.4) Summary - The sourcing in Swedish Peace Support Operations

Figure 5.1 Outline of the case description

The two empirical chapters are therefore built around four aspects: Firstly a general introduction is given and the phases in Swedish PSOs are presented (5.1-5.2). Secondly the objectives, requirements and strategies for the logistics in Swedish PSOs are presented (5.3-5.5). Thirdly a holistic description about the logistics in Swedish PSOs is presented (5.6). Fourthly the supply side of the logistics in PSOs is presented (6.1-6.3). The first three perspectives are presented in this chapter and the supply side of the logistics in PSOs is presented in the next chapter. The outline of the two chapters is in accordance with figure 5.1.

The case presents FM PSOs during the period of 2002-2010. Two operations are chosen to get the holistic picture of FM logistics in on-going operations, rather than to cover every detail that happened during that period. These two operations were UNMIL²⁵ in Liberia and Atalanta in the Gulf of Aden. Complementary data has also been collected mainly from a third operation, ISAF in Afghanistan. Data was collected concerning the central processes at the Government, HQ, FMLOG and FMV. The central processes are handled separately because many activities were not linked to a specific operation and in some instances it was difficult to achieve information concerning which operation was referred to. Limited amounts of data concerning the capability creation phase were also collected to understand the relation to the other phases.

5.1 Introduction - FM in peace support operations

Sweden has a long tradition of participating in PSOs. Supporting UN peace support initiatives has been and still is one important aspect of Swedish foreign policy. 500-1000 soldiers have more or less been permanently deployed in UN supported operations since 1956. Around 100.000 Swedish soldier-missions (3-6 months) have been performed in 120 different operations (Sjöstrand, 2007). With the Defence Decision 1996 (Försvarsdepartementet, 1996b), Sweden started a transformation of the military forces. The strategic shift was from large homeland defence forces to smaller more capable expeditionary forces, with a focus on peace support operations. The Swedish government has put requirements on the armed forces to be able to have 1500-2000 Soldiers stationed abroad in PSOs more or less permanently (Försvarsdepartementet, 2009). PSOs were defined in the first chapter as, peace-enforcement, peacekeeping or security-support operations. Sweden has over the years

²⁵ United Nations Mission in Liberia

participated in operations covering the whole scale of conflict levels. There are though, always long political discussions before deciding to participate in peace-enforcement operations. When it comes to practical performance, the operations can vary in type (for example observation, area control, rapid reaction, mine clearance) and be in very different environmental conditions (for example desert, arctic, or tropic). The political planning requirement on the armed forces is that they should be able to participate in operations within 6000 km from Brussels (Lindstrom, 2007). This requirement means that FM should be able to operate in all environmental conditions. All these different circumstances will put unique requirements on each operation. But at the same time, it also requires that many issues are handled in the same methodological way to meet the time requirements for the deployment of the force.

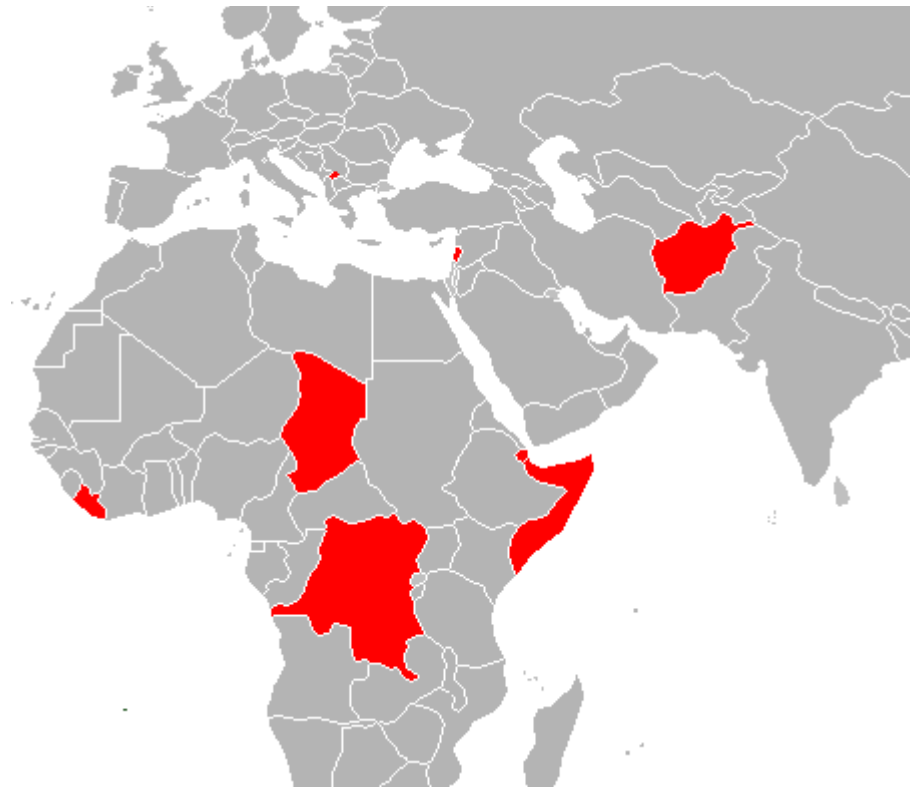


Figure 5.2 Swedish engagements with military units in PSOs during the period 2000-2010

In recent years, the participation in seven operations has dominated the Swedish international engagement (Afghanistan, Chad, Congo, Gulf of Aden, Kosovo, Lebanon and Liberia), see figure 5.2. During these operations the logistic strategy has evolved from a homeland defence oriented strategy to an

expeditionary oriented strategy. The changes are still in an early phase and details remain to be corrected but as a whole the strategy has been implemented. As previously mentioned, in this study three sets of data have been collected from the operations in, Liberia, Gulf of Aden and Afghanistan.

5.2 Phases in Swedish peace support operations

In this section the empirical findings concerning phases of PSOs are presented. According to *the Logistics Doctrine, Grundsyn Logistik* (Försvarmakten, 2007a), FM separates their production into two main processes; capability creation and operations. Basically these two processes are separated by who is responsible for the activity in the HQ. Concerning PSOs the first process seems to incorporate several phases. The first identifiable phase is when FM creates a basic capability. This capability is more or less independent of coming possible operations.

We must have a readiness to deploy with equipped units that have exercised with the correct equipment. (Officer, HQ)

The second phase is the first time where a specific operation is discussed.

A specific mission starts with a politically identified need in different international collaborative organisations. That need is transferred home to the national political arena and the Swedish government... (Former government employee)

This phase is usually initiated by the ministry of foreign affairs in international negotiations to support a specific peace-process with military forces. During this phase a planning process is initiated within FM, and on national level a dialogue between the FM and the Ministry of Defence (MoD) prevails over other activities. The third phase starts with upgrading and/or adjustment and thereafter allocation of the resources to the shipping warehouse for a specific operation. The third phase is initiated by a parliament decision to participate in an operation or to start the preparations, and is the first that can be allocated to operations process according to the doctrine. In the next phase, the deployment phase, the personnel and materiel are packed and transported to the operational area. This phase ends when all systems are up and running in the operational area.

It took us almost two months to get everything in order in Liberia, due to the containers not being packed suitable for the unloading in the operational area. (Logistics officer in Liberia)

The next phase is the operational phase. This phase has overlaps with the other phases it connects to. Some parts of the deployed organisation can be under

installation while others are up and running. The situation is similar but the other way around when an operation is ended. The last identified phase is called the liquidation phase.

We have a tendency to be completely filled up with resources the day we are planned to leave the operational area for home. The logistics in the liquidation phase does not work properly. (Officer, HQ)

This phase starts with a formal decision to withdraw and end when all materiel and personnel are sent home and are restored or managed in some other way, for example handed over to the host nation in the operational area. In all there seem to be six phases:

- Capability Creation
- Negotiation
- Resource Allocation
- Deployment
- Operation
- Liquidation

These phases are used to present the operations in Liberia and in the Bay of Aden below. Further implications are analysed and discussed in chapter 7.1.

5.3 The process of creating objectives for peace support operations

In order to empirically identify and understand both the long-term and short-term objectives for PSOs the processes creating these objectives have been studied.

Identification of a crisis that requires action from the international society in the form of PSO. It can be a slow onset process where the international society is prepared for a conflict, for example in the election in Sudan, 2011, where an international preparedness existed years before the election. It can be a situation with increased violence in an area with a low level of conflicts, for example in the on-going violence in Israel - Palestine - Lebanon area, could suddenly escalate. It can also be a sudden upcoming conflict where the international society is not prepared to act, for example the situation in Libya, March 2011. The difference between the two is the time needed by the international society to act and the level of preparedness among military forces. One should not forget that most PSOs require agreements from the warranting parties. The other possibility is that the international society decides to go in with force without an agreement from the parties in the conflict. The Atalanta

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operation is an example of the latter even if the ambition is to escort sea transports and hinder piracy. In Somalia, the government has agreed to the military operation while other warring factions have not.

Concerning Swedish engagement in PSOs, the international discussions have taken place in the EU, in the UN, and in bilateral talks. In the first phase these talks and considerations have been about whether or not to act in a certain crisis, and if Sweden would consider participating with troops or other civilian resources for example police, legal advisers or humanitarian aid through SIDA²⁶.

The political discussion is broad in the sense that it discusses consequences far beyond the operation, such as the relations with the other contributing nations which can be just as important. (Former government employee)

If agreements have been made within the UN to act with military resources, a decision is taken concerning who will become the framework organisation or nation. In Afghanistan, United Kingdom was the framework nation in the start-up of the operation. This coordinating and leading role was later taken over by NATO as the framework organisation (in the following text, 'framework organisation' is used for both a nation and an organisation). These actions have been formalised in United Nations Security Council (UNSC) resolutions.

...United Kingdom offer contained therein to take the lead in organizing and commanding an International Security Assistance Force... (UNSC, 2001).

The second round of talks is centred on the force generation conference, held by the framework organisation. In the conference agreements are made in two steps: Firstly, agreements are reached on the level of the conflict and how many troops are needed for an operation to meet the objectives within the UNSC resolution. Secondly, decisions are made concerning participation and with what type of force and size each contributing nation should participate.

The management of the logistics for Swedish participation becomes very different depending on who is the framework organisation. When the UN is the framework organisation, much of the logistics is handled by the UN and they reimburse costs for the force-contributing countries at a fixed pricelist, which requires negotiations. (Officer, HQ)

Almost simultaneously to the international process, a Swedish national process starts. The national process consists of two parallel tracks.

The first track is strictly political and concerns mainly international relations and homeland security, even if other issues also are relevant to the decision. The objective with this process is to get an agreement among the parties in the

²⁶ Swedish International Development Cooperation Agency

Parliament. In the Parliament a formal decision on participation and with what is made. This process is not very visible and only a few documents are available to the public, for example the proposition to the parliament or the protocols from the Parliament. Historically, this process has been reactive to the interest and the will of the international society. Lately the Swedish politicians take a more proactive role, where the national politicians put forward plans for actions in international regions. The change occurred with the formation of NBG08²⁷, and the continuation has been supported by the formation of standing forces.

When I worked in Brussels I saw a radical change in the attitude. We had visits from the Swedish government and parliament, and they were much more proactive because of the fact that Sweden had resources that could be deployed. (Officer, HQ)

The second track is a dialogue between the military HQ and the MoD about with what capabilities the armed forces can contribute and the costs for such an operation. In practice the HQ suggests alternatives to the MoD upon which the government in the end decides. No substantial discussions about the end state or the national political objectives for the PSOs, have been initiated by the MoD in the dialogue with HQ.

The political objectives for an operation are rarely communicated from the political level to the military level in a transparent way. (Officer, HQ)

In the dialogue, the MoD presents the results from the first round of discussions in the force generation conference to the HQ. These concern the conflict level and overarching tasks and objectives. From the HQ arguments concerning development of future national capability are included in the discussions. The HQ aims to test new equipment or to develop the organisation. Both these processes end with a formal order from the government to FM to participate in a PSO under the lead of the EU, NATO or the UN. The decision contains the type of contribution, the number of soldiers, the area of operation, and the length of the participation. The decision is the formal order from the government to FM. But, in parallel to the specific decision-making for a unique operation, is the annual budget process for FM. In this planning process on-going and upcoming operations are discussed and planned for. This process creates possibilities for FM to create a more long-term planning than the individual decisions provide. In this process FM can get support from the government, to spend money up front in a new or on-going operation, in order to reduce future cost for the operation. In the end many of the decisions and negotiations are about costs for the operations.

²⁷ NBG08 was the first battalion with Sweden as framework nation for EU rapid reaction force. The force consisted of troop contributions from Estonia, Finland, Ireland, Norway and Sweden.

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In the negotiations in New York, the UN negotiation team presented other needs than those that were agreed on in the force-generation meetings... It took several days before we could agree on the contribution and its costs. (Logistics Officer, HQ)

In the Liberia operation the UN negotiations concerning compensation for the deployed force, were both difficult and time consuming. The Atalanta and Afghanistan operations had to meet the defence budget's planned funding for international operations.

The end state and objectives are developed in the international negotiation process. The top-level documents for the PSOs are the UNSC declarations. These documents often have a superficial overall operational objective. The objectives give a general view but do not go into details as that can delay the decision process considerably, which is not beneficial for the support of the suffering population. The next level of documents present an end state for an operation and are produced by the framework organisation (Liberia - UNMIL, Gulf of Aden – the EU, Afghanistan – first the UK, later taken over by NATO). The top-level document presented by the framework organisation is a political Concept of Operations²⁸ (CONOPS), which defines both military and civilian objectives with the operation. At the next level of the planning hierarchy, a Military CONOPS is produced, which defines military tasks and objectives in greater detail. This document is the top-level for all the military planning. Depending on the operation and the framework organisation, the level of detailing in sub-plans will differ but generally the tasks and objectives in the sub-plans can be traced to the top level. Most CONOPS documents are security classified and any details are therefore not presented here. However the NATO-ISAF²⁹ and UN-UNMIL³⁰ and EUNAVFOR³¹ homepages on the Internet present the open information of the classified documents.

Swedish officers, working in both the Swedish units and in the central commands of the framework organisation, are of the opinion that the sub-plans are generally task-oriented and they lack objectives which can be referred back to the political or operational end state. But, they also argue that the level of freedom for the units is high. So the units can decide to do tasks that are outside their orders as long as the tasks are in line with the political or operational end state. These initiatives are generally supported by the central commands, as long as they do not interfere with the other tasks that the unit is required to do.

²⁸ Concept of Operations (CONOPS) is known to many as a NATO document. I have chosen to use the term CONOPS in this thesis as a general document produced by any framework nation/organization for civil and/or military planning no matter what term is used by the individual nation/organization.

²⁹ NATO-ISAF - International Security Assistance Force; homepage: <http://www.isaf.nato.int/> and http://www.nato.int/cps/en/SID-2A42B07B-7226B928/natolive/topics_69366.htm

³⁰ UNMIL homepage: <http://unmil.org/>

³¹ EUNAVFOR - European Union Naval Force; homepage: <http://www.eunavfor.eu/>

The lack of end state objectives from the Swedish government in the operations in this study is partially due to the decisions to participate was reactive in terms of international affairs.

The first step is that the Foreign Ministry and the Defence Ministry make a first evaluation of if it is in line with Swedish defence and foreign policy to participate in the conflict area in question. (Anonymous, former government employee)

This does not mean that the Swedish government does not have any goals with their participation in international operations or for an individual operation. Swedish view on the matter is presented in the international process, and when operations are decided on an international level, the Swedish government decides to be loyal to these decisions. Internally within FM, goals concerning new operational capabilities often exist in the operations. These goals concern the development of new tactical and logistical capabilities, based on introduction of new processes and equipment.

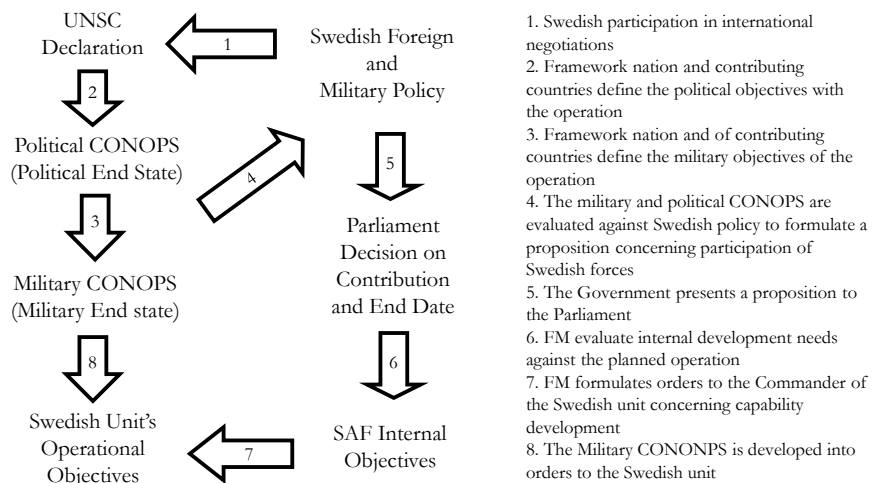


Figure 5.3 Process steps and the hierarchy of documented objectives for Swedish units in PSOs

National contributions in PSOs have an end date rather than an end state. This depends of the limitations in the willingness of the national governments to spend the taxpayers' money on a certain operation. It can also be linked to agreements that another nation will take over responsibility from a certain date. The latter was the situation in the Atalanta operation. An overview of the process of objectives and end state creation is presented in figure 5.3. The arrows represent activities in the process and the text between is the outcome of the process, often in the form of documents.

The Swedish foreign policy is the starting point for Swedish participation in PSOs. If a conflict relates to this policy Sweden tries to take an active role in international discussions. From these international discussions a UNSC declaration is formulated and agreed upon. A framework organisation develops a Political CONOPS based on the UN declaration, together with supporting countries. Based on this document a Military CONOPS is developed. These documents describe the objectives of the operation and the planned end state of the operation. The content in both the Political and Military CONOPS are agreed during the force generation conference. The conference makes preliminary agreements on force contributions. Based on the foreign and military policy the Swedish parliament decides the extent of the contribution and on an end date for the Swedish participation. New parliament decisions to move the end date forward are often made if there is a need to prolong the operation. The FM evaluates the Swedish participation from an operational capability development perspective, and decides on internal objectives with the participation.

5.4 FM logistics strategy for PSOs

FM has been working with the transformation of the forces to a smaller and more agile organisation since 1994. The main reason to why it has taken so long time and is still going on, is that political requirements have changed in steps during this time period. One central aspect of the changes of the forces has been the changes of the logistics. To direct the change of FM and to build a process oriented planning, FM has developed a system of doctrine documents. The top document is *Militärstrategisk Doktrin*, first published in 2002 and updated 2012 (Försvarsmakten, 2011), and linked to this document are a number of functional area documents, guiding the transformation of FM in different areas. In the logistics area *the Logistics Doctrine, Grundsyn Logistik* (Försvarsmakten, 2007a) is this functional area document. In the Logistics Doctrine, FM production is divided into two areas; the creation of military capabilities and the usage of military capabilities. The basic principle presented in the Logistics Doctrine can be summarised with: The logistics should be efficient when supporting the creation of military capabilities and it should be effective when supporting the usage of the military capabilities. In other words this means that in an operational scenario effectiveness is the prime objective, to provide the needed support with a minimum of delays and without creating a logistic burden for the operating forces (Stockpiling in the operational area would be a logistic burden). In peacetime when creating trained equipped military units, efficiency is the prime objective, which means that all actors should strive for cost minimisation of the production system. This ambition is further detailed and out spoken in the *FM strategy for sourcing of equipment* (Försvarsmakten, 2007b). In the strategy it is stated that the sourcing should be

cost efficient from a life cycle perspective, and that an incremental approach should be applied to the development of requirements on the equipment.

Following this, for PSOs, FM has two overarching guidelines. FM has one guideline for the creation of the basic capability, and another when a decision is made to participate. The requirement of effectiveness in operations is outspoken in the *Logistics Doctrine*,

Operational and tactical requirements shall guide the carrying out of logistics in operations” (Försvarsmakten, 2007a, p. 17).

In practical terms this means that a deploying organisation shall have all it needs to survive and act for a number of days or weeks with a few exceptions (e.g. transfusion blood must be resupplied every 14th day).

As already mentioned, the *Logistics Doctrine* directs the activities in between operations concerning the creation of resources and units for future operations, with efficiency requirements as the main guideline. Training and procurement should be done efficiently and meet the requirement that a unit should be ready for a PSO after a limited period of additional training and complementary procurement. The procurement in between operations has to be done to meet national defence needs and peacetime legal requirements. This means that systems have been procured in higher numbers than what is needed for international operations and training all together. The FM aim 2010 was to hold enough in stock to meet the needs of the forces for the national defence. The solution strives to reduce procurement (at least in numbers) of systems or subsystems that are under strong technological development, for example telecommunication systems or computer systems, in order to avoid getting a technological outdated stock. At the same time FM procures larger numbers of systems or subsystems with low technological development pace, e.g. armoured vehicles or hand held weapons. The guidelines from the government regulated in the Swedish Public Procurement Act require that FM and FMV make all possible acquisitions with competitive bidding. The competition requirement has the consequence that FM and FMV in many product areas have more the one active supplier. In the time period between the operations, frame contracts are signed with several suppliers of different types of products needed, both for training in Sweden and for PSOs abroad. These frame contracts speed up the supply chain when products are needed since the administrative procurement work is reduced when supplies are bought with the support of frame contracts. It also opens up for more long-term relations and a greater understanding from the supplier’s side of the FM requirements and needs in PSOs.

The directives, written in the *Logistics Doctrine* (Försvarsmakten, 2007a), change when the negotiation phase starts in a PSO. Instead of the requirement to be efficient the objectives turn towards being effective. This change is important for the sourcing of the outstanding needs for the coming operation. All activities circle around the goal to have the unit ready in time for the deployment. The procurement process has been able to use special paragraphs

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in the law of public procurement, to meet the time requirements. The process tends to support a change from arm's length relations with the suppliers in the initial procurement phases, to a closer cooperation. The customer and the suppliers have discussed what is achievable within the given time frame, and contracts are signed based on the agreed ambition. There has been a clearly pronounced wish from the customer's side to use suppliers which they know, from previous experience, have the capability and the knowledge to meet the needs for the coming operation. It is rare that new suppliers come into question during the political negotiation phase or resource allocation phase of an operation. It is important that the suppliers have proved that they can meet the expectations concerning timely delivery with an acceptable product quality.

When it comes to deployment, FM is a small operator of transportation resources and additionally capability is needed. Several European nations have started a cooperation concerning transportation between national base levels and operational areas. This cooperation does not cover all the needs and other suppliers are contracted both for the initial deployment and, later on, supply deliveries and personnel transports. These resources are often scarce, and the supply chains need further development to be effective.

When the unit has been deployed, logistic activities on the tactical level should be done with military resources. This means that no activities downstream of the operational level can be done by contracted suppliers. The operational level is in this respect regarded permanent camp facilities for the units, the NSE, and its facilities and other warehouses supporting the NSE in the operational area. All resupply of the tactical level should be handled through the NSE. At the operational level, the NSE, camp management or other facilities can be manned by both military and civilian personnel. Private contractors can provide supplies directly to the NSE. At the operational level as much as possible should be sourced locally. Only needs that are regulated in one way or another must be brought in from the base level, for example special spare parts, medical supplies or ammunition. Operational aspects must be considered when local sourcing is done, so conflicts with the operational objectives are avoided. On both the operational and the strategic level (base level) the focus is to create effective supply chains so upcoming needs can be delivered with short lead-times. Frame contracts are used to the largest possible extent both for services and goods. Specific stocks are used for on-going operations on the operational and unit level to meet operational requirements to be self-sustained for a certain number of days. No stocks are built up on the base level for on-going operations. The FM stocks should be dimensioned for peacetime training. The ambition has been to create flexible and effective supply chains for both services and physical products. The ambition has been to create a combination of a push and pull system where staple consumptions are delivered with a push system and upcoming needs are delivered with a responsive supply chain. Between the base level and operational level the pull system dominates.

During the liquidation phase the *Logistics Doctrine* (Försvarsmakten, 2007a) requirements change back again towards efficiency. All activities should focus on minimising costs for the home transport, maintenance and storage preparations of the material that has been in use.

To summarise, the FM logistics strategy goes from efficient before a PSO is initiated to effective during the operation and back to efficient again when the operation is liquidated. A peace support unit should bring what it need for a number of days³². Thereafter the unit should source as much locally as the situation allows. A holistic perspective is important in all phases of the operation, where different interests have to be balanced against each other.

5.5 FM guidelines and rules for logistics in peace support operations

The logistics officers who, in one way or another, have contributed to the information in this section are of the opinion that the operations in Liberia, the Gulf of Aden or Afghanistan were not prepared for in a way that logistics for PSOs will be done in a near future. The anticipated difference between previous and future logistic operations depends both on lack of experience for the new military planning situation and the fact that the planning situation is changing. In the reflections and discussions a picture was presented that the officers saw both as an ideal and a realistic future. The discussions also included how a new operation would look like if it started 2011-12. The interviewed officers had a normative perspective which was shown in the discussions and in their replies to direct questions. This attitude is mirrored in the text below. In this paragraph a perceived time line is used to present the officers' perspectives. Even if one can find functional, organisational and process-oriented links between different activities, it is believed beneficial to use a sequential perspective to discuss logistics in international operations. It gives a holistic overview of different requirements and their consequences on functions processes and organisations.

³² Certain information when studying military are classified, therefore some figures are on purpose left out to keep the thesis as a non-classified document.

Planning and preparation:

Starting with a historical overview, the Swedish homeland defence was built up by a large defence force with conscripts and materiel stored in warehouses scattered around the country. PSOs were done by taking out some of the stored materiel and look for volunteers. The organisations were tailored in all details and this work took several months. It was however not significantly costly since much materiel in the stores needed to be used and replaced. So the cost to equip an international unit was partially covered by the need to rotate the goods in the warehouses. Today the situation is different, The Swedish armed forces are smaller and a much larger part of the materiel stock is in use. This requires changes in the planning for and the conduct of PSOs.

The government will also in the future focus on cost so FM, must have a more balanced approach. It should not be possible to reduce logistics if favour of more operational personnel, especially not when starting a new operation. (Logistics officer, HQ)

In paragraph 5.3 the political process was discussed. From a military perspective it would be beneficial if the decisions taken at the political level would take the existing military units into account. The minimum size of a unit should be of the size equivalent to a company in order to optimise the efficiency of the production of military units. Military personnel believe though that this is wishful thinking and that the planning process must consider smaller units. The government discusses not only company or battalion sized operations with one capability, but also smaller operations or operations with a mixture of capabilities, for example: army: mine clearance, engineering, infantry: surveillance or highly qualified armoured units; navy: mine clearance, escort, blockade; air force: ground facilities, air surveillance, attack operations, tactical transports. So other types of solutions have to be considered. The logisticians argue for a solution with predefined size of the units where the government would not interfere with the military planning, platoon, group, or equivalent depending on the force category and the function. On this level personnel and equipment should be defined for a worst-case scenario that is peace-enforcement. But a worst-case scenario must also be realistic, the soldiers must sleep and eat, and there are limits to how great personal losses the political leadership is willing to take in a PSO far away from the national borders. The planning process for NBG11³³ tended to sum up a lot of minor worst cases and created unrealistic scenarios with huge consumption of fuel and ammunition, which led to over-planning in the logistics area. The decision makers within the defence forces have so far decided go for company and battalion structures. The reasons to decide on company and battalion structures are several, for

³³NBG11 - EU rapid reaction force or battle group, standing in readiness during the spring, 2011.

example the efficiency in training, or the minimum size-structures to do operational tasks for the national defence.

Since the political requirement on the FM is to be able to act in many different climate zones, different equipment amendments lists should be developed for different climate zones. Linked to these lists, budgets and activity plans can form a base line for the logistic strategy for a certain operation or an operational area. In many product areas framework contracts are written. It is unknown if these contracts cover the needs since the lack of equipment lists hinders an appropriate analysis. The maximum readiness would mean that the soldiers are trained with the equipment and the equipment are up to date and in good condition ready for transportation at any time. A structured process with these ambitions would mean that every detail of an expeditionary unit could be finalised before any order to deploy comes to reality. But, this is not economically realistic.

We will always be short of time from a logistic point of view, but this should be seen as the normal case, and the process should be adjusted for that...In many cases the problematic issues are not the materiel but the administrative paperwork, memorandum of understanding (MOU), status of forces agreement³⁴ (SOFA)... to be honest: to send 100 men and 200 containers of materiel, how difficult can it be, without the administration. (Logistics officer, HQ)

The activity plans must contain information on what needs to be done when the order from the political level comes. Equipment might need maintenance, some new things need to be procured, other products need updating and the personnel need additional training. These activity plans should exist with budget cost connected to each task. Turning back to the dialogue between the government and the armed forces in the previous section, with this type of documents it would be easier to present different alternatives for the government with a rather stable budget for each alternative. It would also give indications about the time needed to get the unit ready for deployment. For previous operations there has been a severe lack of logistic thinking in the answers to the government, causing under-estimated budgets and lack of logistic capability in the force size planning. In the end the military logisticians are of the opinion that the operations would be less costly, because less would be done through acute procurement, and less of unnecessary things would be brought along if a structured process is used. All interviewed logistics officers agree that one thing will never change when it comes to participation in operations. From the day of a government decision to the day of departure, it will always be too little time available to do everything. Plans, even if they are schematic will help to solve and prioritize activities needed before deployment.

³⁴ A status of forces agreement (SOFA) is an agreement between a host country and a foreign nation stationing forces in that country. See also Sari (2008).

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Problems will occur when the equipment only is in the plans but not procured or if only limited numbers are procured and they are being used by other units. (Logistics officer, HQ)

The ground operations in Afghanistan, Kosovo or Liberia have started with undefined or halfway-defined units where only limited parts of the materiel lists were defined in advance. For naval operations the situation has been a bit better since much of what is needed is loaded on the ships in normal operations in the Baltic Sea. But still intense discussions about what extra is needed have preceded the deployment. These discussions have opened up for many nice-to-have items to be included on the lists. It has also had the effect that older materiel which the units had trained with was replaced with new more advanced or flashy equipment, which can be more important in the relations to other nations' forces than the operation itself. The new or upgraded materiel caused delays in the time-table. It had cost consequences, and required additional training which, in many cases, there was no time for. There will always be a need of new materiel but this should be reduced to a minimum in order to be able to train the personnel before the deployment. One of the most time consuming activities for a modern Swedish military force have been to produce documents and administrate the paperwork needed to be able to use the materiel in the operational area. These documents include safety regulations, environmental hazardous analysis, operation and maintenance documentation, export and import documents for custom declarations, to mention a few. Many of these documents are legally required.

The defence industry plays an important role in the preparation. It increases the capacity to do maintenance and upgrading. A prerequisite for that supplier involvement to work is that the relations are discussed and principles for the support have been agreed upon before the supplier needs to be used.

Deployment:

To prepare for the deployment reconnaissance groups should if possible to visit the deployment area. The ability to visit the operational area depends naturally on the situation in the conflict, but with a thoroughly performed reconnaissance the possibility to do a successful deployment increases greatly. Infrastructure and local business life should be studied as well as the security situation. Of main importance concerning the infrastructure is the transport entrances; harbours, airfields, railways and roads. Their capacity and capability for reloading and storage of goods need to be studied. The awareness of the limitations of the unloading capacity in Liberia led to arrangements to assure unloading with equipment of their own. If possible, frame contracts should be signed with suitable local or international suppliers operating in the area. In the Atalanta operation, important contracts to get supplies in the operational area were signed with the ship chandler and food suppliers. Contracts were signed concerning lent of camp areas and other host nation were solved. The security

situation determines, to certain degree, both in what order the deployment can be done, and what types of protection the transports need.

The interviewed logisticians were of the strong opinion that deployment should mainly be done by own resources. They argue that logistics is military core business, especially when the operational situation can be hostile. Even if reconnaissance groups have visited the deployment area, there will still be too many unknown factors to allow contractors to take part in the deployment. Losses of civilian lives or large amounts of military equipment during the deployment might endanger the whole operation. The contractual and political risks are believed to be too high. On the contractual side the insurance costs are believed to be too high, and on the political side the ethical aspects not to endanger civilian lives in the start-up of an operation are important. Certain tasks will however not be possible without contractors. Most deployments require sea and air transports to the operational area, and these are not possible for FM to do without contracted resources. These external resources should have military escort if they are approaching an area where hostile activities might occur. The heavy transporter of the Swedish unit had a military unit on-board for the final parts of the transport where intelligence information had pointed at possible hostile activities.

The personnel who packed the equipment and supplies for transportation should be a part of the deployment team and support the unit with the unpacking in the operational area. The supply routes from Sweden must be established from day one, to secure critical supplies. Frame contracts have often been written with local suppliers during the reconnaissance trips, and these are to be used when needed and if the situation allows it. The operational consequences of using local suppliers must be analysed before using them. Do the suppliers have any special connection to any side of the conflict? The unit should survive with its own resources during the first weeks of an operation. So, there ought to be time given to work with these issues.

When being established in the operational area, much of the logistics can be handed over to civilian suppliers. (Logistics officer, HQ)

New equipment should not be included in the unit that deploys, some officers strongly claimed. If new equipment can be motivated, it should be brought in after the unit has deployed and is fully functioning in the operational area. The introduction can also be delayed until the first rotation of personnel. Then the rotating unit can then be trained to use and maintain the new equipment before leaving Sweden.

The on-going operation:

The deployed unit has to follow Swedish law unless the national law in the area of operation puts higher requirements on the unit and the logistic system. Legal advisers to support both the HQ in Sweden and the operating unit are thereby important.

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The units should expect to live in tents, during the first six months!!! (Logistics officer, HQ)

During the first six months of an operation the camp facilities should be based on an easy to rise, easy to take down system, either tents or containers. As soon as the situation permits a private contractor should come in and build a camp of stationary type, if the operation is planned to last for more than a year. Today camps are rebuilt often and each design is done with only limited considerations of possible future needs. Camp construction must plan for both short-term and long-term perspectives. The position of the camp should consider surrounding infrastructure as airfields, harbours, electricity and hygiene. It should also consider possible future needs to grow. What might happen during the operation and what value or use can the buildings have after the military unit has left the camp? The ambition in recent military PSOs has been to leave nothing behind when leaving an operational area. This should possibly be reconsidered and some of the buildings and equipment can be given to the host nation as development aid.

We fly in one shipment of supplies to Afghanistan at least every 14 days. Some supplies need to be replaced with this frequency, blood for example.... (Logistics officer, HQ)

Some supply needed must be delivered from the home country due to national regulations. For example, new blood must be sent to the operational area at least every 14 days. Consequently shipments must have at least this frequency. The maximum length between transports gives a baseline for stock holding in the operational area of, for example spares to fulfil requirements on availability on equipment. The main problems with the supply requirements are that the availability requirements are diffuse, which makes it difficult to balance the push and pull in the system. Regional hubs, regional and local sourcing can improve the supply chain both from a transportation cost perspective and an availability perspective. Supply lines both from the home country and the regional hubs should be under military control, mainly due to possible difficulties with the custom authorities in the operational area but also in transit countries. These problems can happen both when getting the goods into the operational area and especially in the end of the operation to get it out again if not all papers are in the correct order which easily happens when more than one organisation handles the paper flow. The physical transportation of the goods can be done by a contractor, but the formal paperwork should be administrated by the military. Because of toll function and the need to support visitors coming to the unit, a land based NSE will always be needed, also for naval operations.

When the operation is up and running the industry can support with many different activities in the operational area. They can take certain positions in the NSE, hold stocks in the operational area or have a readiness to supply upcoming needs of supplies or services. But there is always a need to be

cautious about suppliers taking high risks. Firms losing personnel, when supporting or supplying the Swedish unit, due to no or limited protection will be ethically questionable. Using ethically questionable suppliers may have severe consequences for the operational objectives when it reaches media (and it will always reach the media sooner or later).

Different kinds of interests controls more and more of the operations, this change has been going on for the last 3-5 years... It must be some balance between what is operationally reasonable and what is specially required. (Logistics officer, HQ)

Different kinds of special interests take over more and more of the processes, for example procurement regulations, environmental requirements, health requirements, or quality requirements. These interests can both exaggerate and lose the holistic perspective for the military area. There is an important need to discuss and evaluate these requirements against operational objectives, costs and risks. A stomach disease can be very serious for the unit, not being able to function for 1-2 weeks and can cause lifelong problems for some of the infected. At the same time the disease often have only limited or no effect on the whole operation. To safe guard against diseases and only use the high class restaurant in well-reputed hotel chains, and not use the local restaurants in the area creates anger and distrust from the local population, which might have a huge negative effect on the operational goals. This example shows that a variety of different interests must be considered and balanced against each other.

The liquidation of an operation:

Just as in the preparation phase of an operation the planning is very important for the liquidation of an operation. Leaving an area of operation can be handled in two ways:

Either we have to fight our way out, and then is it not much to discuss, or we can do the way we have planned. In this case we should consider to transfer responsibility to another organisation within the FM for example FMLOG, which can build up knowledge and specialise on liquidation. (Logistics officer, HQ)

In the first way, the objectives with the operation have failed and the unit has to fight its way out of the area. In a situation like this, all environmental and legal aspects are reduced to laws of war, and the logistics objective is to bring as much as possible home.

In the second way, the objective with the operation is completed and the withdrawal is performed in a structured way. In the Liberia operation the unit was required by the next level above in the command chain, to do operational tasks until the last day in the area. Agreements need to be made with the framework organisation, to be efficient. Operational requirements should be reduced to meet the needs for home transportation and other liquidation activities as for example handing over goods or infrastructure to the local government. The unit should do a proper handover to the home transportation

organisation. The home transport organisation should not be responsible for the activities to put the materiel and equipment into order for home transportation. The home transportation organisation should be responsible for giving the unit directives and advices. No waste should be left behind and all personal and unit equipment should be packed in a way and sent home in a condition so that efficient reconditioning and maintenance can be performed after unloading in Sweden. But before home transportation, all materiel and equipment should be considered to be donated to the host nation as aid. The camp area should be considered for alternative use when leaving and this should have been planned for when building the camp.

Central processes

The planning period between operations is essential for the success of FM participation in PSOs and to the ability to meet different requests from the government. Preparation must be made to meet different operational requirements. This means that there is a need to make smaller building blocks than we do now. When formal decisions are made by the government there will always be a narrow time period until deployment. Processes must be in place to meet the time requirements.

With different kinds of special interests becoming more important in the processes, ethical and legal advisors also become more important. It is viewed to be important not to lose the holistic perspective of the operations. Therefore camp constructions should also be planned in a longer perspective, for development aid. When ending an operation efficient aspects become more important, and therefore the planning should be about minimising costs.

The development of the logistics strategy, the guidelines and rules, has been done in parallel to the on-going PSO. The development of the strategy and the guidelines has had effect on the operations. Changes in the operations can be traced to this development.

5.6 Logistics performed in Swedish peace support operations

In this section the logistics for two operations, Liberia and Atalanta/ME01, are presented.

To give an overview of logistics in PSOs a sequential approach has been chosen for the presentation. Using the timeline might not always be the best way to catch all details in the logistics for PSOs, but it has many benefits when it comes to give a holistic understanding of what has happened. In figure 5.4 brief overviews of the two operations are given. Both descriptions are developed out of both the primary and the secondary data about the two operations.

5.6.1 Logistics for the Swedish Liberia operation

Discussions about Swedish participation in Liberia started in late summer 2003. A Swedish company was deployed during the spring 2004. The Swedish engagement in the operation ended in the autumn 2006 and most parts of the aftermath was finished during the spring 2007. The Swedish operation in Liberia was an operation under UN leadership. In UN-missions, participating countries negotiate with UN about compensation for their participation. UN supplied all parties in Liberia with some basic needs as e.g. provisions and fuel. UN took the responsibility for and handled the transportation of the units' equipment from a departure harbour in Sweden to the area of operation. Additionally the UN-operation had complex patterns of negotiations, before the formal request was sent to Sweden. The formal petition contained requests about already agreed resources, in terms of soldiers and equipment. The Liberia operation is presented below with the assistance of a timeline, describing the most important or interesting occasions (see also figure 5.4). The aim has been to identify activities and/or circumstances that are important to an operation to give an overview of phases and activities.

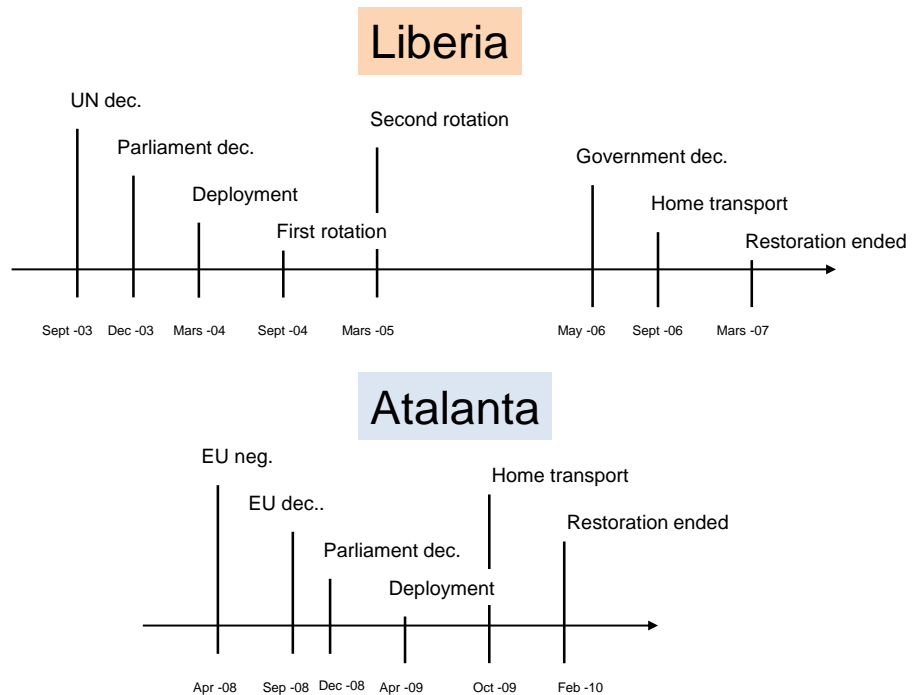


Figure 5.4. The timelines of the Liberia and Atalanta operations

September 2003 - December 2003, The Negotiation Phase.

The United Nations Mission in Liberia was established by Security Council resolution 1509 of 19 September 2003 to support the implementation of the ceasefire agreement and the peace process; protect United Nations staff, facilities and civilians; support humanitarian aid and human rights activities, as well as to assist in national security reform, including national police training and formation of a new, restructured military (UNSC, 2003). Parallel to the process in the Security Council, the first talks concerning Swedish engagement in the operation started. During the autumn negotiations between UN and Sweden were held concerning what troops and equipment Sweden could/should contribute with. In the early stages of the negotiation period, the Armed Forces had difficulties to interpret the governments' will. The headquarters started to prepare for an amphibious unit to deploy meanwhile the government and the UN discussed a mechanised company. It was not possible to identify where this misunderstanding appeared in the interviews or documents. It was apparent though that FM wanted to deploy an amphibious unit, to improve the international experience within the amphibious forces. The consequences of this misinterpretation were essential. The Armed Forces had considerably shorter time to prepare the unit for the operation. Even if the foundations for the unit existed, a number of activities had to be performed, to adjust the equipment and organisation, from a homeland defence battalion for Swedish environment and climate, to a rapid reaction company with a very different environment compared to Sweden and in a tropical climate.

December 2003 - March 2004, The Resource Allocation Phase.

The decision was taken by the parliament to send troops to Liberia. The work to transform the unit increased in speed. Experts from HQ, FMV and officers from the unit formed a project group working with different decision documents for personnel and equipment. Due to a number of different issues the list of equipment and consumables that were needed ended up being very long. The reasons why it turned out in this way can be categorised in operation specific and general management problems. The operation specific problems causing the long list were mainly limited knowledge about the operation, about tropical climate and uncertainty about transportation possibilities. The general issues, adding to the ones above, were vague directives, too high ambitions, and mistrust in the capability to support an on-going operation with rapid supply of new needs and resupply of broken equipment or spare parts. Two reconnaissance trips to Liberia were performed. These trips gave information concerning the harbour and the airport, how the situation would be when deploying into the area, and what assistance could be given by others; the Irish battalion and UN, and the possibilities to source locally.

A number of logistic activities were performed, maintenance and modification of equipment, procurement of new equipment and consumables,

packaging and transportation to the shipping warehouse. The work was done both by FM's own resources and contracted private companies. Many unpleasant unexpected circumstances occurred during this phase. Local decision-makers within FM prioritised other activities higher than the Liberia operation. The minds of many officers were still on the homeland defence doctrine thinking. Equipment was not sent to the shipping warehouse for example due to the fact that it was planned to be used in training later the same year. Some parts of the equipment appointed to be used in Liberia, required more maintenance than anticipated, and were not ready in time for shipping, so they had to be shipped with some remaining maintenance to be done in Liberia. Many of these problems could have been handled in a more rational way avoiding remaining maintenance, if the communication between the government and FM had worked better during the early stages of the negotiations between the UN and Sweden. Maintenance and postponed repairs of equipment could have started earlier. To get the unit ready in time for shipment the Base Level Logistics network was used. The same network was also used to support the unit when it was established in Liberia.

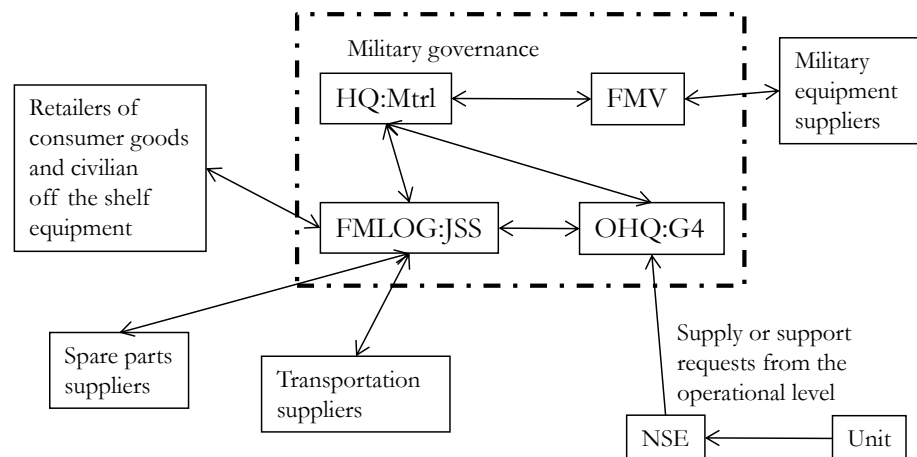


Figure 5.5 The Base Level logistics network in the Liberia operation

The Base Level Logistics Network is described in figure 5.5. At the Base Level, a military governance organisation existed. OHQ:G4³⁵ decided if the incoming requests from the NSE were new demands or resupply of consumed goods. Resupply needs were sent forward to FMLOG:JSS³⁶ (later called JSS) for execution. New demands were passed on to HQ:Mtrl³⁷ with a recommendation.

³⁵ OHQ:G4 - Operational Head Quarter, Logistics element

³⁶ JSS – Joint Service Support

³⁷ HQ:Mtrl - Head Quarter, Materiel Command

HQ:Mtrl decided and if the decision was to supply the unit, the task was passed on either to FMV or to JSS depending on the type of product.

March 2004 - April 2004, The Deployment Phase.

The packaging was finished by March. The last steps were performed in great hurry and the packing was not done to meet operational requirements. The goods were taken on board the ship in Norrköping for transportation to Monrovia in Liberia. The ship was hindered to leave the harbour before some corrections were done. The ammunition was packed and declared in an incorrect way not fulfilling legal requirements. The problems occurred due to lack of knowledge on how to handle dangerous goods, in this case ammunition, for sea transport among some of the store workers. Ammunition containers had to be left on the quay, and were later transported with military air-freight down to Liberia. The problems were solved and the ship could leave for Liberia in time. This incident was reviewed so severe that a police investigation was started to evaluate if there were reasons to press charges against responsible managers.

The unit arrived in Monrovia. The personnel arrived in two flights with chartered airplanes. The first smaller group arrived ahead of the materiel and the second main group arrived when the camp was established. The ship arrived, the unit was staged³⁸ and the camp and the NSE were established. The first smaller group was the deployment team and they were responsible for establishing the camp with support from local authorities and the Irish battalion. In Liberia, both the airport and the harbour had severe limitations. The airport had a huge runway (reserve runway for the US space shuttles), but without any real unloading capabilities so the freighters had to bring their own resources. The harbour had shipwrecks hindering more than one or two ships to unload at the same time (see picture 5.1). The setup of the camp turned out to be complicated. The unloading of containers, where the camp was to be established, was problematic. The personnel who loaded the containers in Sweden were not a part of the deployment team. The containers were not packed in a way that would have been suitable for establishing the camp and the packaging documents did not completely correspond to the content in the containers. The containers were packed as deliveries arrived at the shipping warehouse. This meant that things which were needed first when establishing the camp could be behind things not needed for establishing the camp in one container, and the next needed thing in another container e.g. canvas in one container and tent pegs in another container. Therefore, much of the materiel was moved around and it created even more disorder in the containers and the documentation. Both the unit and the NSE lost track of where to find things. They realised the problem and tried to start to restructure the order in the

³⁸ Staging – the activities conducted to bring personnel and materiel together to an operating unit.

containers and data systems, but they had too many things going on to be able to get everything in place directly.



Picture 5.1 The Monrovia Harbour at the time of the deployment of the Swedish unit

April 2004 - August 2004, The Operation Phase, First Unit.

Despite the problems during the deployment the unit and the NSE were in place and started to operate. The tiers structure of the logistics organisation established after deployment to Liberia is shown in figure 5.6.

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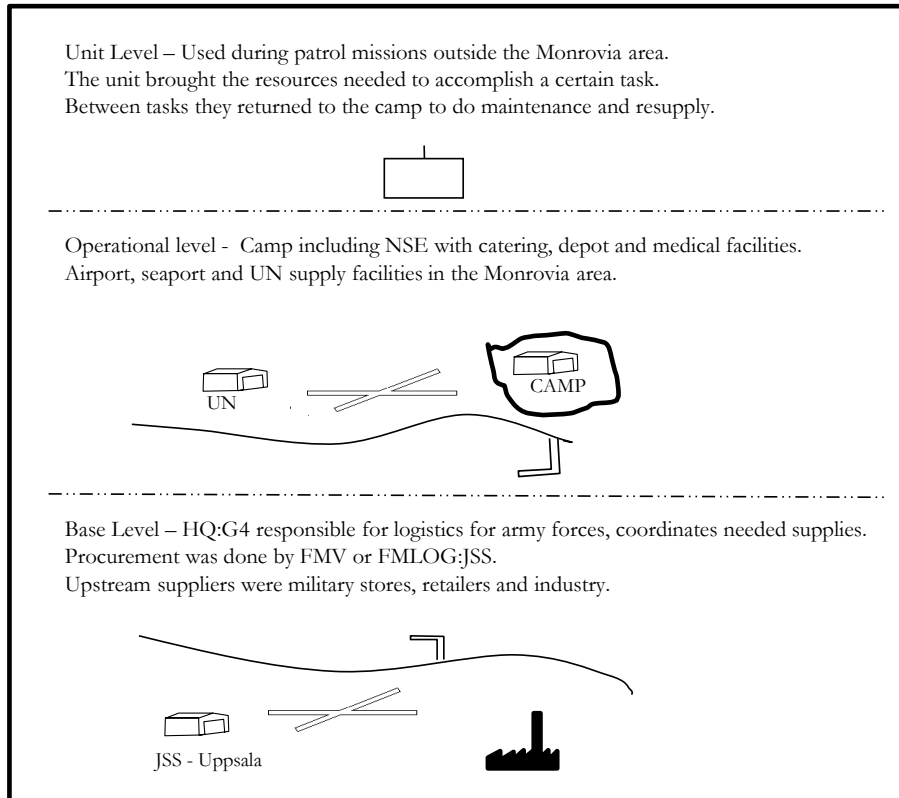


Figure 5.6 Logistics tiers in the Liberia operation³⁹

The unit level had a section with mechanical, supply and medical personnel to support operation outside the camp area. The mechanical personnel was also the primarily source used when doing maintenance of the units equipment in the camp after a performed task outside the camp.

The operational level was responsible for the day-to-day production in the camp and the sustainment of the unit. The NSE ran the repair workshop, the Role 3 hospital (together with the Irish NSE), the military restaurant, and the camp-stores. The support of the camp itself and the PX-shop⁴⁰ was outsourced. Travel of personnel was later taken over by the NSE from the home base. The change was done because it was both possible to get good prices and that it

³⁹ Signs used ; army unit company size, airfield, harbour, warehouse

⁴⁰ PX - Post Exchange, a store operated at the camp for the soldiers' well fare.

supported the growth of the international flight connections with Monrovia (see also March 2005 – February 2006 below).

At the base level, requests of new or replacement products including spare parts, were handled. Products not existing in military stores were procured. Goods transportation back and forth to Monrovia was arranged for. The transports were done with military or chartered airplanes and when needs were urgent with parcel suppliers, for example DHL. The timeframe for the operation was unclear so no supply transports were planned to go by sea. All personnel were of the opinion that it would have been more cost efficient and effective (that is, fulfilling the supply requirements), to supply the unit with a combination of commercial sea transports of predictable goods and commercial flight deliveries of unpredictable goods. The base level in Sweden gave technical assistance on equipment and had a helpdesk function for the computer systems.

September 2004 - February 2005, The Operation Phase, First Rotation.

The first rotation of the personnel was done. The new personnel was to focus their work on getting control over the materiel that they were supposed to have and correct all mismatches between the information in their data systems and what they had in the reality. The other main objective was to start arranging the camp and local relations including business relations, to meet the HQ planning that the mission would last for at least another year. The camp was changed from tents to container apartments, with much better hygiene, environmental protection and higher comfort for the personnel.

March 2005 - February 2006, The Operation Phase, Second and Third Rotation.

The second (March) and third (September) exchange of the personnel were executed during this period. In March 2005 all material was still not accounted for. Compared with the data system both surplus and shortage were found. During the following months much material that was not needed, was sent back to Sweden or disposed in Liberia. The main part of goods transportations was done by chartered or FM's own air transport. The transports were perceived as irregular in time and costly by the unit in Liberia. Some of the carriers was going half full one way and empty the other. Transportation of personnel was handled through regular flights, which proved to be much more cost-efficient and flexible than chartered carriers. Another positive effect was that the safety issues were in favour of regular flights, due to the fact that you normally do not send more than a part of the personnel with the same flight. The difference in price to buy a ticket in Liberia or in Sweden was large. The local business interest in Liberia had an interest in that as many as possible used regular flights. Because of that interest, they kept the prices low. Chartered air-

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transports were hired by officials in Sweden, through brokers. It was questioned by many of the interviewed soldiers, if the air safety on these chartered carriers met reasonable levels. No accident had happened so far but the airworthiness of the airplanes was questioned. The consequences a possible accident would have been severe for the FM and the Swedish government.

The local resources in Liberia, which had been in civil war for many years, were very limited. Due to this the unit could not source more than limited amounts from local companies. Activities to connect with the local business grew rapidly during this period.

It became apparent, when the unit had gained control on their equipment and material in Liberia they had too little to do, way too much time was spent to gain control of the goods shipped to Liberia. An important conclusion from the personnel in Liberia is that the unit should leave Sweden with fewer goods and be able to get more, when needed, with less administration. The NSE would function with fewer personnel if they had less problems taking care of too much such as badly packed supplies in the beginning of the operation. Instead of gaining control of brought materiel they could spend more time to connect with the local business and support the patrols with the support they really need. At this point in time the operational level supply network stabilised. The network is presented in figure 5.7.

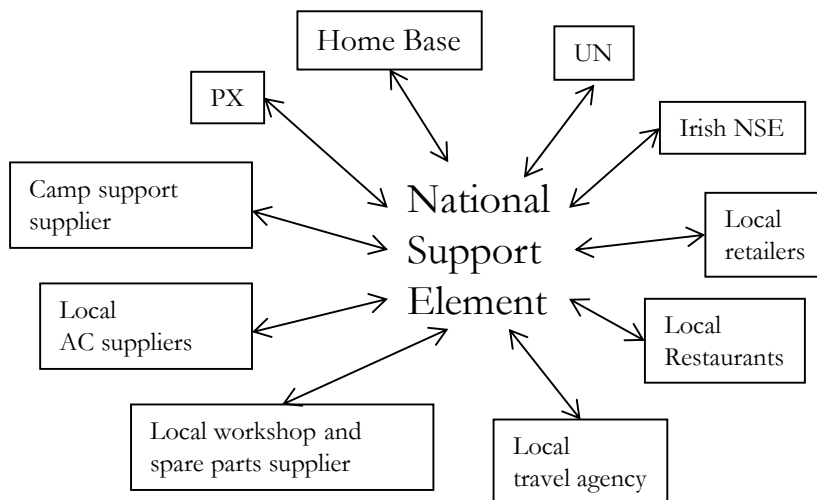


Figure 5.7 The operational level supply network in Liberia.

Two suppliers dominated the NSE supply base, the Home Base and the UN. The Home Base supplied almost everything except for food and fuel, which was supplied by UN. Deliveries from the Home Base came with air-freight every third week. All other suppliers were involved and delivered on a more or less continuous basis.

March 2006 - November 2006 - The Liquidation phase.

The final rotation of the personnel was done. During this period the government decided to withdraw from the mission. The date for the withdrawal changed several times and complicated the planning. A team from FMLOG was a part of the personnel in the last rotation, which made the redeployment to Sweden more effective. Which goods that had to be brought home and which goods that could be sold in the area were not clarified until very late in the process. Giving away any goods as aid activities was never discussed. During the autumn most activities were focused on closing down the camp. The material sent to Sweden was packed to reach their final destination without need to be repacked when arriving to Sweden. The camp was closed down and the personnel left Liberia 15th November 2006. When closing down the camp the requirement to continue to do operational tasks was difficult, but required. The security situation was not good when closing down the camp; the unemployment rates were high and thefts were starting to become a serious problem in the area. Back in Sweden the materiel was serviced and put into warehouses.

Concluding remarks on the Liberia operation.

The operational planning had many obstacles to handle in the early phases. Time constraints led to mistakes like the handling of ammunition when loading the ship in Norrköping. During the resource allocation phase the time schedule was very tight due to the changes that needed to be done on the unit's capability. Much of the equipment needed was in use for other purposes, and other had to be bought through rapid procurement. The time did not allow packaging to be done in a way that would have supported the deployment. Instead a planned packaging procedure all goods had to be loaded more or less directly into containers as it arrived to the shipping warehouse. Due to the rush mistakes were done in the logistics data systems. The tables in the data system did not reflect the content in the containers. This resulted in problems to establish the camp and gain control over the goods in Liberia. When the operational phase was reached most supplies were delivered from the Home Base or the UN. Deliveries from Sweden arrived with flights every third week. The capability to unload airplanes at the airport and ships in the harbour was limited. Urgent needs could be sent by parcel deliveries, for example DHL. As the operation continued more and more supplies were possible to get from local suppliers. When the operation closed down security aspects created problems. The unit was required to do operational tasks until a few days before leaving the area. The operational requirements were in conflict with the ambition to pack containers for their final destination in Sweden.

5.6.2 Logistics for ME01 in the operation Atalanta in the Gulf of Aden

Discussions about Swedish participation with naval forces to hinder piracy outside the coast of Somalia started in the spring of 2008. EU formed operation Atalanta, which started in December 2008. In this operation each force contributing country had its own logistics system. Sweden has had two operating units in the Gulf of Aden (ME01 and ME02). ME01 was operating in the area May-September 2009, and ME02 was operating in the area April-August 2010. From a Swedish perspective, these two units can be considered as two different operations, since they had separate political decisions and that the Swedish presence in the area was completely withdrawn in the meantime between ME01 and ME02. The operation presented here concerns ME01. Home transport of ME01 was conducted in October 2009, and most of the aftermaths were finished during the winter 2010.

ME01 is more interesting than ME02 from many perspectives. Three ships were engaged in the operation during ME01 (ME02 was only one ship) and the corvettes required more adjustments before the operation and frequent bunkering during the operation compared to HMS Carlskrona (ME02), which made the logistic planning more complicated. This was also the first time of larger⁴¹ Swedish naval engagement in peace support operations. At an operational level the logistic solution was partially different from the Liberia operation presented above.

April 2008 - May 2008, The Negotiation Phase, early stages.

Discussions were going on in the UN concerning the problems with piracy outside the coast of Somalia and the World Food Program (WFP) problems with aid transports (UNSC 1814, 2008). At the HQ limited planning started in preparation to send a force based on two corvettes and a support-ship in an internationally lead operation. Discussions concerning how suitable the corvettes were for different types of water were held between FMV and HQ. A first version of a list of modification action points was developed for the corvettes.

June 2008 - December 2008, The Negotiation Phase, continued.

Based on WFP needs to protect aid transportations to Africa from piracy, UNSC decided to request naval protection of sea transports, mainly WFP transports, on 2 June (UNSC 1816, 2008). Political negotiation started within the EU to form an EU-lead operation, later called EU NAVFOR or Operation

⁴¹ The word larger is always relative. Here it is meant that it concerns more than one operating unit and that the two corvettes have a support ship following for resupply and advanced medical care at sea.

Atalanta. The FM received the question, from the Swedish Government, with what and how they could operate in the Gulf of Aden. The discussions within the EU and the force suggestion from the FM lead to a continuation of the planning of three ships, two corvettes and one support-ship. Since the Swedish corvettes are built for a different kind of scenario in the Baltic Sea, the two corvettes for the Atalanta operation needed some adjustment to meet the new requirements. New systems had to be added both for safety reasons and for operational needs. The climate in the Gulf of Aden is different from the Baltic Sea, the seawater is warmer, saltier and the waves are of a higher length and amplitude, and the air temperature is warmer and the solar radiation is more intense. The scenario for the Baltic Sea was to engage larger ships, in this area the main hostile threat came from fast, small motorboats. To have a relative stable upgrading activity on the ships, the list action points were updated and agreed, and no changes were to be done if they were not on the list. A schedule for the action points was made. On-going procurements were speeded up and new contacts were made with suppliers, who earlier had delivered similar sub-systems to other ships in the Swedish Navy.

December 2008 - Mars 2009, The Resource Allocation Phase.

In December the Government gave FM the order to prepare for participation in Operation Atalanta in the Gulf of Aden. All final contract decisions for equipment and ships were made by FMV and the Naval Logistics Battalion (NavLogBat) in Karlskrona. Installation work started on the corvettes and the support-ship. FMLOG local organisation in Karlskrona supported the unit with procurement of consumables. During the operation several units within FMLOG took part, but to simplify the description these are all summarised under JSS. From the first planning stages throughout the whole operation the Base Level Logistics Network was used to prepare and support the unit. The structure of the Base Level Logistics Network is described in figure 5.8. Also in this operation FM had a governance organisation at the Base Level. JSS decided if the incoming requests from the Logistics Cell (LogCell) were new demands or resupply of the consumed goods. If it was resupply it was directly processed by JSS. If it was a new demand, the request was passed on to HQ:Mtrl who, in collaboration with OHQ:M4, decided if the request should be approved or denied. If the request got an approval, HQ:Mtrl gave order to the most suitable organisation to execute the request, that is FMV, NavLogBat or JSS. The arrows in the picture describe interactions existing between different parties.

The Base level is more complex for a naval operation than for an army operation. In naval operations the ship builder plays an important role. In Sweden, Kockums acts both as a naval dockyard for larger maintenance overhaul and shipbuilding yard for Swedish warships. Traditionally in this area the cooperation between FMV and Kockums has been close, where FMV has contracted suppliers of subsystems and Kockums has integrated them in the ship. The Naval Logistics Battalion (NavLogBat) in Karlskrona, has been

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responsible for contracting overhauls and minor changes on the ships which does not affect the main capabilities of the ships. The practical work has been done in close cooperation between all actors (the ship crews, NavLogBat, FMV, HQ:Mtrl and Kockums). These routines were kept during the preparation of the ships. NavLogBat contracted a heavy transporter, to take the unit uploaded down to the operational area. This saved maintenance on the ships, reduced fuel consumption, and made the transport less vulnerable to bad weather when passing the bay of Biscay.

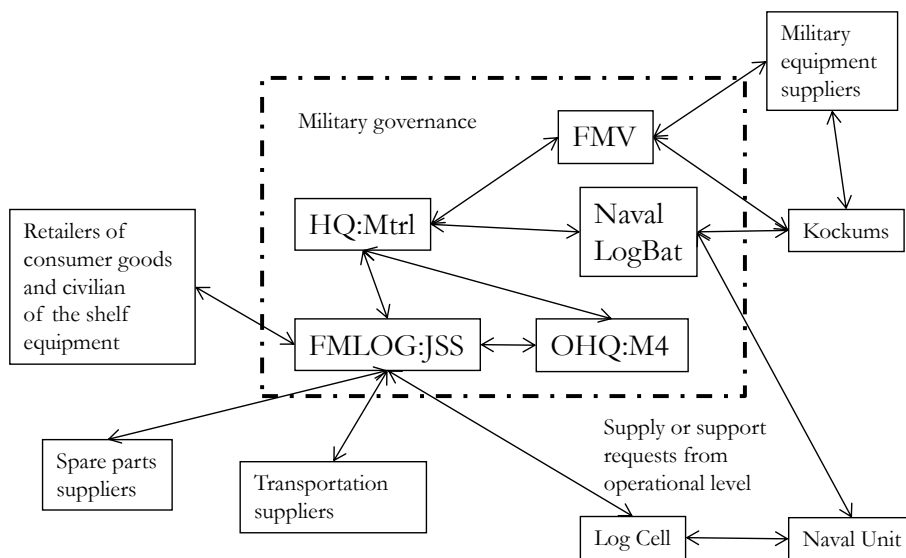


Figure 5.8. The Base Level logistics network in the Atalanta operation.

A reconnaissance team visited Djibouti to prepare for the arrival of the unit. Basic contracts were written with the ship chandler and a few other suppliers in the area. The health aspects and requirements were increased compared with the earlier operations, putting stronger requirements on who to write contracts with for supply of sustenance, water and accommodation. Locally produced food was not allowed at all. The support unit which was planned to be stationed at land in Djibouti did not get any training about regulations for local procurement or customs. In March the Swedish Parliament decided to deploy the force for the period May-September 2009.

April 2009 - May 2009, The Deployment Phase

The ships and personnel were transported to Djibouti. The personnel were transported with a chartered flight. The ships were transported with a special heavy goods carrier (M/S Eide Trader, picture 5.2). With the heavy goods carrier, personnel from NavLogBat came along, to make the ships ready after transportation. During the deployment a serious incident occurred on HMS Trossö, the support-ship. The propeller shaft broke shortly after the ship was debarked from the transportation ship. The transportation was the first experience from going uploaded with the Trossö type in a high temperature area. The maintenance activities before and just after debarkation were not designed for this type of transportation.



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Picture 5.2 M/S Eide Trader with the Swedish unit uploaded

The cooling system of a bearing got clogged and the crew, having no experience in running the ship in warm waters, did not realize that the bearing was overheated until it was too late. These two factors are probably main reason why a bearing got overheated which led to the broken propeller shaft. This incident tested the logistic support system to its limits. Kockums which had a support contract did work in collaboration with the defence forces to transport and repair the ship in Jeddah, Saudi Arabia, around 1200 km from Djibouti. Even though this type of incident was not prepared for, the cooperation within the supply chain worked well and the repair went fairly quick.

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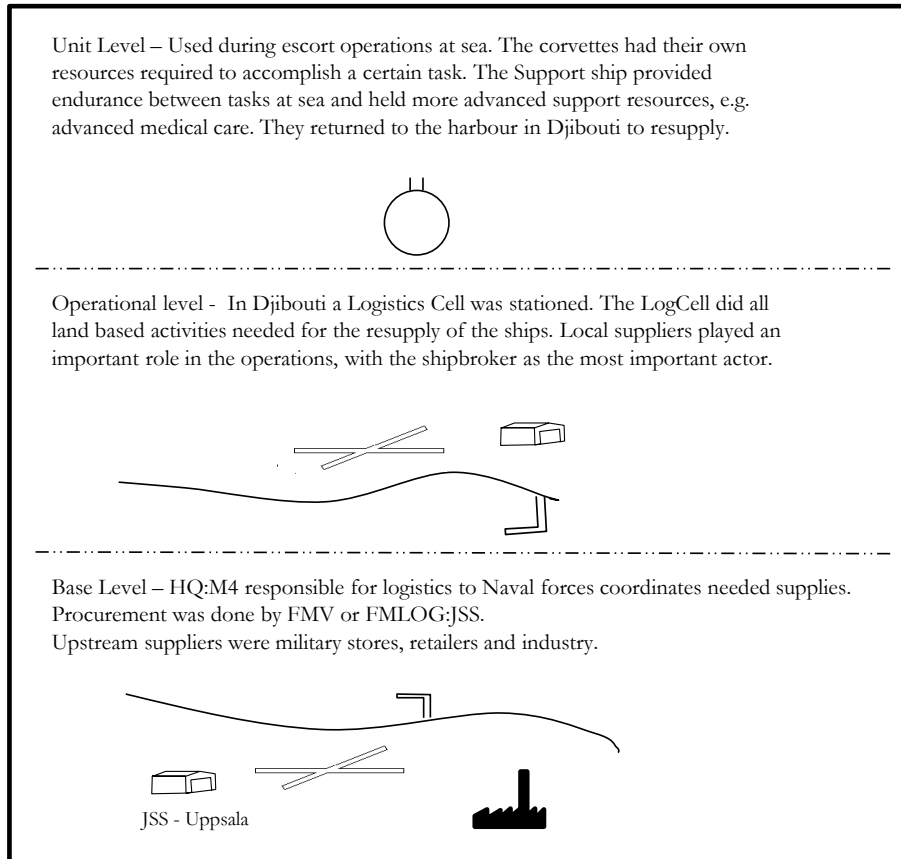

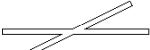




Figure 5.9. Logistics tiers in the Atalanta operation.⁴²

May 2009 - September 2009, The Operational Phase

Without HMS Trossö, the corvettes had some minor limitations on their operational capability. A LogCell under the unit command was established at the airport in Djibouti. The temporary loss of HMS Trossö put pressure on the LogCell to arrange for the corvettes to resupply more frequently in Djibouti. When HMS Trossö returned, the logistic solution in the original plans and orders were executed. The logistics tiers structure was according to figure 5.9.

The unit level and the operational level were organisationally integrated. The LogCell in Djibouti was a part of the Logistics Unit of which the other parts were stationed at HMS Trossö. The LogCell acted as an operational level

⁴² Signs used:  navy unit battalion size,  airfield,  harbour,  warehouse

logistics organisation. Some of the tasks on the logistic ship had also a character of operational level activities. These were mainly technical support, maintenance and health care. The operational order for the unit covered the logistic activities both on unit level and operational level (rather self-evident since both the LogCell and HMS Trossö were under the unit leader's command). For technical support concerning the ships, the unit should contact the NavLogBat directly. There were some problems with the chain of command when the LogCell belonged to the unit, and the commander was out at sea. During ME02 this was changed, so instead of having a LogCell the FMLOG had a NSE in Djibouti.

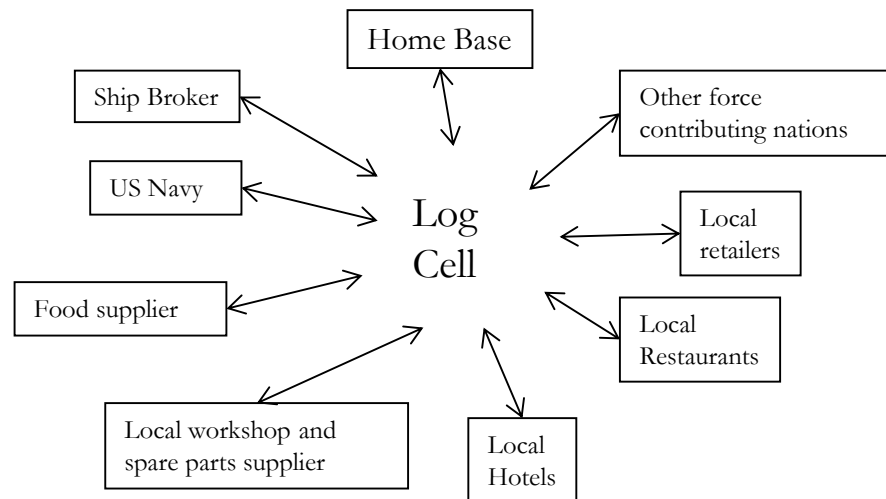


Figure 5.10. The operational level supply network in Djibouti.

Upcoming smaller new needs or resupplies should be covered by local procurement to the largest possible extent. This was done by the LogCell, both with the support of frame contracts and through direct purchases with other suppliers. If supplies were not possible to get locally a request was sent to JSS. On the operational level the supplier network is presented in figure 5.10. On a few occasions problems occurred when goods were delivered from Sweden, by Kockums. Kockums had an agreement with another ship chandler in the harbour. The local communication in Djibouti between the ship chandlers, the custom authorities and the LogCell did not work perfectly and the goods were delayed.

The reasons to the delays were more than one, but the most important problem was that the LogCell was not aware of the fact that the goods were coming and thereby did not look for it. It was also problematic by having more than one ship chandler involved since there was limited communication between the two. Before the deployment, Kockums argued that it would go

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faster and be simpler if they were to use their own supply chain and handle the administrative paper work by themselves. These deliveries could also cause some problems with the custom declaration when sending broken spare parts or line replaceable units back to Sweden, since they were handled differently. Officers pointed at that there might be bilateral agreements between Sweden and the Host Nation, which can be in conflict with FM's public private partnership agreements, especially concerning custom handling. In this case there was some minor mismatch between the agreements between the FM and Kockums on one hand and Sweden and Djibouti on the other hand. It was vital for the LogCell handling of incoming goods to become well known by the local custom servants. The Swedish representative handling military goods had to be viewed as an official person, and that his signature and stamp were accepted without having to use bribes.

Another issue that the deployed logisticians saw as problematic was the long lead-time of the deliveries of some spare parts (up to three months). This was a malfunction of the supply chain, which was difficult to find the reason behind. In this operation the delays did not hinder the operation, but engineers on-board the ships were concerned and some of the redundancy in the ships was lost for a period of time. These problems could be explained by some of the problems that existed in the supply chains, where elements of distrust and lack of communication existed.

October 2009 – February 2010, The Liquidation phase.

The ships were handed over to personnel from NavLogBat in Djibouti. The personnel took part in the loading of the ships on M/S Eide Trader and followed the transportation back to Sweden. Back in Sweden the ships were unloaded. The NavLogBat and the crews went through the ships together. Goods that were not supposed to stay on-board were sent to FMLOG and put into stores. The ships were sent for the scheduled maintenance at Kockums.

Concluding remarks on the ME01 in the Atalanta operation.

The planning of needed modifications on the corvettes started very early. This was critical for the ships to be ready in time for the operation. This was the first time a Swedish naval unit participated in an operation with more than one ship and in this area. The Navy argued for a logistic solution with a LogCell, which was based on the experiences in the Baltic Sea. This proved to be a less than optimal solution and was changed for ME02 to a solution similar to land operations. The deployment was performed with the ships uploaded on a heavy transporter. This was important for several reasons, the ability to have a fixed date for arrival in the operational area, to avoid scheduled maintenance at the arrival, and to have a fresh crew when starting the operation. The close working relations between NavLogBat and Kockums made the repair of Trossö smooth and fast, considering the circumstances. Spare parts deliveries did not work

perfectly during the operation causing some problems with the redundancy of systems. For the Atalanta operation the ambition to source as much as possible in Djibouti was outspoken. Different functional requirements limit the number of available suppliers in some product areas.

Swedish naval PSOs differ in one important way from land operations, which has consequences for the logistics system. The Swedish participation in a naval operation is often limited to a short time period, 3-4 months. The ships sail or get transported to the area of operation. They run the operation for a period of time 3-4 months, and then leave the area. If the operation is continued, the unit can be replaced by another naval unit, either Swedish or from another force contributing country, for example in UNIFIL⁴³ outside Lebanon, where HMS Gävle was replaced by HMS Sundsvall in April 2007. To keep the ships in the operational area, change crew and perform larger maintenance at a dockyard in the area, have so far not been executed by Swedish units in PSOs.

What also makes naval operations different from land operations is that they have a relatively large storage capacity on-board. The Swedish corvettes are not primarily built for long-term operations at sea, but as a unit with a support-ship they can operate for long periods of time without resupply from land.

5.7 Summary

To summarise, in this chapter the case of Swedish logistics in PSOs has been presented. Logistics in PSOs is a complex combination of external and internal processes and actors. The internal processes have both operational and functional perspectives with different internal actors covering their own area of interest. The external processes have both political and business dimensions, and the actors are governments, international organisations, national military, and firms. The process to form objectives for a PSO, and especially the objectives for a Swedish unit has been presented. The strategies and guidelines for the logistic activities in all phases of PSOs have been presented. The change between efficient and effective logistic processes has been especially focused on. The requirement to bring resources and being able to operate in the area without getting new supplies, balanced with the requirement to not create a logistic burden on the operating unit were identified. Many small and large guidelines for planning and conduct of logistics in operations were presented. Two PSOs, in Liberia and in the Bay of Aden, with different objectives and different types of units were presented. The two operations proved to be similar in many logistic aspects. The operational logistic structures, the

⁴³UNIFIL - The United Nations Interim Force in Lebanon, was formed by UN to execute security council resolutions (most important: 425, 426, 1655, 1697, 1701).

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managements of the logistics, and the supplier networks were similar; only on micro level did differences appear.

In this chapter we have touched upon sourcing as one of the logistic key decisions. We will continue to discuss sourcing in greater details in the next chapter.

6. Supplying peace support operations

In the previous chapter, the logistics concept for FM and the outline of the solution for two operations, Liberia and Atalanta, are presented. In this chapter, the focus is shifted towards describing the sourcing and the supplier side of PSOs. FM's supplier relations from both a NSE and an upstream HQ perspective are discussed. The chapter starts with a presentation of the supplying of the NSE. The next paragraph presents some consequences of The Swedish Public Procurement Act (LOU). The Act had strong limitations on FM's abilities to form different types of supplier relations during the studied period. Thereafter, the main body of the chapter is presented, that is, FM's sourcing decisions. The paragraph starts with a presentation on FM's make or buy decision, followed by the market decision and the decision concerning the number of suppliers and ends with the supplier relation decision. Finally, a summary is presented at the end of the chapter.

6.1 Supplying the NSE in peace support operations

The focus of this study relates to the supplying of the NSE, not the operating unit. The explanation to this standpoint is that this study has viewed all deliveries to the operating units pass the NSE before being delivered⁴⁴. The lead-times at the NSE can often be counted in hours while the lead-times at the upstream often are days, weeks or sometimes even months. So, in the following the FM's supplier relations from the NSE and upstream are discussed. The PSOs studied required supplies of many different categories. Much of the goods needed to start up the PSOs had been purchased far in advance. Early purchases were made because the supplies were needed for training and the national defence. Larger orders were placed for some supplies to gain efficiency in the procurements. Other products to be supplied early had too lengthy lead-

⁴⁴ In the Atalanta operation, this standpoint could be questioned mainly because of two reasons. Firstly, many deliveries went directly from the shipbroker to the ships. Secondly, the LogCell in the Atalanta operation did not have a formal NSE status; rather it was a part of the unit. But, even with these demurs it seemed correct to interpret that the LogCell was to be seen as equal to an NSE and that the shipbroker deliveries administratively were handled by the LogCell.

6 Supplying Peace Support Operations

times when needed for PSOs. But even though many products were procured in advance of an operation, a number of additional supplies and services needed to be procured once the PSO was decided upon. A first batch of goods was purchased and delivered to the transportation warehouse before the deployment to complement the previously purchased equipment and other types of supplies. The operations studied brought many different types of goods when deploying, but that was far from all that was needed for the whole operation. When leaving the base level and entering an operational area, the units required a minimum level of goods to survive until the supply lines were up and running. Once the supply lines were up and running in the operations studied, the NSE received deliveries from different suppliers on just about a daily basis. Some suppliers only delivered a few times during the whole operation period while others delivered periodically, that is, on a daily, weekly or monthly basis. Some products were consumed at rather constant levels, as water or sustenance. Others varied to a large degree and depended on both operational tasks and random incidents, for example the need for spare parts. Figure 6.1 illustrates the purchases made by the purchasing organisations within FM as well as the flow of the purchased goods from suppliers to the NSE, during the operations studied.

We get orders from the NSE on an almost daily basis; the delivery frequency depends mainly on how often we have flights to the operational area. (Anonymous, FMLOG)

When we have an urgent need we try to buy it on the local market. Only when we do not find what we need we turn our request to Sweden. (Anonymous, NSE)

Several types of supplies, for example fuel and food, are delivered directly to the NSE by civil suppliers or military partners. (Anonymous, NSE)

During the operation, timely and fast deliveries were critical for the operational capability of the unit. The unit commander would have been reluctant to perform assigned tasks, if he thought that the supply lines might not be able to provide the necessary support.

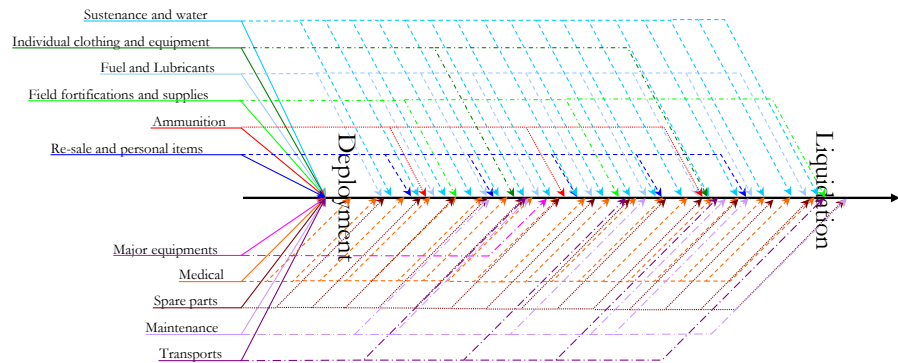


Figure 6.1 Purchases and Deliveries of Goods and Services to PSOs

During the operation, the unit commander would blame the head of the NSE if supplies had not been in place when needed. To maintain an efficient and effective support for the unit's needs, it was essential that the NSE had timely deliveries from upstream suppliers. Otherwise the NSE had to stockpile supplies in larger quantities in order to meet the unit's needs. Stock piling required storage capacity, which in turn required more space, supplies and personnel in the NSE, in other words it would have created a larger logistic footprint.

6.2 Consequences of the Swedish Public Procurement Act

The presentation of LOU in chapter 3 can give the impression that the legal possibilities to fulfil the requirements in the FM logistics strategy documents (Försvarmakten, 2007a, 2007b), and the demands for PSOs are good. But the interviews clearly point in another direction:

We wanted to buy some more[supplies] since the operation grew in size, but since we had no option in the contract with the supplier, we had to make a new competitive bidding. (Anonymous, FMV employee)

We try to put more and more of needed goods into frame contract where additional products of the same type can be bought when needed. But to do this takes time and is administratively complicated. (Anonymous, FMV employee)

The general view, presented in interviews at FMV and FM is that it is complicated to fulfil the requirements and needs. The most important arguments concerning these problems were: 1) Contracts for longer periods than three years are avoided, while much of the equipment has a life length of

30 years or more. 2) Dormant business relations are difficult to create with a reasonable administrative effort. 3) Additional procurement of exactly the same product cannot be done from the previous supplier unless valid options exist in the original contract. Especially difficult are the requirements in the strategy documents concerning the life cycle perspective, the reduction of the number of systems and the incremental development of new requirements to fulfil.

6.3 FM's Sourcing decisions

The FM's internal production is divided into two areas: the first one is to train soldiers and military units, and the second to operate with the units. FM has a separate organisational unit, FMLOG, working with logistics to support these two production areas. FMLOG has its own support production capacities in the area of logistics, mainly in maintenance and warehousing. Forty years ago, FM had both production of materiel and services in-house. Since then, almost all production capacity of materiel has been out-sourced and privatised by government decisions. During the last 15 years, FM has internally started to question its own production of services. However, this process has not been discussed until 2010, in a structured way based on the needs for PSOs. A thorough analysis of the consequences of having or not having special capabilities in-house has not been possible to perform in this study. But it is noteworthy that the reduction of FM to a smaller and more agile organisation has led to capabilities being taken over by the industry. Nevertheless, the majority of the supplies and services needed are procured from suppliers.

A wide range of supplies is needed for PSOs, which includes both physical products and services. To procure these supplies, a supply chain⁴⁵ is required. It is possible to divide FM's supply chain into seven different groups: The first group consists of main equipment suppliers, the second group consists of sub-systems suppliers, the third group consists of suppliers of consumables, the fourth group consists of spare parts suppliers, the fifth group consists of transportation/logistics suppliers, the sixth group consists of suppliers of products related to the camp/NSE in the operational area, and finally the seventh group consists of military partners acting in the region (Figure 6.2).

It is always many suppliers involved in the support of an operation, but we try to keep the number low. One important aspect to achieve a reduction is to cooperate with other nations. (Logistics Officer, HQ)

These groups play different roles in supporting the operations, but suppliers from all groups are necessary in order to support the operation. Some of the suppliers within a group are essential for the operation while others make life more comfortable, for the soldier. Each group differs in number, type and size

⁴⁵ In line with the definition- a complex network of suppliers

of the suppliers. Some suppliers must have the capability to deliver within hours after a need is identified. Other suppliers can use much longer lead-times and achieve an efficient production and/or delivery. Even though there are some variances among the suppliers within a group, each group tends to be rather homogenous when it comes to these parameters. The differences between the groups have naturally affected the FM perspective on the relations with the suppliers. From the supplier perspective, each group seems to also be rather homogenous in their view of the relation. Nonetheless, it was also possible to trace other firm-unique reasons why they handled FM in a certain way.

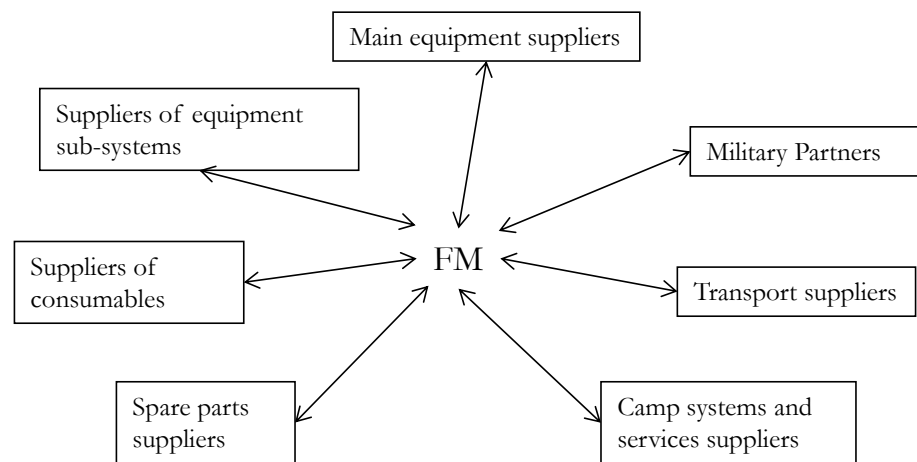


Figure 6.2. FM's supply chain for PSOs

When it came to the choice of market in the studied operations, FM actively aimed for the national market for some specific supplies, and the international market for other supplies, both mainly belonging to the categories, main equipment and sub-systems. Other areas followed the regulations in LOU, which in the end resulted in the suppliers were situated in Sweden in most cases and thereby belonged to the national market, although a few exceptions existed. The use of the local market in the operational area followed a special clause in LOU; therefore, the supplier relations could be established with less bureaucracy. The use of military partners as suppliers followed another clause which reduced the bureaucracy. FM had a general ambition to cooperate with other nations in order to reduce costs and increase efficiency. Several suppliers existed in each group. FM aimed to have supplier redundancy on all products, except for main equipment and sub-systems. When a decision was made as to one supplier of main equipment or sub-system, there were large consequences

6 Supplying Peace Support Operations

to change during an on-going operation. Therefore, it was not considered possible or plausible to change a supplier during an on-going operation.

In this study, some of the groups in figure 6.2 have played a more important role in the supply chain for PSOs than in the peacetime supply chain that is in the supply chain for peacetime training and capability building. Therefore the results presented here do not, in all perspectives, reflect the total situation of the relations in the supply chain. However, the suppliers and the relations have been important in the operations studied.

When working in preparation for an operation or supporting an operation the relation is more cooperative than otherwise. (Anonymous, main equipment supplier)

The relations apparently seem to change to a certain degree compared with the normal peacetime situation; all parties seem to be more cooperative in their engagement when they work for a PSO.

Many suppliers had difficulties understanding the FM procurement organisation. The FMV, FMLOG (JSS, RESMAT, MV Kungsängen, NSE are different sub-units with separate mandate) and the NavLogBat conduct the procurement, see Table 6.1.

What FMLOG procures [and] what FMV procures, is overlapping, and we do to some degree have different routines. (Anonymous, FMLOG)

These separate organisational entities do not always present the same picture to the supplier concerning needs (both peacetime and for PSOs), internal processes (since they are different organisational entities they also have differences in their processes) or legal requirements (different interpretations of the Act on Public Procurement). Some of the suppliers have transactions with more than one of the FM organisational entities. These differences have made the suppliers question the customer's business manner and trustworthiness.

Table 6.1 On-going supplier relations during an operation: Different procurement organisations within FM and different types of supplier groups.

	Main equipment suppliers	Sub-system supplier	Consumables Supplier	Spare parts supplier	Camp systems and service supplier	Logistics supplier	Military Partner
FMV	x	x			x	x	
JSS FMLOG stab			x		x	x	x
RESMAT	x	x	x	x	x		
NavLog Bat	x	x		x		x	
MV Kungs- ängen	x	x		x	x		
NSE			x	x	x	x	x

6.4 Supplier relations

The Swedish Act of Public Procurement more or less compelled FM to engage in procurement and to have relations with the suppliers in a certain way. The legal situation created some limitations for FM's possibilities to utilise the tools for differentiated relationships. There were, however, possibilities within the legal framework for some differences in the relations depending on the situation, which have been used in the operations studied. The three perspectives power and dependence, trust and interdependence and willingness proved to be appropriate to describe the relations. These parameters are therefore given special attention when presenting the relations below. Thus, each supplier group has a different relational situation with FM; therefore, the relations will be presented by one supplier group at a time.

6.4.1 Main equipment suppliers

Main equipment has some basic features that most respondents, both from supplier and customer side, agreed upon: Main equipment remains in use for a long time, sometimes up to 50 years. The equipment requires upgrades, spare parts and technical support. When it comes to most modern equipment, it is

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not possible to ask anyone else but the firm that developed the equipment for any of these services. The equipment is often too complex in design for other firms to acquire the knowledge required to upgrade the equipment or to provide technical support. Besides these practical issues, there is also often a complex situation with the handling of immaterial property rights and defence secrets if other suppliers were to perform these supply services.

The supplier relations that FM has with their main equipment suppliers are probably their most important relations for achieving and maintaining the operational capability. The relations are strategically important and FM has tried to maintain some sort of long-term relationship since the Second World War with the defence industry located in Sweden. These suppliers are few and are dominated by three companies, SAAB AB, Kockums AB and BAE Systems AB (Bofors and Hägglunds⁴⁶). These firms have been developing and supplying a dominant part of the FM needs for more than half a century. The relations between the firms and FM/FMV have not always worked smoothly and without problems.

We normally operate with two customers, one for upgrading: FMV, and one for support: FM. We are used to this dividing line, so it causes no problems for us. (Anonymous, main equipment supplier)

The relations are to a certain degree divided into two separate tracks where maintenance and support were handled by FM while initial procurement and upgrading are handled by FMV. Over the years, many discussions have taken place hindering the complete development of close relationships. To complicate the picture even further, the Swedish government has changed its position during the last ten years and argues that instead of developing and procuring from the industries discussed above, all Swedish military materiel should be purchased off-the-shelf with a minimum of development. Specifically, all acquisition should be done on the international market with the support of a competitive procurement process. These requirements more or less forced FM/FMV to have arm's-length relations with the industry, especially in the procurement phase of new equipment. Practically, both FM and the industry tried to establish more cooperative processes after a contract was signed.

The fact that many of us in the industry have a background in the military helps both us as suppliers and the customer. We understand the need and we feel a certain responsibility towards the customer that we otherwise would not have. (Anonymous, Main equipment supplier)

⁴⁶ Previously, Bofors and Hägglunds were competing, privately owned companies with FM as their main customer.

The personnel at FMV are divided as to how to handle the relations with the industry. One group genuinely distrust the industry and believe that detailed contracts with whip and carrot clauses are the only thing that would work.

The commercial side of FMV is often very critical to turn directly towards our main equipment suppliers and the frame contract. They argue that we must strive for competition and that the incentives in the frame agreements are too weak. (Anonymous, FMV)

They argue that the industry's only interest is to make as much money as possible from selling to FMV/FM, and that the industry would not take any responsibility for the military capability or the availability of their delivered systems. This group argue that use of power is the only tool that work in the relations with the industry. They implied that LOU hindered FM/FMV to engage in procurement in any other way than short-term contracts with competitive bidding. The second group, on the other hand, saw the relation from another perspective, where FM/FMV and the industry were two upstream/downstream partners in the supply chain, which was aimed to provide military capability. They believed in creating mutual interdependencies and strong personal relations with the suppliers. This group also argued that behavioural rules in partnership relations hinder corruption more efficiently than in arm's length relations.

When discussing the relations with the industry, the situation was more or less mirrored with two similar standpoints, one group argued for arm's length contracts and the other for strategic partnerships. The first group in the industry argued that FMV was not a long-term partner to trust. FMV's only interest was to minimise the price for a certain product. According to the same group, FMV was not trustworthy when it came to long-term contracts. They believed that the industry would never enter into a relationship where FMV have access to the accounts of the industry or see the figures underlying a certain quotation.

The other group realised that FMV had certain formal (legal) processes to follow, yet after a signed contract, close relations could be established. Cooperative relations were often apparent on the working level between the industry and FMV. They thought that the industry and FM/FMV should strive for establishing partnership relations.

Having frame agreements with the main equipment suppliers are essential in order to reduce the administrative process... to a level where we shorten lead-times, share risks and meet the functional requirement. (Anonymous, FMV)

Both the industry and FMV agreed that a power game partially existed in their buyer/supplier relations, and that this was not been beneficial for PSOs. Both sides agreed that profit considerations were important in the relations and that it could delay or hinder production for PSOs. In the operations studied, it happened more than once that this situation caused delays and problems. None

6 Supplying Peace Support Operations

of these occasions had any apparent operational effect but it caused some problems for the deployed unit or for the NSE. However, both FM and the industry also agreed that in the production for a PSO, the working climate had been more trustful and partnership-like than during the normal buyer/supplier relation.

When it comes to a PSO it is about getting the equipment ready for deployment. If we are not ready in time both FMV and we have lost, so we shorten the decision times and thereby we also improve business side on the relation. (Anonymous, Main equipment supplier)

Besides the profit interest, there also existed a national honour, among the personnel in the industry, in support of FM operations abroad. This probably resulted in that upcoming problems did not escalate to a situation that affected the operational capability. When it came to the ethical aspects in the buyer/supplier relation, no real, official policy existed either from FM or from the supplier side. It was possible to sense a limited 'understanding' from FM's side that the supplier had to act on a market where methods of a questionable character often were used. As long as the supplier's relations with other customers did not interfere too much with the FM's buyer/supplier relation, these problems were seen as something that the industry had to take care of on their own. Any illegal aspects of the arms export should be taken care of by the police authorities. From the supplier side, the ethical aspects were more a question of where to be seen and where to have their personnel. The ambition seemed to be different among the companies, where some saw it as important to be visible supporting international operations, while others were more concerned with risks for the personnel and costs for providing support in the operational area. In both the Liberia and Atalanta operations, the partnership-like relations dominated, creating effective solutions for problems occurring both before deployment and when the units were in the operational areas.

6.4.2 Sub-system suppliers

The suppliers of sub-systems often played an important role in the upgrading of main equipment used in international operations. These suppliers were often small to medium sized firms with high technology products. Thereby, they were important for FM capability development. In the preparation for the Atalanta operation, these suppliers were involved in updating and delivering new sub-systems such as fire extinguisher systems, communication systems, davit systems and combined rescue and boarding boats. In army operations, these systems can often be stand-alone systems if they are not integrated into vehicles or containers. But when building an army unit, not all systems are equally important for the main function of the unit. Main systems for an army unit include the system that describes the unit, for example combat vehicles for a

mechanised infantry unit. Other systems are here viewed as sub-systems, as night goggles, additional protection plates on the vehicles or new communication equipment. These suppliers proved to be innovative; they developed or used new technology. They often preferred to have contracts with the FM rather than the prime contractor of the main equipment.

We prefer to have the commercial relation with FMV; the main equipment supplier can sometimes push all the responsibility towards us and put us in an impossible delivery situation. When FMV coordinates, this becomes less of a problem.
(Anonymous, Sub-system supplier)

They argue that governmental organisations were usually fair in their business relations, while large prime contractors often used a power-oriented language in the relation. A small sub-system supplier had nothing or very little to bargain with when the large firms who told the small firm to deliver at a certain date. The only choice they had was to tell FMV that they would not supply under such circumstances. If FMV signed a contract with a sub-system supplier, FMV then also had to sign an integration contract with the main equipment supplier. For the sub-system suppliers, contracts with governments were important from many perspectives.

Supplying to government organisations is always of special interest, they push the requirements one step further. It makes us more competitive on the private market.
(Anonymous, Sub-system supplier)

Especially within the military area where the customer often has high technological capability, and thereby through requirements push the firm's product development forward. The firms perceived that they got competitive advantages on the private market through sale to governmental customers. All interviewed sub-system supplier respondents viewed signing contracts to supply military needs in PSOs as something positive from an ethical perspective. Delivering to the military could also be positive from a marketing perspective. Most suppliers argued that they thought positively about selling to FM.

It is always of special importance to supply equipment that is used for something good. (Anonymous, Sub-system supplier)

These firms were generally sensitive to whom they were doing business with. They were not willing to risk tarnishing their name as a well-reputed supplier for a contract with a questionable customer. The suppliers were of the opinion that FM/FMV had possibilities to use power within the relations, however, they relate that this was seldom done. They mainly saw the relations as being interdependent with large portions of trust in the personal relation between the supplier representatives and the buyer representatives. From the buyers' perspective, the contacts with these companies often ended up on one person or a small group. Often, the FM/FMV representatives would have preferred to negotiate directly with these firms instead of following the legal process.

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It is absolutely crucial that we know the supplier and its personnel, when we are working with the tough time-constraints, as we do when preparing the equipment for a PSO. (Anonymous, FMV)

In most cases, the people working on this level argued that they would have improved quality and reduced the price if they could have had a larger freedom to procure in a way that suited the individual purchase instead of following the formalities within LOU. Many of the suppliers were small companies and by being somewhat more flexible as a customer, they would have improved both quality and cost. This meant avoiding serial delivery of half-way developed products, and to meet the firms' development and production capacity to a higher degree. It also meant that the FM could have supported the supplier to achieve higher quality within given timeframes. The procurers at FM/FMV argued that they knew the market for their product category and they knew when to use competition and when to use a monopoly or partnership sourcing. In the Atalanta operation, mainly suppliers from outside Sweden were used for this category, and similarly for the Afghanistan operation several international suppliers were used. The procurers argued that it would have been even more beneficial if they had had greater freedom in the procurement process. They think that the transactional orientation of FM/FMV was devastating for the ability to supply equipment to FM in an efficient and effective manner. One identified result in the deliveries for the operations was a tendency of having not fully tested systems being used which caused some problems in the operation. Higher flexibility in the procurement process, with a higher integration between the supplier and buyer in the final product development could probably have reduced some of these problems. But on the other hand, these problems were mainly due to constraints in the development and production schedule. What was really needed was a change in the planning and ordering process so the suppliers could begin their work earlier. From a customer's perspective, these relations were almost always open and trustful, and very few on the FM/FMV side expressed a lack of trust with the supplier or that they were forced to use power strategies in their relation to accomplish their objectives. The only problem FMV encountered with some of these firms was that they could be a little bit time optimistic in their delivery planning.

6.4.3 Supplier of consumables

Supplier of consumables existed on the local market in the operational area and on the international market.

We try to go down early to the operational area and sign framework agreements with suppliers in the area. As the local market grows and the NSE gets to know local suppliers we help them with new agreements. (Anonymous, FMLOG).

As a customer, FM was important for many of these suppliers even if small quantities were purchased each time. The majority of the suppliers in this group were small or had many small customers. Most contracts were signed through competitive bidding on the international market, and many suppliers had framework contracts for their products. Even though the competition in the bidding process took place internationally, only a few framework contracts were signed with international suppliers. For JSS needs, Swedish retailers dominated the supply side. The suppliers seemed to be aware of what price level was required to gain a renewed contract when the former term ended. Many of the suppliers had had relations with the FM for many years. These long-lasting relations resulted in many relations that existed on an individual level between the purchaser at JSS and the seller at the companies.

We know our suppliers, we know how fast they will deliver and they will tell us directly if there are any problems that they can't solve. (Anonymous, FMLOG)

The trust between supplier and customer was solid and many supply needs were handled faster due to the existence of these relations.

When JSS calls, this will always have first priority. We always take pride in supporting Swedish soldiers abroad. (Anonymous, Supplier of consumables)

In some areas, however, the FM was too small as a customer to get these fast supply chains. In most cases though, the deliveries were fast enough anyway, so not being a prioritised customer was not such a big disadvantage. One of the suppliers commented:

I take orders in turn as they come in, but it is very rare that any order will be left on my table for more than two days, and that has proved to meet the JSS needs. (Anonymous, Supplier of consumables)

Nevertheless, no key performance indicators were used in the operations and the knowledge about possible consequences of a late delivery was limited within FM. The reason for this was probably that no complaints had come forth from the NSE or the unit regarding these supplies. In most cases the supplies were not time critical and some supplies could also be sourced locally by the NSE. Sourcing from local suppliers in the operational area often did build on what was available on the shelf. The supply chain upstream for the retailers was not reliable in Liberia. The situation was better in Djibouti, but the operation did not last long enough to establish any lasting relations with the local suppliers. In some product areas, there were only a few suppliers, which were large firms. These firms specialise in certain goods, for example food. In these areas, FM tried to find solutions where the purchases were coordinated with other customers in the operational area. Typical for this area was the facts that many different suppliers existed and relations on the working level were long-lasting, but lacking top management engagement. From the FM's side, the top management expected the appropriate organisational level to handle

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relational issues with these suppliers. The situation seemed to be similar on the supplier's side since an agent or his/her middle management handled all contacts with FM.

6.4.4 Suppliers of spare parts

FM suppliers of spare parts were often also suppliers of equipment or sub-systems. FM also used spare part suppliers that were specialised in spare parts retailing. On the customer's side, RESMAT was the central unit for resupply of spare parts for the military warehouses. For urgent needs, emanating from the PSOs, FM had special procuring units for the army (MV Kungsängen) and the navy (NavLogBat). These were the organisational units that received the customer's orders from the PSO. They first contacted RESMAT to get supplies, and if they could not get the spare parts within a reasonable timeframe, they contacted their own network of spare part suppliers.

We had suppliers that promised to deliver at a certain date, but did not fulfil their promise. They do not deliver to the international operations any longer. (Anonymous, FMLOG)

The spare part suppliers and FM representatives normally knew each other well. Most supply needs were handled the same day, when the supplier got the information that the spare part was needed for the PSO. The supplies of spare parts to PSOs were often small volume deliveries with unique parts, and the business value was in many cases not that high. The sellers in the supplying firms were in most cases appointed to support FM, and they normally also had the contracts for supply of peacetime needs in Sweden.

Almost all spare parts suppliers prioritise us when we say: -It is for international operations. (Anonymous, FMLOG)

They often recognised that they were doing something important when helping Swedish soldiers abroad. The customer and the supplier had often worked with each other for many years. The supplies of spare parts did build on trust between the customer and the supplier, that the need was real and urgent. From the supplier side, some sort of patriotic or doing good feeling was important for the effort laid down to make fast deliveries.

In some cases the supplier have had problems with too long lead-times in the supply chain. To meet needed time requirements, we have in-sourced that production. (Anonymous, FMLOG)

The relations between the equipment and sub-equipment supplier and FM did not always work as smoothly as with the specialised retailers. Delivery of spare parts or repairable units seemed to have low priority for some of the suppliers in these groups. Since FM had separated the supplier relations into procurement

categories, these problems failed to get the priority as was required from the customer's side. FMV, often being the most important customer contact for these suppliers, had only a limited interest in the resupply of spare parts.

The NSE purchased some spare parts locally. However, buying spare parts locally have been proved to be difficult; accordingly, often the supplier had problems to verify who the original producer was and thereby, the quality of the spare parts was questioned. But in longer operations and for special equipment, local sourcing could have been the best solution, for example, spare parts for air conditioning equipment were bought locally in Liberia. Coincidentally, when building a logistic solution for the spare parts from local suppliers, as in the Liberia operation, it was important to have a trustful relation with the supplier.

6.4.5 Supplier of camp systems and services

Suppliers of camp systems and services often had close relations on the operational level. Many of the suppliers acted in the operational area, in the camp. This created a situation of mutual interdependence between the supplier and the customer.

We have 6-8 travelling assemblers who enjoy going to unusual places. (Anonymous, Supplier of camp systems)

Other suppliers in this area had framework contracts with FM, which were used by JSS. Furthermore, these sub-orders, based on the framework contracts, were in the end often managed by the NSE concerning order fulfilment and practical aspects.

This is the baseline for our business idea, to support within the camps. (Anonymous, Supplier of camp services)

From the FM perspective, this area has been under debate for many years. One area of focus for the discussions has been concerning whether or not the suppliers should be in the operational area at all. The other discussion has been as to whether the camp management as such should be outsourced. The consequence has been that the strategies have emerged related to the needs in each individual operation. These emerged strategies have covered what and how to contract for supplies to constructing and running the camp. Due to this debate, some contractors have also waited with their business development for this area.

6.4.6 Logistics suppliers

Procurements of transportations are normally done through competition. Some of the airfreight companies often return as supplier for individual flights. We have gotten to

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know the crew level, while the commercial parts are formally handled. (Anonymous, FMLOG)

The logistics suppliers' main role has so far been to supply transportation services both during the deployment, during the on-going operations and for home transportation. The empirical data for this area is limited. It is thereby only possible to see the results as indications. Transportation was normally bought from specialised charter firms or by large international transport firms. All these contracts and relations have been short-term based on market transactions.

6.4.7 Military partners

Military partners are other military organisations, either international, for example NATO or the UN, or other national forces. Agreements were made to support each other's units in the operational areas. In Liberia, such agreements existed between FM and the UN, and between FM and Ireland. In Djibouti, such agreement existed between the FM and the US and between FM and France.

Sometimes is it uncomplicated to get supplies from a military partner. It depends on the MoU⁴⁷ and the interest by the nation to cooperate. (Anonymous, OHQ)

These agreements were often decided upon in bilateral military talks. For many reasons, these agreements were beneficial for all military partners.

In a mission it would be stupid not to cooperate when the supply lines are several hundred kilometres, and your partner has the needed goods or service capability in the same area of operation. (Anonymous, Military partner in a PSO).

Support resources were used to a higher percentage, costs for maintaining readiness were shared, and different countries could specialise on certain capabilities. This area was growing and was believed to be of more importance in the future. This area was also somewhat problematic, for example, the supporting organisation might prioritise differently and risks might be evaluated according to different scales. A very obvious example was the need for Swedish helicopters in Afghanistan. In the early phases of the operation, it was agreed that German MedEvac⁴⁸ helicopters should cover the needs for Swedish ambulance transports. This covered the needs for the operation. When an injury incident happened, the German helicopters were delayed on one occasion due to enemy activities, and on another occasion the time for the helicopter to reach the position of the wounded was considerably longer than it would have been if the Swedish unit had had its own helicopter capacity. One

⁴⁷ MoU - Memorandum of Understanding

⁴⁸ Medevac – Medical Evacuation

can, of course, discuss if the helicopters were stationed in a good ground position to support both the Swedish and German units and if the risk evaluation for flying would be any different for Swedish helicopters. Subsequently, both political pressure and requirements from the personnel led to the deployment of Swedish helicopters. This example shows that these partnerships require both support and understanding from the personnel side and the political leadership.

6.5 Summary

In this chapter, the supplying of the PSO is presented. Some limitations and consequences of LOU have also been discussed. LOU limited FM possibilities to develop close relations with their suppliers. FM did not have a structured process for the make or buy decision in place, even if some attempts to go in this direction were identified. FM chose the market and number of suppliers based on the type of product they needed. Moreover, the FM supply chain was presented and the relations between FM and the suppliers were discussed. The supply chain was divided into groups mainly based on the type of product. The FM approached the suppliers within each group in a similar way. LOU placed limitations on FM's ability to fully use differentiated supplier relations, even if large differences were obvious. Especially noteworthy was the fact that many suppliers were of the opinion that needs generated from the PSO had first or at least high priority.

7. Analysing logistics in peace support operations

This is the first of three analysis chapters. In this chapter the logistics in PSOs is discussed and analysed. In the next chapter the analysis continues with the sourcing decisions and the relations in the upstream parts of FM supply chain. In chapter nine the logistics key decisions are brought together to discuss how they change during PSOs. In the same chapter the links between the sourcing decisions and the logistics outcome are also discussed.

The theory development in the area of military logistics is important. Existing literature comes mainly from three fields; the military history field (e.g. Lynn, 1993; Peppers Jr., 1988; Van Crevald, 1977), the logistics and supply chain management in military science field (e.g. Eccles, 1959; Foxton, 1994; Kress, 2002) and governing document (e.g. EU, 2004b; Försvarmakten, 2007a; NATO, 2007; UN, 2008b). The literature in the military history field is theoretically relatively well developed. The few published books and articles concerning logistics in military science field have been dominated by studies on or theory for US or UK large force operations. Many of the government documents have a theoretical underpinning but are poorly documented when it comes to citations and other types of links back to earlier research. There is a need to develop theories valid for small countries' logistics operations. The empirical data has thereby an important role both for the discussions in this chapter and for the creation of a theoretical platform for future studies of smaller nations' military logistics. It can always be discussed in which end one should start when developing theories for an area which has a paucity of previous research. Which types of knowledge are more important than other? This answer is partially developed in the second chapter by referring to what other authors have been writing about when discussing large nations' military operations. Also papers discussing needs of future research in military logistics have been taken into account (e.g. Tatham, 2005; Taylor & Tatham, 2008). The studied case has also brought important insight to this matter both by strengthening the theoretical areas presented in the second chapter and by showing the specifics of small nations' participation in PSOs and links to sourcing. In the literature, three levels of theoretical areas were identified that were supported by the findings in the case; macro structures for the organisation of logistics in PSOs, objectives and requirement on the logistic planning for PSOs, and strategic or key decisions made for logistics in PSOs. Within each area a number of constructs were identified, both in the literature and through the studied case, as vital for PSOs.

In the area of macro structures for the organisation of logistics in PSOs, two constructs were identified: logistic phases in PSOs, and logistic tiers in the PSOs. In the area of objectives and requirement on the logistics planning for PSOs, six constructs were identified; long-term objectives, short-term objectives, adjustment to unique operations, capability and capacity, security and safety, and command and control. In the area of strategic or key decisions made for logistics in PSOs, four constructs or logistics key decisions were identified: the basic supply decision, the stockpile decision, the balance decision between lean and agile approaches, and the sourcing decisions. These constructs are discussed below except for the sourcing decisions, which are discussed in the next chapter.

7.1 Logistic phases in peace support operations

In this study a process-oriented approach was chosen. Both the case and the literature illustrate that PSOs are complex and includes different processes in different phases of the operations (Försvarsmakten, 1997; Kress, 2002). Important inputs to the processes are objectives, requirements and strategies, which also change and affect the outcomes of the processes. In FM logistics doctrine (Försvarsmakten, 2007a), FM discussed two major phases: Capability creation and operations. Other authors suggested several different phases (Foxton, 1994; Henderson, 2008; Kress, 2002; Tuttle Jr., 2005). The studied case showed that the activities for planning and conducting of PSOs changed significantly over time. It seems therefore correct to divide logistics in PSOs into several phases in line with Tuttle Jr. (2005) suggestions instead of the FM logistics doctrine approach with only two phases (Försvarsmakten, 2007a). The case showed that a circular perspective on the phases was appropriate, but one of the phases could be considered to be the initial phase. PSOs start with the development and training of military units. The case showed that the logistic capabilities for PSOs were created and developed parallelly. It is therefore logical to call this phase the Capability Creation Phase. In the studied case a clear shift occurred when a specific PSO was initiated. This period in time was dominated by international political discussions about the need of a PSO, and national discussions about available military capability, costs for both the operation and to adjust the deployable units to the operational needs. The importance of this phase was apparent in the studied case and supported by UN documents (Boutros-Ghali, 1992). But this phase tends to be forgotten by military theory authors who assume no need of operational adaption of the units (e.g. Kress, 2002). The main output from the phase was the decided ambition with the operation through the long-term objectives, both from a national and an international perspective. This phase is called the Negotiation

7 Analysing Logistics in Peace Support Operations

Phase. After that an agreement was reached and a national decision in the parliament had been taken, the focus changed towards the military preparation for the operation, deployment and conduct of the operation. These steps are presented as separate phases, by several authors, but with slightly different terms, and slightly different aspects in the details (Foxton, 1994; Henderson, 2008; Kress, 2002; Tuttle Jr., 2005). After the negotiation phase ended, the activities in the studied case were dominated by bringing needed resources together, adjustments and maintenance of equipment, and operation specific training of the personnel, therefore this phase is called the Resource Allocation Phase. The next phase is called the Deployment Phase and starts with the packaging of the resources, continues with the transportation and the reception in the operational area as it was both in Liberia and in Atalanta. Kress (2002) divides these activities into three separate phases, but when studying the case, Kress division seems to be exaggerated, especially for a small nation's PSO. The phase finishes when the camp and the NSE are fully operational. The next phase is what many view as the actual PSO, but it is only the Operation phase, where the operating units are in the area conducting their tasks. Finally the operations are ended, all operational facilities are closed down, the material and personnel are transported home, and finally refurbishing of the materiel and debriefing of the personnel are carried out. This phase is called the Liquidation Phase. The case show that this phase is important from many perspectives and complex in its nature which is confirmed by the experience from the First Gulf War (Pagonis, 1992).

In this study data from all the six phases has been collected (only limited data from the capability creation and liquidation phases). The presented phases of logistics in PSOs build on previous research and are further developed based on the studied case. It appears to be a fruitful way to divide the operations from a logistic perspective for a small nation. Even if the phases overlap to some extent in time most phases have a clear cut, through decisions or the start of certain activities, based on the studied case. This gives us a logistic PSO phase-cycle with the following six phases: Capability Creation phase, Negotiation phase, Resource Allocation phase, Deployment phase, Operation phase and Liquidation phase (figure 7.1).

The case and the discussions above give the following summary of the activities in each phase:

In the Capability Creation phase, the formation of units and their basic training for the PSO are conducted. At the same time the basic capabilities for the logistic system are developed. The logistic activities are, for example, contracting important suppliers and storage of scarce resources. Long lead items and main equipment are procured.

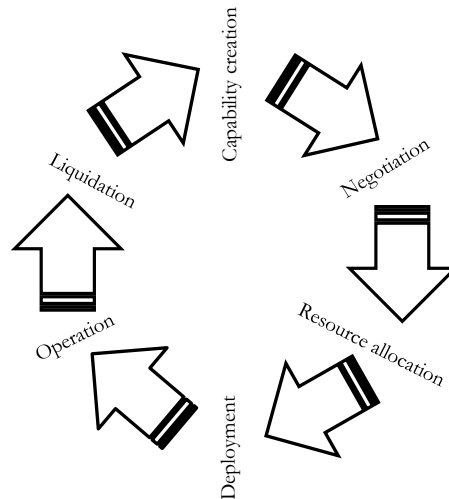


Figure 7.1 The logistic PSO phase-cycle

The main activities of the Negotiation Phase concern the first planning stages of a specific operation. It starts with the international activities to agree upon an operation and the national decision to give a force contribution. During the phase the Armed Forces start looking upon what type of units can be deployed and what types of adjustments are needed. Budgets and costs are dialogued between the government and the FM. The HQ starts preparing or updating organisational tables for materiel and personnel, for the planned units. The detailed planning of the logistic solution has to start as soon as an operational area is identified.

The Resource allocation phase starts with a formal decision from the government to the Armed Forces to deploy at a certain date. Final materiel and personnel tables are decided, materiel and equipment are directed to a collection depot and packed according to operational requirements. The personnel are given additional operational specific training.

The Deployment phase starts with the loading and transportation to the operation area, followed by the organising of the logistic solution for the operational area.

The Operation phase has started the period when logistics in the operational area is conducted to support the operational units' tasks.

The Liquidation phase starts when a political decision is taken to leave the operational area. The end of the phase is the final evaluation of the complete operation. The phase can include a number of activities, such as evaluation of suppliers, transports, order effectiveness, technical support, maintenance, and

medical and equipment availability. The results are used to develop and update plans and routines for new and on-going PSOs.

7.2 Military logistic tier structure

Military operations have, over the years, been discussed with many different approaches concerning tiers in the military logistics organisation, from the multi-tier system in the US and NATO forces during the Cold War (Foxton, 1994; Peppers Jr., 1988) to the two-tier system in the FM Homeland defence doctrine (Chefen_för_Armén, 1993, 2001). To a certain degree it can be argued that structure is dependent of the size of the military force, but with modern thoughts of sending supplies directly from-factory-to-foxhole, the size of the units plays a less important role (Kallock & Williams, 2004; Peltz, Halliday, et al., 2005). Based on Foxton (1994), Peltz, et al.(2005) and the FM Homeland defence doctrine (Chefen_för_Armén, 1993), a three-tier system is suggested in chapter 2. This structure builds on both the recent development of the reduction of tiers based on the flow concept and FM logistic principles before the doctrine changed towards international operations. This structure proved to be suitable to describe the tier structure in both the studied operations Atalanta and Liberia.

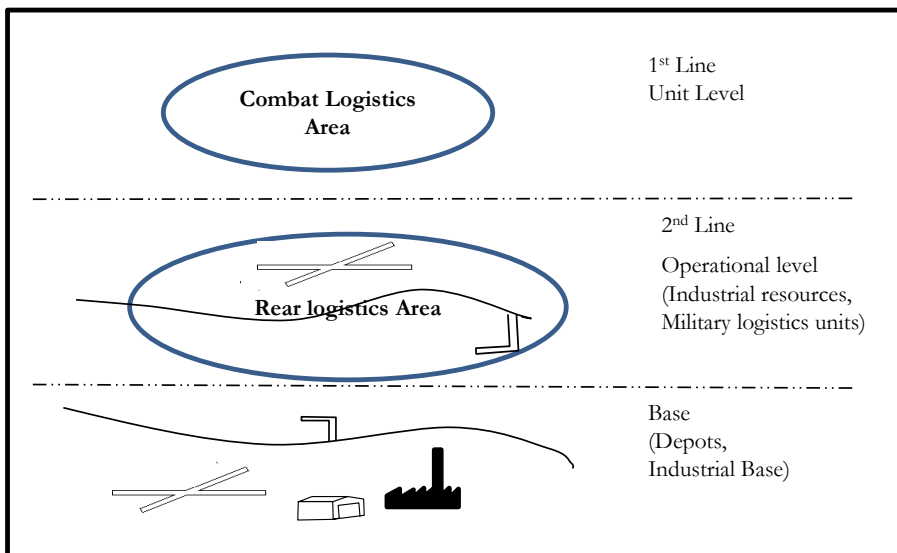


Figure 7.2 Military logistics tiers for small nations' forces in PSOs

Based on the interviews from the Liberia operation it was indicated that the logistic tier structure also could describe the logistics structure for the Irish battalion in the area. It can therefore be assumed that the model is valid for small nations' logistics tier structure in PSOs (figure 7.2). It is a common view in the literature that the homeland military organisation with the supporting industry constitutes a base level at the rear end of the military logistics structure (Eccles, 1959; Foxton, 1994; Markowski, et al., 2010). The base level itself contains many different supply chain tiers in both the military organisation and with sub-suppliers in the industry (Markowski, et al., 2010), which will be further discussed in the next chapter. This study shows that the baseline for defining the base level only as one tier in the model is the management of the tier. The flow of supplies from this tier is coordinated by the HQ in Sweden, no matter if the supplies are delivered via a regional transportation hub to the operational area or via a national transportation hub to the operational area.

The next tier downstream of the base level has in theory been presented as the rear logistics area, or the second line (Foxton, 1994). The study suggests that this level is in the operational area and consists of the NSE with support of local suppliers. The NSE has access to harbours, airports or railway facilities to get deliveries from outside. This level has two flows to manage; one flow to the combat area and one from the combat area (Henderson, 2008). The NSE in the studied operations had limited problems to manage the reverse flows. With larger forces the complexity increases but nothing in this study indicates a formal difference hindering larger forces to handle the operation the same way, which is also supported by Henderson thoughts on distribution management (Henderson, 2006).

In this study two different management situations existed on the operational level. In one operation the NSE was formally under the command of the Multinational Operational Head Quarter, in the other operations the NSE was under the command of FMLOG. Both solutions have benefits and drawbacks. In Atalanta the NSE was under the international command, which created some problems; the wins in flexibility by standing under a multinational command are lost due to the lack of understanding of the national needs or requirements. Since the requirement to support special national needs dominated it was decided that the NSE should be kept under a national command the coming operations. The case showed also that a national management was beneficial because of both national legal requirements and bilateral agreements between the sending nation and the host nation. The choice between the two alternatives did not affect the logistics tier in the model, though.

The next tier downstream is called the unit level, the combat area or the first line (Foxton, 1994). This tier takes care of operating units' daily needs (Henderson, 2008). On this level both suppliers and military personnel have been acting according to the literature (Peltz, Halliday, et al., 2005; Singer, 2008). This has been questioned by many, both practitioners and scholars (e.g.

Verkuil, 2007). In the operations studied only military personnel acted on this level. Important for the Swedish decision to only have military personnel was the international agreements of war (Försvarsdepartementet, 1996a). Another argument presented was the need of being able to arm the logisticians if hostile activities were going on. The operating unit should not need to do all protection of the logistics activities, some should the logisticians be able to handle by themselves. The theory for large force operations during The Cold War was built around a five tier system (Foxton, 1994). In the changes of US and NATO structures with their changes in logistic principles, as the new concept of 'from factory to foxhole, a three-tier system could be identified (Peltz, Robbins, et al., 2005). The difference between the five-tier system and the three-tier system is the change in the logistic solution where the five-tier structure was based on a pure stockpile solution, and the three-tier system meets flow based requirements (Peltz, Halliday, et al., 2005), but can also cope with limited stockpile requirements. Even if some important differences were identified between large force operators in the literature and the small nation studied in the case, the three-tier system catches, in an appropriate way, the tiers for a small country's logistics in PSOs. The main difference is that smaller nations need a higher degree of stockpiling to meet the lower frequency of deliveries. Also the Logistics Doctrine (2007a) describes three levels of logistics; strategic level, operational level and tactical level, which support the suggested three level structure.

The logistic tiers differ from the supply chain tiers in several important ways. The military logistic tiers build on the military threat level and the military command structure, while the military supply chain tiers build on the relations in the supply chain (Foxton, 1994; Mentzer, et al., 2001). In this way an organisation can belong to the second tier in the logistic tiers and at the same time belong to the fourth tier in the supply chain tier structure.

The three levels structure seems also to be important for future studies in military logistics. This study indicates that, even if much of the logistic flow passes through all tiers, many important studies can be isolated to each tier.

7.3 Logistic objectives in peace support operations

In the research purpose, a part of the aim was to study the achievement of short-term and/or long-term objectives. In chapter 2, the achievement of long-term objectives is described as how the logistic activities can contribute to the operational and political end state, in most PSOs to create security and contribute to a lasting peace (Boutros-Ghali, 1992; JDCC, 2004; UN, 2008b). The achievement of short-term objectives is presented as the logistic ability to timely supply the operating units with needed physical products and services.

None of these objectives have been seen as controversial or illogical by any of the respondents in the study, but it has been mentioned, by some of the respondents, that every PSO is unique with the consequence that the objectives might differ to some degree between operations. As discussed above, PSOs go through different phases. The logistic objectives on a more detailed level can be expected to change over time in PSOs mainly due to the fact that different phases can have different objectives.

7.3.1 Long-term objectives

All PSOs have two overarching objectives or operational end states in common, to create security, and to contribute to a lasting peace (Boutros-Ghali, 1992; JDCC, 2004; UN, 2008b). On a general level all PSO phases have the same objectives but on a more detailed level the case indicates that some changes appear over time, which makes it relevant to go through them one by one.

The first phase, which concerns the creation of a PSO's capability, has a slightly different objective than the other phases. The objective of this phase is to create a readiness for PSOs in line with the requirements by the Ministry of Foreign Affairs (Utrikesdepartementet, 2008a). The case indicated that these requirements principally were followed. The internal FM documents support this ambition and try to define the readiness requirements. But in the ambition to be available for PSOs FM seemed to forget the balance required between being effective and efficient. The ambition tended to be too high on readiness on existing units with little thoughts on flexibility to meet new or other operational requirements from the government.

The negotiation phase is interesting because during this phase the objectives for the specific operation are settled. In the case a political process was identified where only agreed information was documented. The national ambitions were presented on a general level to get an international agreement. The intentions presented in Swedish national strategy (Utrikesdepartementet, 2008a) were almost lost in the dialogue concerning a specific operation between the government and FM. The internal discussions in Sweden tended to focus on cost, tasks and capabilities to support an operation with, instead of the long-term objectives. The objectives for the PSO were stated in the UNSC declarations and the CONOPS. Even more important for the logistics were that guiding documents existed on international, national and operational level (e.g. UN, 2008b; Utrikesdepartementet, 2008a). These documents support a long-term objectives thinking for logistics. In FM PSOs the logistic planning was focused on short-term objectives and these types of documents were only used in a limited way. Two reasons for this are believed to be more important than others. It was a lack of the long-term objectives in the dialogue between FM and the government and a lack of knowledge within FM that logistics is also an important tool for achieving the long-term objectives for PSOs.

7 Analysing Logistics in Peace Support Operations

All the remaining phases, showed in FM PSOs to have the same long-term objective, create security and support a lasting peace. Just about all UNSC resolutions⁴⁹ have this in common. In some missions additional requirements existed, for example to protect WFP ships from piracy (UNSC, 2008a). These objectives were dealt with in the CONOPS for the unique PSO. The problem appeared when the objectives were transferred to the national level. It was a lack of awareness that logistics could contribute, both among officers in the HQ and abroad in the operations. Important is though that the officers confronted with this issue thought that this was an important aspect that had been overlooked. A support for the development of logistics to contribute to operational long-term perspectives exists. Activities to support the long-term objective were performed in the operations, but in an unstructured manner.

The lack of knowledge about the long-term objectives did also mean a lack of planning to fulfil them. Reasons to war and ways to achieve peace can be explained by Triple-R (reasons, resources and resolve) or Triple-M (mutually hurting stalemate, mutually enticing opportunity, mutually obtained rewards) (Ohlson, 2008). The R- or M-factors were not used to discuss how logistics should be executed in the operations. But these types of factors would probably help the planning of logistics in PSOs to achieve the long-term objectives. With a military perspective on peace-building, PSOs tasks were carried out, to some degree, within the area of logistics. The units and logistic organisation had dialogues with the local population, to encourage the support of the operation. But it also lacked activities to get support from the population for the military presence. Andersson (2001) suggests for example that medical assistance to minefield victims could help to get the population's support. Very few of these types of activities were carried out. The argumentation against these activities was that they created more problems than they gave support for the PSO and it was primarily not a military task to support the population. This view is supported by some authors (Barry & Jeffreys, 2002), but most authors support military engagement in humanitarian activities (Gourlay, 2000; Hofmann & Hudson, 2009; Hubner & Ditzler, 2004; Jenkins, 2003).

The civil part of the peace-process is about reducing the suffering among the population and rebuilding the basic functions of the society. The central institutions are important, but so are local capacities (Korac, 2006). If logistics is to support the building of central institutions this ought to be within the military CONOPS for the whole operation, thereby the national focus, in a multinational force, is about on supporting local capacities. The grassroots and local communities are important in many perspectives; to create new businesses and jobs, to support the peace-dialog among the population, and to give people motivation for the peace-process (Korac, 2006; Lederach, 2005; Stephens, 2000). Also national (Swedish) and international businesses engagement in the peace-development is an important factor to consider and to support from a

⁴⁹ All UNSC resolutions are available at www.un.org/Docs/sc/

military logistic perspective (Oetzel, et al., 2009). Military logistic functions seem to have good possibilities to engage in and support the peace-development both by direct engagement in the local community and business life and by putting requirements on suppliers from outside the operational area to start new ventures in the area. In the Swedish operations these types of activities have been performed but not with the long-term objective in mind. The consequence of this will be further discussed in relation to the sourcing decisions and their impact on the long-term objectives in the next chapter.

7.3.2 Short-term objectives

The short-term objectives were presented in the first chapter as the logistic ability to create the means for the operational units and to support the operational tasks (Skoglund & Dorn, 2008). In the second chapter the operational tasks to give humanitarian aid were included in the short-term objectives. (EU, 2004b; Pettit & Beresford, 2005; Sebastiaan J.H. Rietjens, et al., 2007).

The classic military theory Sun Zi (~500 BC/1997), Von Clausewitz (1832-34/1991) and de Jomini (1838/2007) point at aspects necessary to consider for the logistic planning to achieve the short-term objectives. It is a well-known fact that military operations always need to consider possible hostile activities and unknown problems. Thereby the logistics need to be kept simple and with redundancies in the supply chains (Sarin, 2000). The mechanisation of the armed forces (Liddell Hart, 1954/1991) and use of IT-support in the operational planning and decision-making, introduced a higher operational tempo (Boyd, 1987; Warden III, 1998). This development put requirements on the logistic system to increase flexibility and speed (Wang, 2000).

The studied case showed that short-term objectives come natural for the logisticians in FM. They know that the operating units require that their equipment is available and functioning when they need it. They know that failing to give the needed support can mean failure for the unit to perform the required task and in worst case the loss of soldiers' lives. The operational requirements to increase flexibility and speed have resulted in logistic contingency planning (Boyd, 1987; Kress, 2002). During the operational planning, in the studied operations, the logisticians worked not only with the support the unit's next operational task, but also with activities that facilitated the support of the coming tasks. When looking into the details, especially in the earlier phases of PSOs, the decision in the Swedish Parliament defined a date when the unit should deploy. The deployment required engagement by the operating unit no matter how the security situation was expected to be. So, in line with these results from the case, the focus of the logistics in the phases prior to the deployment was to facilitate the deployment and the coming tasks in the operational area. This supports that short-term objectives is to create the means for the units and support on-going tasks (Skoglund & Dorn, 2008). The

short-term objective to give humanitarian aid based on operational tasks was self-evident both to the logisticians and the operating units. These tasks were no different from other operational tasks given by the framework organisation's OHQ.

7.4 Requirements on logistics in peace support operations

As early as 1834 Clausewitz mentioned the complexity and the many unknown aspects in military operations. He used the term friction to describe problems that a military force would encounter. Modern warfare requires higher flexibility and capacity to react faster (Boyd, 1987; Warden III, 1998), and this study has shown that this is relevant also for PSOs. In the Post-Cold War operations a higher degree of civil contractors have been giving support in the operational area with security problems as a consequence (Peltz, Robbins, et al., 2005). The governing literature in combination with the case point at four areas of requirements that is especially important when planning and conducting logistics for PSOs (Boutros-Ghali, 1992; Försvarsdepartementet, 2009; Försvarsmakten, 2009a; JDCC, 2004; UN, 2008b; Utrikesdepartementet, 2008a):

- Adjustment to unique operations
- capability and capacity
- security and safety
- command and control

These areas of requirements are completely in line with the studied operations. During the studied period all operations have differed both in size and in used equipment. The dialogue between FM and the government has sometimes been intense concerning capabilities and financing. The security situation, especially in Afghanistan, affected the contractor's support in the operational area. The chain of command changed over time in the studied operations, which caused some minor problems. The four requirement areas relate to the complexity of PSOs and they explain why military operations need rather detailed strategies and plans to be successful.

7.4.1 *Adjustment to unique operations*

It is commonly argued that every operation is unique. It is of course a correct statement that every military operation is unique, but on the other hand it is a military operation, and the number of different types of military units is

limited⁵⁰. There is also a limited amount of different tasks that can be given to each type of military unit. So what is really unique in each military operation and what are the consequences of the uniqueness?

Based on the Swedish participation in PSOs, each operation tends to be unique in the following aspects (Försvarmakten, 2002):

- The area of operation varies from arctic climate with dry air and snow, to rainforest climate with heat and high humidity, to deserts with sandstorms and large changes in temperatures between day and night, at all continents (EU, 2004b).
- The type and number of personnel needed, which varies from single observers to operating units with different skills and from regular soldiers or sailors to specialists with civilian competence as e.g. doctors (Utrikesdepartementet, 2008a).
- The type and number of equipment needed, such as airplanes, ships, battle tanks, construction machinery and hospitals also vary.
- The length in time varies from a few days to several years (Försvarmakten, 2009a).

The combinations can in principle be endless, but in reality is it of course an inherent limitation. Military equipment is primarily developed and optimised for certain environment and certain tasks in certain military units. The equipment FM has is primarily specified for defence operations within Sweden. What primarily becomes different from Homeland defence in PSOs is that the operations have different purposes, and that they often are carried out in a different climate zone (EU, 2004b). The area of the operation is different for Swedish units, and the equipment is mainly used for different purposes. So when participation in a PSO is preliminary decided upon in international negotiations, the key issue for FM is to identify which type of military unit best suits the operational requirements, with the least adaptations.

The sustainability of the operation showed in the studied case to be dependent on the availability of personnel and main equipment. For small countries like Sweden the case showed that the sustainability could cause limitations, especially in naval operations, where ships often require larger overhauls after certain periods of operations, especially if they are developed for shallow water close to the homeland. But, also other functions, such as the mine clearance capacity could be limited by the number of soldiers trained on mine clearing equipment, for example.

The case showed that it is not the uniqueness of the operations as such that is interesting, instead it is the similarities between the operations that are interesting. The similarities identified in this case were that FM has certain

⁵⁰ A similar discussion has prevailed in humanitarian logistics, which has been questioned (Jahre, Navangul, Dieckhaus, Heigh, & Gomez-Tagle Leonard, 2011).

capabilities and capacities with limited sustainability. These are the resources the Swedish government can offer to participate in PSOs with. But, these capabilities will always need some adjustments to meet the requirements and the environmental conditions of the operation. The case shows that the supply chain needs to have the preparedness to adjust the units' equipment and other supplies for the operations and to deliver the required sustainability both before and during the on-going operations.

7.4.2 *Capability and capacity*

The second set of requirements, concerns capability and capacity to perform PSOs. Every nation has a limited number of different types of military units and capabilities and the sustainability of each capability are limited (Försvarsmakten, 2002). When it comes to the decision about participation in a specific PSO, the first question is if the military has the needed capabilities or units. If these units or capabilities exist, the second question is if they can be adjusted to the operational setting. The Swedish government has required FM to handle large variances (Försvarsdepartementet, 2009; Utrikesdepartementet, 2008a). During the studied period, FM's planning has not totally been in line with these expectations. FM expects the Government to reduce the number of different variations and requirements to create new units out of different capabilities, in the future. This study has shown that FM, with the support of their suppliers, has been able to handle these requirements, though. In the decision by the government concerning the participation a PSO, a number of how many military troops the FM is allowed to send is given. This number was previously internationally agreed upon on a force contribution conference. In the international negotiations personnel and equipment reductions are often done to keep the national costs. This often puts requirements on FM to create new units within a smaller personnel frame to perform the requested tasks. The effect of this situation has been twofold, according to several respondents, the units need to be made up of small building blocks to be able to adjust the size of the units, and some of the logistic tasks must be handled by civilian suppliers.

With small building blocks that can be reorganised into new units, FM can fulfil the operational requirements to an acceptable level. It has forced FM to consider third party logisticians and industry in the studied operations to solve tasks that they were not manned to handle. In the future when the FM will have moved over to the mission-oriented capability and capacity completely, the need to have assistance for certain tasks is expected to be higher and therefore is it realistic to believe that the civilian involvement in logistics on the operational level will increase. The studied case shows that with a high ambition to participate in PSOs, the equipment needs to be flexible for a small nation so it can be used in many different scenarios, to be affordable. FM and the supply chain need to have the ability to adjust the main equipment to specific

operational requirements. The units must also have access to alternative kits for different climate zones where they can be required to operate.

The case showed that the complexity of adapting the units to a given PSO, requires FM to have a stable, easy to understand, and time-effective process for adjusting units and deploying the units into operations, in order to meet the readiness requirements from the government. It also requires close working relations to a few especially important suppliers.

7.4.3 Security and safety

All military operations are in one way or another about violence, so are PSOs (Sjöstrand, 2007; von Clausewitz, 1832-34/1991). In PSOs, it is a quite possible condition for military to expect to be fired at. Other actors in the operational area can also expect to be affected by the violence, especially organisations that support military forces in PSOs (Singer, 2008). Security problems can on some occasions hinder civilians to enter the operational area due to the safety risks being so high that it is not possible to insure employees and civil transportations (Barge Jr, Davis, & Schwent Jr, 2003; Trim, 2003). After the end of The Cold War, civil contractors have become much more involved in activities in the operational area (Singer, 2008). The results have been that the forces tend to spend more and more resources on giving protection to civilians and less and less time to their tasks (Peltz, Robbins, et al., 2005). Contractor casualties have also given negative publicity to the forces for using unprotected civilians in military operations. In FM this has resulted in intense internal discussions on where to allow civilian participation, according to several respondents. The debate was especially intense when it came to the discussion about the support of the forces in PSOs and the fact that the civilians not only danger themselves but also the military units both directly and indirectly. In a direct way there is a higher level of uncertainty with many civilians who do not know how to follow military rules and thereby endanger military lives. In an indirect way, civil casualty or transportation losses can cause degrading in materiel availability, with reduced operational capability and capacity as a consequence. This debate has resulted in the suggestion that the last-mile should be handled by military. The last mile tries to describe the area where civilian involvement has a negative effect on the military operation. In practical terms this means that FM advises the suppliers to only give support in certain areas and to the operational level, but not to the tactical level. Several respondents mentioned that the security issues were an important part of the planning for the logistics in PSOs. If civil contractors are used to give support in the operational area, where and how they can give support need to be clarified both out of humanitarian reasons and international agreements in for example the Geneva conventions (Försvarsdepartementet, 1996a).

Another perspective of the security is the risks involved when civilian organisations are giving humanitarian aid to the suffering population. The

baseline for military in PSOs is to provide security. Almost all PSOs are in areas which can be classified as having complex emergencies; both a military operation and a humanitarian relief operation are going on parallelly (Van Wassenhove, 2006). In areas with complex emergencies, not all aid workers in the relief operations can expect to be able to do their jobs under peace-like circumstances. When there are security problems, military units in PSOs play an important role as guarantor for safety (Boutros-Ghali, 1992). If the security situation is so hazardous that the civilian organisation cannot give the needed assistance to the suffering people, the military unit should be prepared to give the assistance with their logistic resources. These activities should be managed from a civilian authority, though (UN, 2008a). The Swedish force in Afghanistan have been giving aid in this way, where a civil authority have given guidance for the relief tasks.

7.4.4 Command and control

There are both organisational aspects and process aspects of command and control of PSOs. The studied case showed that command and control concerning logistics for PSOs changed during the phases. During the capability creation phase the production side in the HQ was commanding authority. Other actors in the HQ supported the commanding organisation with activities both for the on-going phase and activities that would shorten the lead-time in the next phase. In all phases FMLOG and FMV supported the HQ with their functional responsibilities.

Moving to the political negotiation phase, the command was managed in the HQ by the responsible for contact and cooperation with MoD. When the decision about a specific operation was taken by the government the command moved to the operational side in the HQ. When the unit arrived in the operational area the command of the unit was handed over to the framework organisation's command. The NSE stayed under Swedish command, but with delegated authority for local decisions in several areas. In the studied operations one exception in the command structure appeared, the LogCell⁵¹ was a part of the unit and there by ended up under the international command. In the aftermath of that operation, when the logistics was evaluated, this solution showed to have several problems. Due to lack of understanding of national needs or requirements, the international commander can prioritise other tasks if he is in command of the NSE. This can create a negative spirit in the operating unit if they do not get the support they are used to. It can also cause national legal problems, as national requirements exist in several areas. It can also create

⁵¹ The LogCell was in practise the same as the NSE for the other operations (see also paragraph 5.5).

bilateral problem between the sending nation and the host nation since many agreements are made on this level.

What was identified in the studied case was that the command over the logistics in the operation changed during phases, between different organisations within the HQ. That is not surprising, but it needs a common logistic strategy and suitable processes that support the handover of the leadership to minimise risks and problems. It was argued that this could be replaced with personal relations in a small military staff where everyone knows each other, to a certain degree, as in the Swedish HQ.

In the operations studied the control function was limited. There were probably many reasons to this. To begin with, everyone working with logistics in PSOs was so focused on solving the needs, they had very little time left over to think about other issues, such as control functions. Secondly, the knowledge about what to monitor is limited both in practise and in the literature. Without strategies and plans it is difficult to know what to follow up (Davidson, 2006; Parapob, et al., 2009). The focus in this area has been on the capability creation phase, where efficiency can be measured, and where the production is relatively stable. Another reason for the limited amount of control was related to the lack of directives about what to focus on. A logistic strategy or plan for an operation can support these needs.

7.5 Logistics key decisions in peace support operations

Many would probably argue that defence forces in general have a long-term logistic planning that is rather detailed in its structure. This was also the situation in FM during the Cold War era. After the Swedish Defence Decision in 1996 (Försvarsdepartementet, 1996b), this stable process slowly degenerated when the ambition to build a new type of defence started to take place. In the beginning of the twenty-first century, FM logistic planning contained few elements and that had a short time horizon. With this situation at hand, FM began a process to restructure the logistic planning and strategies. One of the first main efforts was to produce a logistics doctrine, *Grundsyn Logistik* which came out in a first draft version 2003 (Försvarsmakten, 2007a). The Logistics Doctrine has been followed by other strategy documents in the logistic area, of which the most important is the *Strategy for FM Sourcing of Defence Materiel* (Försvarsmakten, 2007b). To supplement the top documents, directives and guidelines have been given to manage the logistics in PSOs. To support the management development of logistics in PSOs, this study analyses four logistic aspects; the basic supply decision, the stock pile decision, the balance decision between lean and agile approaches, and the sourcing decisions, which have been identified as key decisions for military logistics strategies in the literature

(Lyon, 2006; Mathaisel, 2008; Peltz, Halliday, et al., 2005; Sarin, 2000; Tatham, 2009; Taylor & Tatham, 2008; Tuttle Jr., 2005).

The first three logistics key decisions are discussed in detail below (7.5.1-7.5.3), while the fourth key decision is discussed in the next chapter. Many of these aspects do not only relate to the key decisions, they also point to the need of a coherent strategy for logistics in PSO. It also becomes apparent that the decisions change between different phases in PSOs. The dynamics of the decisions are discussed in chapter 9.

7.5.1 The basic supply decision

Researchers have discussed that military logistics has three basic supply alternatives; bring resources, obtain resources in the area, or get resources from outside (Foxton, 1994; Kress, 2002; Van Crevald, 1977). All three alternatives were used to different degrees in the studied operations. Important is thereby to discuss what constitutes the choices between the different alternatives.

The first choice, bring resources have always been used in military operations, for scarce resources and to start up an operation (Lynn, 1993; Van Crevald, 1977). The scaling on what and how much to bring depends on the operational requirements and logistic capabilities. Sometimes, the operations can be so short in time that the operating unit can bring all resources it needs. Either the unit comes in to perform a single task within the frame of a larger operation or it can be an operational end date with a rather detailed task description. It cannot be an end state or objective for the operation due to the fact that the unit has to leave before it runs out of resources, similar to the Warsaw-pact logistic solution, where a new unit took over when the first ran out of resources (Foxton, 1994). In PSOs, this type of logistic choice can be used for a unit that has the task to open up a certain area for the deployment of a PSO. Normally PSOs last for longer periods, the studied operations have lasted/lasted for several years. Military units will always bring certain amounts of supplies, to survive and to be able to perform a number of tasks. But, as they intend to operate longer than the inherent supplies will cover, they must get new supplies, which leads to the second and third choice.

The second choice, obtain locally has historically been the normal solution in military operations (Lynn, 1993; Van Crevald, 1977). It was not possible to transport the needed fodder and food for the horses and soldiers long distances on land before the industrialisation. The ability to transport has of course increased with the new means of transportation due to the mechanisation of the armed forces. Modern transport capacities render it possible to bring in all needed products from outside of the operational area. But, in the studied case the local sourcing was the preferred solution for sustaining PSOs. The reasons for a modern armed force to source locally have not been discussed coherently from a military perspective. Dispersed arguments for and against local sourcing can be found in the literature. Support of the population, reduction of logistic

footprint, and cost reduction can be found as positive arguments, while different kinds of supply risks dominate among the negative factors (GAO, 1991; Kaldor, 2003b; Peltz, Halliday, et al., 2005; Tuttle Jr., 2005). In the studied case, the arguments for local sourcing were: shorter lead-times, increased flexibility, redundancy, and support of local businesses.

Not all products were possible to source locally in the Swedish PSOs. If the war/conflict had been going on for a long time, the markets and the civil society had been torn apart by the war, for example in Liberia where only limited amounts of supplies were available. The quality of many products was questionable since it was not possible to trace them to the producer, which made the supplies unsuitable for the Swedish units. In PSOs both the quality and availability can be expected to increase on the local markets when the situation calms down. The provision of security and support of local business life increased the availability of supplies on the local market. The supply chain became visible and quality could be traced for a number of different supplies. This change was possible to follow in the Liberia operation. In a historical perspective, local sourcing has been limited by what can be produced locally (Van Crevald, 1977), not what could be supplied by retailers locally. In the modern globalized world the local production is a too narrow perspective. The international supply chains play an important role also for sourcing in war torn countries in the Third World (Oetzel, et al., 2009). A typical example is air conditioning equipment, which was easier to obtain in Liberia than to get from Sweden. Going back to the historical example the consequences were that an army could not stay in an area if the local suppliers ran out of goods, and that happened within a certain time period (Lynn, 1993). A similar problem exists for modern forces operating in war torn developing countries. Local suppliers can in the early phases of a PSO only supply limited amounts of goods. The situation in Liberia when the Swedish unit arrived was a sourcing situation where there was more or less lack of everything. But also having suppliers with their own supplier network as the ship chandlery in the Atalanta operation showed that a little bit more mature retailer organisation is able to handle difficult requests.

The choice to source locally is supported by many arguments. The most important is considered to be shorter lead-times and minimised costs for transportation. A possible contribution to a lasting peace through support of the local business life will probably increase in importance in the future. The top management of FM had the opinion that local sourcing was the first choice after deployment of a Swedish unit.

The third choice is to get supplies from outside. In modern wars the possibilities of getting supplies from outside always exist. (Tuttle Jr., 2005). In PSOs this is also normally the case even if delays due to political discussions can occur, which happened the Swedish PSOs. Henderson (2006, 2008) presents the concept of battle rhythm and argues that the deliveries of supplies need to follow this rhythm. Henderson's thoughts can be criticised to be out

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dated and belong to the Cold War operational planning. He discusses large scale operations with stable and frequent deliveries from the Home base. The idea about battle rhythm builds on a relatively static timetable oriented logistic supply structure. The case indicates that small nations' PSOs have a more flexible supply chain. When studying the Swedish operations, the deliveries of supplies to the operational area were much more flexible, both in terms where they came from and the frequency of the deliveries, compared with Henderson's concept. From an availability or quality perspective, locally obtained resources can be complemented by getting supplies from outside. Except for the deployment and home transportation, a small nation's force contribution in PSO (not more than about 1000 soldiers) normally requires only limited transportation capacity. The large supply volumes consist of food, water and fuel. All of these supplies are preferably sourced locally. If these resources are not available locally, they can cause a transportation problem and create limitations to the operational capability⁵². When getting supplies from the outside two problems were identified by the NSE, firstly the HQ in Sweden had to get convinced that the product was needed and secondly it had to pass the customs handling into the operational area. With good preparation these problems could be reduced, but they remained to a certain degree in all the operations studied.

In the Swedish PSOs the decisions on how to source the needs of the operation depended on two main aspects:

The supplying had three factors to consider:

- The consumption of the operating unit.
- In the Swedish operations more than one product had a to-be-used-before-date, which did put requirements on the supply chain.
- Technical and/or quality aspects of the needed supplies.

The choice to obtain locally or to get from outside depended on two issues:

- Was there any operational reason not to source locally?
- Could the local market supply what was needed?

Sourcing of the Swedish PSOs is done in following sequence: The first choice will always be used in PSOs. The operating unit, including the NSE, will always bring resources for a certain number of days to start up the operation. If or when the NSE needs new supplies to support the operating unit, local sourcing will always be the first choice. If the needed supplies of the required quality for

⁵² If a soldier consumes 2 kilos of food and 50 litres (~50 kilos) of water daily and the unit uses 30 m³ (~30 tonnes) of fuel/day, the unit's (1000 soldiers) consumption/day is about 82 tonnes. As a reference the military cargo airplane C-17 carries just over 70 tonnes.

some reason is not available at the local market or the political situation hinders local sourcing the supplies are brought in from outside.

Also in regular large scale military operation (Kress, 2002; Tuttle Jr., 2005) the importance of local sourcing has increased.

7.5.2 The stockpile decision

The just-in-case principle was developed after WWII and built on stockpiling of supplies (Howard, 2001; Peppers Jr., 1988). Up to WWII military capability had been a tool for politicians to use to gain certain goals, often with offensive intentions (Herberg-Rothe, 2007). After WWII most European countries turned away from this position and looked into how to prevent a third world war and what was needed if the catastrophe happened anyway. Stockpiling was used to make it clear to the enemy that it would be too costly to attack and to have the resources to defend the nation if it was attacked. Stockpiling was used in the arms race in The Cold War, where for example special stewardship programs were used to maintain the nuclear capability (Levine, 2006). The basic idea was that it would be possible to win a war without firing a single round but instead to force the enemy to give up due to an economic collapse (this was the case with the intention of the arms race with the Reagan Administration, but it is questioned if this was an important reason for the collapse of the Soviet Union). After the end of the cold war almost no nation could argue internally for this costly solution (Wither, 2005).

The concept of stockpiling was also integrated into the logistic thinking in The Cold War's large forces. In many national forces, each organisational level had relatively large resources stored and additional stocks were spread out in the expected operational area to support planned operations (Henderson, 2006).

After the experiences in the First Gulf War, the US decided to change their logistics operation from stockpile to flow (GAO, 1991; Kallock & Williams, 2004; Peltz, Halliday, et al., 2005). This concept combined asset visibility through ERP⁵³-systems and RDIF⁵⁴, and the ability to redirect the flow of certain supplies to users with greater needs. Other countries have followed this path to reduce the stockpiling, when the national doctrines have changed towards smaller and more flexible forces. This trend was visible in FM and similar trends in other European countries were also indicated in the interviews.

Stockpile or flow has large similarities with postponement and speculation (Boone, et al., 2007; Dorn, et al., 2009; Pagh & Cooper, 1998) and relates to the push or pulls principles (Skjøtt-Larsen, et al., 2007). Small nations have a great benefit of using the supply chain perspective in postponement and speculation for PSOs. During the capability creation phase, postponement will create

⁵³ ERP - Enterprise resource planning

⁵⁴ RDIF - Radio-frequency identification

flexibility to adjust the technical systems to the unique requirements of a specific operation. But that requires balanced and planned speculation in the capability creation phase to create a basic capability with the needed built-in flexibility. During the Resource Allocation Phase FM upgraded and changed the equipment to suit the specific requirements for the specific operation. The advantages of these late changes were obvious. The needed subsystems or upgradings were optimised for the planned operation. The needed technology level was reached. No sunk costs appeared for old subsystems that had to be scrapped. The updating of the equipment was done in a partnership manner without any problematic time delaying discussions on cost issues. During the time the studied operations were going on the deliveries from outside (Sweden or a regional hub) had a limited frequency. This situation required some speculation on the operational level on how to meet the requirements. With the speculations at the NSE at the operational level all flows in the system were possible to do with a pull principle. Only requested goods and services were delivered downstream. The case showed many reasons for using the concepts of postponement and speculation. Speculation must be done to a certain degree to create a basic capability. Postponement creates capability to meet operational needs and to minimise costs for replacing subsystems with fast changing technology. When studying the case data it was identified that that FM did not talk in terms of postponement or speculation, but had an apparent ambition to reduce stockpiling and postpone deliveries of supplies until they were needed.

7.5.3 *The balance decision between lean and agile approaches*

The balance decision is about finding a suitable balance between lean and agile and/or efficient and effective approaches. Tatham (2005) argues that military forces need to be lean in peace and agile in war. This statement can be rephrased to be valid for PSOs. Military forces need to be lean during the capability creation and liquidation phases and agile during all other phases. This perspective can however be questioned. Later approaches to lean thinking mean that lean thinking also can be applied to military operations (Hines, et al., 2004; Tatham & Worrell, 2010). Lean processes in the production industries have a strong focus on minimising waste and to create value to the end customer (Goldsby, et al., 2006; Jones, et al., 1997; Womack, et al., 1990). Lean in the defence has partially a different perspective; minimising waste still is important but the focus is to be efficient with the taxpayers' money instead of creating value to the end customer (Mathaisel, 2008; Tatham & Worrell, 2010). Being efficient with the taxpayers' money is one of the pillars in the FM logistics doctrine (Försvarsmakten, 2007a). FM had not worked with the lean concepts during the studied period, but had anyway succeeded to achieve several activities which were in line with lean thinking. New subsystems were introduced during the resource allocation phase in all the studied operations. The units got suitable technical solutions for the unique operations. The major

parts of this work had a lean approach. But FM also made serious mistakes that meant destroyed materiel and sunk costs. In the Liberia operation many mistakes were made during the resource allocation and deployment phases. The unit brought more than they needed when they deployed and much of these resources got destroyed. The studied case complements earlier scarce studies on lean in defence, and support the perspective that lean approaches reduce costs in the military supply chains.

An agile supply chain has an inherent flexibility to meet changes in the requirement from the end customer (Christopher, 2000; Christopher & Towill, 2001). The foundation for agile thinking is where in the supply chain the production or logistics need to be delayed until the product is requested by the end customer (Towill & Christopher, 2002). Agile in military terms is similar to the business term. The productions or logistics after the decoupling points are delayed until the needs for a specific PSO are identified or requested. In the studied case, the most apparent example of a lean approach was the late changes to the main equipment where the procurement of some subsystems was delayed until the needs were clarified.

The needs in the PSOs varied to a high degree between the different operations and FM needed to get specific supplies and support for each operation. Agility in the supply chains is the flexibility small nations are looking for, in order to be able to adapt to different operational requirements. During on-going PSOs, logistic delays dominated in the supply chain. For a PSO, FM mostly ordered relatively small amounts of the suppliers' total production volumes. This made it easier for the supply chain to meet the requirements of a PSO. The core in military agile thinking is to have processes that are effective with the taxpayers' money. This means to have the focus on what is needed in the short-term perspective, that is the on-going operations. It also means that changes in the operations should be anticipated and the logistic planning needs to be based on redundancies and flexibility.

Many have argued that it is possible to combine lean and agile concepts in business (Hines, et al., 2004; Stratton & Warburton, 2003). This can be argued to be especially important in the military environment where the production changes from capability building to participation in operations. The production differs much between phases in PSOs. The case showed that by using lean and agile approaches to all phases in PSO logistics, FM could improve in terms of both effectiveness and efficiency. The case showed many examples where FM made mistakes which created both waste and delays. Lean and agile concepts were not applied in FM in order to become more efficient and effective in PSOs. But the case also showed that a balanced decision-making around these concepts would be important for an efficient and effective use of the taxpayers' money, and at the same time create an ability to meet the requirements of PSOs to a greater extent.

7.6 Summary

Logistics has by many been discussed as the practice of the many details. To summarise this chapter, a holistic approach has been taken, trying to avoid all the details and instead discuss the patterns for logistics in PSOs. With the support of the theoretical framework and the case, three levels of theoretical areas were identified; macro structures for the organisation of logistics in PSOs, objectives and requirement on the logistic planning for PSOs, and strategic or key decisions made for logistics in PSOs. Within each area a number of constructs were identified, both in the literature and through the studied case, as vital for PSOs.

Two macro structures were identified; the logistic PSO phase-cycle and the logistic tiers in PSOs. The logistic PSO phase-cycle is suggested to be divided into six phases: Capability creation phase, Negotiation phase, Resource allocation phase, Deployment phase, Operation phase and Liquidation phase (figure 7.1). The logistic tiers in PSOs are three; the tactical level, the operational level, and the home base level (figure 7.2). These three levels are separated by actors, requirements and activities.

The general long-term objective for logistics in PSOs has been identified as: logistics shall contribute to the creation of a lasting peace. The short-term objective in PSOs has been identified as: support the on-going task and to facilitate the future tasks. Both these objectives have implications on the sourcing key decisions. The requirements on logistics in PSOs can be divided into four areas; adjustment to unique operations, capability and capacity, security and safety, and command and control. The specific requirements relates to the complexity of PSOs. To a certain degree every operation is unique. Small nations have capability and capacity limitations that affect the planning and conduct of operations. Security and safety issues become more important with higher involvement by civilian contractors in the operational area. Command changes over time and if not handed carefully national interests might get lost for small nations' force contributions. Control has shown to be low priority, but in the future it is believed to gain importance.

In the end of the chapter three of the four logistic key decisions are discussed and analysed; the basic supply decision, the stockpile decision, and the balance decision between lean and agile approaches. The fourth decision, sourcing, is discussed in the next chapter. In chapter 9 the logistic key decisions are brought together to discuss how they change during PSOs and their importance for logistic planning.

8. Analysing the sourcing key decisions in peace support operations

This is the second of three analysis chapters. In previous chapter the logistics in PSO is discussed and analysed. In this chapter the analysis continue with the sourcing decisions and the relations in the upstream parts of FM supply chain. In the next chapter the logistic key decisions are brought together to discuss how they change during PSOs. In the same chapter are also the links between the sourcing decisions and the logistic outcome discussed.

The military supply chains is the frame on which the sourcing key decisions are made. This chapter starts therefore with a discussion on the vital aspects of the military supply chain (8.1). In the first chapter sourcing is defined as a part of military logistics and in the second chapter sourcing decisions were identified as one of the logistic key decisions. In the same chapters the key decisions were identified as four; the make or buy decision, the market decision, the channel decision, type of relationship with the suppliers. In this chapter is these four analysed one by one in order to understand what parameters are important for the sourcing decisions in PSOs (8.2-8.4). Finally is the chapter summarised in paragraph 8.6.

8.1 The military supply chain

The logistic tier structure presented in the previous chapter and the military supply chain is closely related. While the tier builds on military aspects as military threats, management and planning on different levels, military supply chain builds mainly on the flow of supplies. The tier structure plays an important role for the planning of the flow in the supply chains, and answers questions like; who is contracting who, and to where in the supply chain should the contracted supplier deliver.

Military supply chains in PSOs have properties which are different compared to most business supply chains (Johnsen, et al., 2009; Markowski, et al., 2010). These properties give a baseline for the following discussion on sourcing key decisions (Eccles, 1959; Johnsen, et al., 2009; Markowski, et al., 2010):

8 Analysing the Sourcing Key Decisions in Peace Support Operations

- Large number of different types, variation in life length and complexity of the supplies.
- The unpredictability and instability of the demands in PSOs.
- Customs handling and transportations of military are often especially complicated
- The ethical aspects of suppliers and customers.
- Risk that hostile actions affect the supply chain.

All these five parameters have also been discussed in the case as aspects that need special attention. No ranking of importance has been done in the study, but anyway the data indicates that the large number of different supplies plays the most important role. Due to the fact that FM in PSOs use many different types of supplies, the supply chain becomes complex with many actors already in the first and second tier. It was indicated in the study that FM have become more dependent on suppliers compared with the situation for twenty years ago. In other words the supply chain structure and supplier relations have increased in importance since the end of the Cold War. There is also a tendency that even though the volume in the defence area is reduced, the number of suppliers increases, due to the situation that larger parts of the defence procurement are done through competitive bidding. Important for the military supply chain structure are the supplied products.

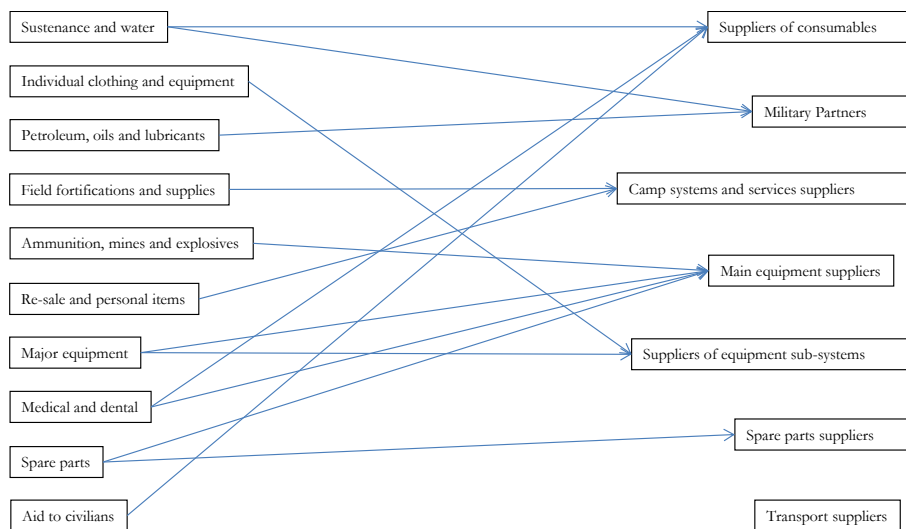


Figure 8.1 The relation between product groups and supplier groups

The products needed for military operations can be divided into different groups. The most commonly used classification, is the US classification system (Foxton, 1994). This system has mainly been used to support transportation and usage calculations in logistics operations. The structure showed to be useable for the understanding of the supplier network for FM PSO. None of the product groups had a 100% fit to one supplier group, but most products within one product group was sourced from suppliers within one supplier group (Figure 8,1). The only supplier group that did stand out was the logistics suppliers. The suppliers within this group did supply services that related to all ten product groups.

When arranging the FM suppliers into groups also other parameters became important. The first parameter, defining a supplier group - was 'military partners'. Other nations and organisations which FM was to cooperate with during the operation and other military partners were operating in the area (e.g. US in the Gulf of Aden) shaped one supplier group. This group could formally cooperate concerning supplies in any product group, even if some groups dominated in this study. These supplier relations have also a special clause in the LOU, excluding this group from the normal procurement procedures. The second parameter, defining other supplier groups is linked to FM use of different organisational entities to procure different products. Both processes and interpretation of LOU in these procurement organisations, will affect how the suppliers are grouped. The third parameter is linked to the market situation. In some areas the both the supplier side and customer side have few actors, while other have many actors on each side. The actual supplier situation for FM showed in practise to be as presented by Markowski et al. (2010). The situation with a bilateral monopoly is typical for the FM relation with the main equipment suppliers. Suppliers of main equipment are relatively large industries, with unique products and capabilities. The numbers of actors are few both on customer and supplier side, and for a specific product often only one supplier exists. Suppliers of subsystems, who interact directly with FM, are often small firms with products that often in some important aspects differ from other suppliers' products. These relations can be categorised as monopolistic competition (Markowski, et al., 2010). Customers for these products often exist both on the civil and military area. To a certain degree are the markets competitive, but the suppliers do not primarily compete with price but mainly with technology and services. In the remaining areas rather many actors exist on both supplier and customer side, price competition has seemed to be important when studying the FM suppliers, so the situation can be classified as atomistic completion (Markowski, et al., 2010).

In chapter three, in figure 3.2 a theoretical description of supply chain for PSOs is presented. Figure 8.2 shows an adoption of that presentation and a generalisation of FM supply chain for PSO to a small nation's supply chain for PSOs. Upstream the supply chain is no different from any other supply chain. The first unique actor is the focal supplier. In the studied case FMLOG was the

focal supplier. The reason to have a focal supplier were two; firstly, the unpredictability and instability of the demands in PSOs secondly the customs handling and transportations of military are often especially complicated. FMLOG had the capability to store supplies to handle the fluctuations in demand. Through JSS and MOVCON (Movement Control) FMLOG managed the transportation and the formal handling of necessary customs documents.

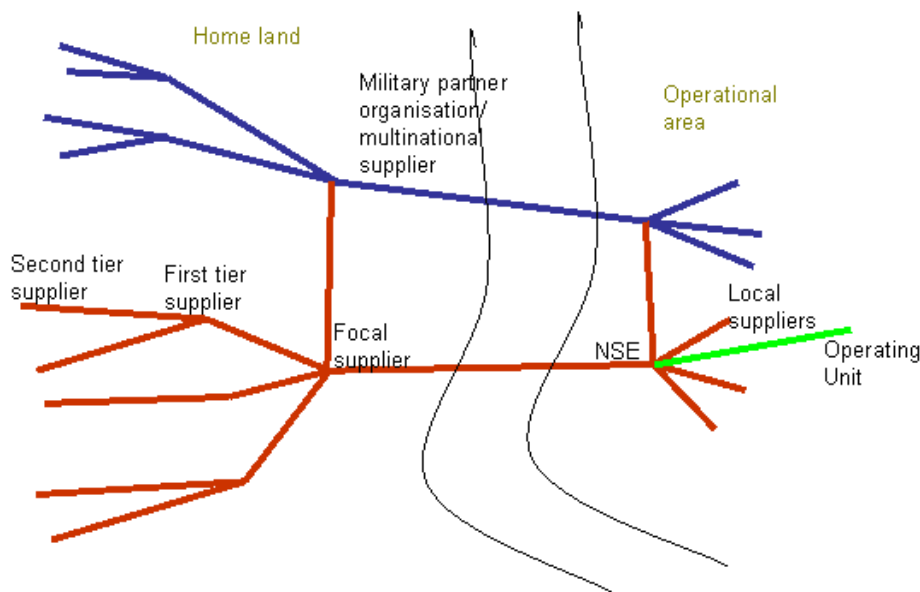


Figure 8.2 A small nation's military supply chain for PSOs

The focal supplier is the own organisation outside the operational area. Normally positioned in the home land but it can also have facilities outside the homeland closer to the operational area, for example had FMLOG an office in Abu Dhabi for the Afghanistan operation. Military partners or multinational suppliers can deliver to the focal supplier or sometimes directly to the NSE. The critical aspect of all deliveries into an operational area was customs handling. The focal supplier has direct contact with several tiers depending on the procurement activities, for example spare parts are often procured directly from the producer no matter where in the supply chain the firm is positioned. So neither the physical flow nor the formal contacts follow always the tier structure. FM has in the operations studied been having direct contact both with first and second tier suppliers, where subsystems have been procured directly by FM and the first tier has gotten the order to integrate these systems. For the focal supplier or the NSE was a military partner no different from other supplier relations in the supply chain (with a possible exception for the

contract handling). The flow between the operation unit and the NSE have in the studied operations normally been handled by own resources (the green line). In the naval operations some of the deliveries will always go direct from the ship chandlery to the ships when they are in the harbours.

The structure of the supply chain and its properties is the basic framework for the sourcing key decisions that will be discussed below.

8.2 Make or buy in peace support operations

Military organisations as any other organisation have to decide upon the sourcing issue make or buy. Most products needed to create the means for hostile military operations were bought or obtained by force in the operational area (Van Crevald, 1977). In a historical perspective, the most soldiers were relieved from duty, while officers and specialists trained new soldiers/sailors and maintained the equipment, during peace time. During The Cold War, own production facilities became an important integrated part of the armed forces (Mathaisel, 2008). After the end of The Cold War a shift towards outsourcing of the own production to the industry have been a dominant trend among western armed forces (Ferris & Keithly, 2001; Singer, 2008). Thereby several armed forces, in modern warfare or in PSOs, rely to a large degree on external suppliers (Peltz, Halliday, et al., 2005).

The make or buy decision is based on the value adding in the supply chain (Cousins, et al., 2008). In business supply chain management is make or buy often discussed in terms of core competence or critical success factors (King, 2001; Prahalad & Hamel, 1990; van Weele, 2005). Another important factor are in the area of standardised products, where quality price, delivery capability or cost reduction capability have an important role (Talluri & Narasimhan, 2005). In the defence area, also other factors become essential for the decision making. Entry and exit barriers might force the military to have own production capability in certain areas (Markowski, et al., 2010). Other aspects that can be crucial for the end customer are responsiveness and security of supply (Mathaisel, 2008; Tatham, 2005, 2009). In FM, the case showed that the decision makers often discussed make or buy in terms of cost minimisation especially during the Capability creation and the liquidation phases. Most authors discussing make or buy in the defence area point at the need to have stable situation for external suppliers to be cost efficient (e.g. Markowski, et al., 2010). But, as discussed above when supporting PSOs, the consumption of supplies is difficult to predict and varies much over time.

In the phases where efficiency requirements dominate, that is in the capability creation phase and the liquidation phase, cost issues has a strong focus. In these phases FM showed a long term ambition to try different types

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of contract and supplier relations to find efficiency grounds for the decision making on make or buy issue. E.g. public private partnership was used in a number of areas to improve efficiency. Several of these contracts aim also to reduce the entry barriers into the defence area and thereby open up for new suppliers.

During the remaining phases, effectiveness has a higher focus, the decision makers try to make the best use of own resources. Critical success factors showed to be important for the decision making in the operations studied.

During the preparation of the studied PSOs, FM had no internal discussion on make or buy. The situation practically solved it selves with the joint goal in the supply chain to get ready in time for the deployment. The available resources were limited and the individual strengths were used to achieve the joint goal. The make or buy decision was based on the FM core competence and that this competence is developed with this production in mind.

When the units were deployed the decision making became more intentional. Only FM resources were used when activities on tactical level were conducted. Three arguments to this decision dominated; first, as a military unit within logistics you can in most situations handle the security issues with own resources and you have the right to do so. Second, being a military logistics unit, the risk to hinder the operations on the tactical level is reduced since the activities are integrated in the military plans. Third military personnel have a special position in the international agreements of war (Försvarsdepartementet, 1996a). External resources were only used in the rear logistics areas of the operations, in the studied case, in the camp or at the harbour, or delivering to the camp or to the harbour. External resources were contracted for certain functions in the operations. These could be both of a very complex nature or basic support. In the operations studied all personnel in the NSE:s were FM employees. In the future this was expected to change and some of the personnel will come from suppliers. These supplier positions need to be only in the rear logistic area, in the studied case the logistics personnel had work rotation between the combat logistic area (unit level) and the rear logistic area (operational level). In contacts where FM need to represent some authority (Swedish government or the framework organisation for the operation), this has to be handled by own personnel.

Interesting to note is the change of reason to the “make or buy” decision over the phases of the operation, from a cost focus to a focus on critical success factors and back again to the cost focus in the last phase. These changes seem to make the make or buy decisions in military PSO different from the decisions in business supply chains.

8.3 Markets in peace support operations

In chapter 3 it was discussed that three different markets can come in question for the sourcing of PSO, the domestic, the global and the local. To support the analysis a three step model was suggested.

The first step concerns the use of the domestic market. On a domestic level in a small nation, most military products exist on a monopoly market with one supplier and one buyer, and both are often viewed as a parts of the national defence system (Markowski, et al., 2010). For this reason the domestic sourcing decisions begin with the decision if any suppliers are a part of the national defence system. Proximity is another aspect that can be of high importance for the choice of the domestic market. Proximity relate positively to transportation and support (Kalfakakou & Tsouros, 2001; Klier, 2005). For products with high uncertainty in demand, proximity to upstream suppliers has a positive effect (Håkansson & Wootz, 1975). In the studied case the domestic market was chosen in the sourcing decisions, when the aspect of support had a crucial importance. A typical example on this is the proximity between the naval base and the shipyard in Karlskrona. First of all it makes the naval support easier, and second it create flexibility, which by several was argued to be a prerequisite to get the ships ready in time for the Atalanta operation. Many arguments exist for using the domestic market, as innovativeness and productivity, usability or buyer supplier relations (Gertler, 1993; Molina-Morales & Martinez-Fernaández, 2003; Steinle & Schiele, 2008). These aspects seemed though to only play a limited role for FM sourcing with the exception for the supplier relations. For FM to be able to only turn to the domestic market, special arguments are required by LOU, three perspectives have been relevant in the sourcing studied, security reasons, the need to get a rapid delivery, requirements on proximity related to maintenance or other types of support.

The second choice relates to the use of the global market. In business the use of the global market is an internationalisation process with the aim to increase involvement across the national borders (Welch & Luostarinen, 1988). The Uppsala-model suggests an incremental growth of the customer or supplier relations (Johanson & Vahlne, 1977, 1990, 2009). Also, with the purchasing perspective the knowledge accumulation and processes can be expected to work in a similar way as in marketing for which the Uppsala-model was developed (Matthyssens, et al., 2003; Meyer & Gelbuda, 2006). For FM LOU puts some limitations on which they can turn to. The study showed that where active contacts had been taken by FM, it was to a large degree with firms in Western Europe where the procurers had earlier experience of the firm or at least other suppliers in the same region. It is also reasonable to believe that many possible suppliers choose not to enter the bidding process due to the factors in the Uppsala model. Otherwise, one could expect to see a larger mixture of suppliers within EU and some from other parts of the world. In the study were most suppliers domestic or from nations geographically close to

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Sweden. The critique that the Uppsala model is slow in the process (Autio, et al., 2000; McDougall, et al., 1994; Oesterle, 1997), seems not to be relevant for the defence area. Instead FM internationalisation seems to be slow process where suppliers are evaluated from a security building perspective as well as strict commercial aspects. Agndahl (2006) argued that the decision to source internationally depended on three forces, need, opportunity or external pressure. Public procurement in the defence area looks very much this way with the law as the external pressure.

The third choice relates to the use of the local market in the area of the operation. As discussed in chapter 3, local sourcing can support the peace building (Skoglund & Hertz, 2011). The study has only confirmed that local sourcing creates relations (Lederach, 2005) and support the grassroots economy (Korac, 2006), which is believed to be important for the peace building process. The second factor of importance for local sourcing is the delivery lead-time, and especially the toll regulations for bringing goods into the area. In this sense the same factors that are relevant for the domestic market are also relevant for the local market, proximity relatively the end customer relate positively to transportation lead-time (Kalfakakou & Tsouros, 2001; Klier, 2005). The third factor relates to hostile actions. It is well known in military planning that reduction of the enemy's logistics capacity reduces his operational capability (Ohlson, 2008). In the operations studied some minor difficulties appeared with the customs clearance. No hostile activities affected the operations studied in a way that local sourcing was needed, but other nations used local sourcing to certain degree to reduce the effects of hostile action (Flens, Rietjens, de Leeuw, & van Amstel, 2008).

In the operations studied all three markets were used and the strategy decisions followed the pattern discussed above. Besides the formal documents, the top management in FM stated that local sourcing should be used when possible during on-going operations. To some degree these documents are in line with the suggested decision model in chapter three. For the decision making concerning domestic or global sourcing the study did only give limited indications that the steps in the model was used. Instead of doing considerations which supported the national defence or a good business deal, the focus was to meet the requirements in the law of public procurement. This was especially apparent for the early phases of the operations. Generally FM did use the international market without any considerations about national requirements, supplier proximity or competitiveness. This can partially be explained by that the government has signalled that the international market should be used for all new defence procurement (Försvarsdepartementet, 2009). When a PSO was deployed the third step in the model was used. How much of the sourcing that came from the local market was thought to a large degree dependent on the knowledge among the logistics officers in the operations. For PSO the decision to use or not to use the local market is probably the most important. The usage of the international market can under

certain circumstances improve the effectiveness in the supply chain through shorter and cheaper transport routes, and thereby possibilities to use higher frequency in the deliveries. This type of solution was used in the Afghanistan operation and has earlier been used in other Swedish operations. The decision concerning the first step in the model is probably of limited importance for PSO. This step has much higher relevance for the general strategies concerning a small nation's defence procurement.

8.4 Number of suppliers in peace support operations

In the business area many firms had a large supplier base (Womack, et al., 1990). The trend has been a reduction of the supplier base and the creation of supply chains (Hines, et al., 2004; Holmen, et al., 2007). Many firms establish single sourcing in important areas to achieve better quality, stronger and more durable relationships, higher commitment and effort, better communication, economies of scale, better cooperation on development and services (Skjøtt-Larsen, et al., 2007). Many firms decide though to use dual sourcing (e.g. Liker & Choi, 2004). Important reasons are both cost and risk reduction, especially from delayed deliveries (Anton & Yao, 1987; Kouvelis & Li, 2008). In the defence area for small nations exist often only one industry, but the industry is also dependent on one single customer, the national defence forces, which make the relation balanced in this perspective (Markowski, et al., 2010).

The studied case showed that a general tendency in FM is an extension of the supplier base, mainly due to the requirements in LOU, but for PSOs the decision is dependent on the phase, and the number of available suppliers. In general terms, FM needs a huge number of different products to enable homeland defence, international operations and assistance to the civil society. It exist a practical limitation in FM sourcing. Due to the high number of products needed FM can only handle a limited number of suppliers for each product type. Therefore FM actively searches for single or dual sourcing solutions (2-3 suppliers). The highest number of suppliers in PSO exists in the Capability creation phase. LOU put requirements on allowing "anyone" to send in a tender. In the end though many product areas have few suppliers which limits the number of suppliers that FM have business relations with. FM also takes active measures to reduce the number of suppliers in some product areas, by signing frame contracts. In these areas 2-5 suppliers get contracts that are valid for 1-3 years. Thereby FM keeps a competitive pressure on the suppliers to perform and keep down the prices.

During the preparation phases for a specific PSO, FM had a strategy to use single source suppliers, which also were reflected in most sourcing decisions. This speeded up the process and limited the number of products and suppliers

for the operation. Even if the decision was to use single sourcing, it was obvious that the many relations in this phase had a sole source character. Only one possible supplier existed. But this is not a huge problem since FM also was in most cases the most important customer for the supplier which is in line with Markowski et al. (2010) argumentation.

When the unit was deployed the local market was approached, which opened for the possibility to contract new suppliers. As discussed above the FM ambition was to use the local market as long as it had positive effect on the operational objectives. But, the ambition was to avoid becoming dependent on the suppliers in the local market as a “single source”. Suppliers on the local market should always be matched with suppliers from the outside if the supply was important for the unit. At the same time the other way around was also important, if supplies from outside was delayed of any reason local suppliers play an important role, respondents gave examples of earlier PSOs when this had happened. Based on the different arguments from the case on the need to have reliable deliveries during on-going operations and FM purchasing capacity, dual sourcing (2-3 suppliers) from the outside is believed to be optimal for most products. The number of suppliers used on the local market depend on the security situation, and the number of available suppliers, where positive effects on the are created by multiple sourcing (Skoglund & Hertz, 2011).

8.5 Supplier relations in peace support operations

This chapter started with a discussion concerning military supply chains and the supplies in the chains. Different supplies have different strategic importance for military operations and so also for PSOs. These differences affect the supplier relations. Due to the fact that there are many different suppliers in the supply chain, the supplies are of many different types and of different importance for the PSOs, the supplier relations will be handled differently. Many different ways to categorise the supplier relations exists in the literature, common categorisations are based on either products (Kraljic, 1983) or processes (Lakemond, 2001). The structure can be discussed in terms of first and second order as suggested in chapter 3. The first order aspects were; short term arm’s length relation, durable arm’s length relation, supplier dependent relation and partnership. The second order aspects were; power and dependence, trust and interdependence, and willingness. Product oriented categorisation as suggested by Kraljic (1983), have been criticised for ignoring much of the relational aspects of supply relations (Dubois & Pedersen, 2002). But because of the importance of the supplies in military operations this perspective also needs to be considered.

In private business relations it is suggested that a firm can have only a few strategic partners (C. J. Gelderman & van Weele, 2005). Another perspective is that a unique optimal solution exists for each firm (Choi & Krause, 2006). This later perspective seems to be more relevant for FM. Based on the study of FM there are reasons to argue that the number of strategic partners can be higher than five, even if the number also depend on how the term strategic partner is defined. Dependent on who was asked FM had from none or up to more than 30 partners. Both main equipment suppliers and subsystem suppliers have in their relation with FM shown attributes (trust, interdependency and willingness) that supports the definition of a partnership relation. On the other hand the LOU and its interpretation at FM and FMV pushes the relations towards competitive arm's length relationships (Lindskog, et al., 2010).

In the sourcing activities for the studied PSOs, the focus of the process was to be effective and in short-term to meet the operational needs. This leads to differentiation of the handling the supplies needed. What the markets looked like in the different supply areas played an important role too.

In many areas, FM have shown an ambition to create dormant relationships aft of the unique PSOs, by signing frame contracts that support effective handling during on-going PSOs. The legislation has also affected the relations. In the studied case, LOU limited the possibilities to fully utilise the benefits of partnership relations. The sensitivity among both customer and suppliers concerning the creation of competitive advantage or accusation of bribes is an important hinder in the relation building that is required to achieve full-blown partnerships (Alexandersson & Hultén, 2007).

8.5.1 First and second order relationship identifiers

It exist many different first order categories in the literature (Axelsson, et al., 2005; Bäckstrand, 2007; Dubois & Wynstra, 2005; Dyer, et al., 1998; Ford, et al., 2003; van Weele, 2005). Based on these suggestions and the situation in the defence area, four first order relation identifiers were identified in chapter three. Short-term arm's length relations are used to describe buyer supplier relations which only have short-term contract with only limited personal contacts. Durable arm's length relations describe relations where more than one supplier exists on the market. The supplier get contract renewal based on competitive grounds. Supplier dependent relation is used to describe situations where the customer only has one supplier to buy from and where the relation is adverse. The fourth type is partnership. The relation is long-term and builds on cooperation. Connected to the first order identifiers was a set of second order identifiers developed. These are discussed one at the time below, and thereafter these results are integrated into the first order constructs.

Power & dependence

Power and dependence is often seen as each other's opposite (Cox, 2004a; Emerson, 1962). French and Raven (1959) suggest discussing power in terms of reward power, coercive power, legitimate power, referent power and expert power. Evaluating the power and dependence situation has to be done with qualitative reasoning (Cox, et al., 2004). The power categories were sufficient to analyse the buyer supplier relations in the studied case.

LOU builds on the idea of competition on the perfect market (Engelbrekt, 2011). The defence procurement is in some areas in this way, but in many other areas it is a long way from the perfect competitive situation. Instead can it be a situation where it only exist one customer and one supplier for the product (Markowski, et al., 2010). Several of the FM main equipment has a life expectancy for 30-50 years, which requires supplier support. Use of power during the product deliveries from the customer side can cause the supplier to behave opportunistic for the post production period (Cox, 2004a). The customer becomes dependent of the supplier in the post production service period. Many of the contracts are written by FM with a large deal of penalty clauses. These clauses indicate the use of power or threats to use power. In the discussions both with procurers and suppliers concerning main equipment and subsystems, they indicate that sometimes both sides act in a distrustful manner, and try use coercive power based on the contract clauses (Stannack, 1996). Power or dependence was not used in the specific operations studied. Both suppliers and FM did say that use of power sometimes existed in adverse relations during the capability creation phase.

Interdependence & Trust

Interdependence and trust is something that evolves in a long-term relationship (Håkansson & Snehota, 1989). Interdependence can be discussed in terms of, sequential, reciprocal and pooled (Dubois, et al., 2004; Thompson, 1967). Sequential interdependence exist when tasks which need to be done in a certain order of both parties in the relation. Reciprocal interdependence is when output of one becomes input for others. Pooled interdependence is about achieving economies of scale through joint utilization of resources. In the studied FM supplier relations for PSOs, pooled interdependencies dominate. But the interdependencies was not about creating economies of scale, instead the objective was to be effective and to use the joint resources to create the needed updating or support to the different kind of supplies needed in the PSOs. During the capability creation phase or the liquidation phase sequential or reciprocal interdependencies becomes dominating. These dependencies seem to be less important factors for the relations. In this study, trust was based on the perspective that no party exploited the others vulnerability (Dyer & Chu, 2000). Trust is similar to power in many ways, many different operationalisations exist and it requires qualitative analysis (Claro, et al., 2006;

Swan, et al., 1985; Young & Daniel, 2003). Swan et al. (1985) suggested dependability/reliability, honesty, competence, customer orientation, and friendliness. For the buyer supplier relations in FM PSOs dependability, honesty, competence and customer orientation played important roles. Another aspect seemed to be at least as important and that was the profit margin. Realistic profit margins were the baseline to develop trust in the relation from both supplier and buyer perspective. The dominating problem in the relations between FM and their suppliers is that it exists sometimes mistrust in the relations, especially in main equipment area. FM believe that the industry require too high profit. They also fear that the suppliers would try to sell the second best solution which creates higher profits in the case of fixed prices or that they use their own product, instead of a better product from a sub-contractor. This issue of distrust can be explained by market situation for defence materiel, where the actors are few (Markowski, et al., 2010). Young (2006) suggested that trust changes over time; in the studied case, this seemed to be typical for the phases in PSOs, where trust in most relations was very high during the resource allocation phase. A trustful strong relationship requires that the customer monitor and support the supplier's achievements (Liker & Choi, 2004; Mellewigt, et al., 2007). Only then will the suppliers be competitive, which is required for a lasting partnership. This seems to be one of the problems in the capability creation phase, The FM suppliers is only rarely interested in letting FM monitor their achievements from both a technological and commercial perspective. It was also an internal problem within FMV where requirements on personnel reductions have drained the resources from these types of activities.

As a general conclusion from the studied case, in PSOs there was a genuine trust in the individual relations between the suppliers and FM/FMV. To support the equipment it was necessary to have trust in the relations on individual level. Concerning other products the level of interdependence were low in most relations, in some of the relations were the supplier more dependent of FM than the other way around. But in almost all these relations a genuine trust existed on the personal level between the customer and supplier, FM did not use the advantage of the dominant position. These relations were often supported by the existence of frame contracts which supported the sourcing and reduced the open issues for each delivery. Any previous use of power seemed to have limited effect for the buyer supplier relation for a specific PSO. All other contractual discussions set aside and a more positive attitude is used when work is initiated for a specific PSO. So in the logistics for PSOs, power and dependence appear normally only in the capability creation phase and in the liquidation phase where the efficiency requirements dominate. This study indicates that power and dependence in the relations are more apparent in the relations between FM and main equipment supplier compared to the other FM's supplier relations. From the case study one especially interesting finding appeared; the noted change in trust between the different

phases in PSO seemed also to be a change of perspective in the relation between an organisational perspective and an individual perspective, where the individual perspective dominated in the relation was of a partnership type.

Willingness

Willingness was in the third chapter presented as two aspects of special importance to the defence market.

The first aspect was risk consideration; Huemer (2004) pointed at that many believe that risk is the other side of the coin, when you study trust. But in the defence area a significant difference can appear. Are there any reasons when the supplier might not deliver? From the supplier perspective the same question should be raised are there any reasons for me not to deliver? FM had not done any assessments on this issue for PSOs. This type of problem have happened once for FM but did only affect a military exercise, no real operation. Insurance aspects have been a critical issue for one supplier, which made it unclear if they could deliver support in the operational area. The support was never needed by FM and therefore was the problem never discussed in detail by the supplier. In this perspective none of the suppliers interviewed had any problem with FM being involved in fighting. Neither had they any problem with sending own personnel to a hostile operational area as long as FM guided and protected them in the area. FM on the other hand was to a certain degree reluctant to have civil suppliers in the operational area. But when services on place were needed they have never hesitated to use civil suppliers. It can be expected that firms that do not meet these requirements choose not to enter the defence market.

The second aspect concerns ethics, i.e. personal values and social considerations (Michelson, et al., 2004). Corporate ethical codes play an important role for setting an ethic agenda within a firm and the area grows in importance (Lee, 2008; Stevens, 2008). The national cultural differences will affect the ethical codes and legislation, and in turn the firm agenda (Hofstede, 2001). In this area all suppliers said to have considered supplying to FM and that this was in line with their ethics. The domestic suppliers were patriotic and argued that deliveries to a Swedish soldier abroad were more important than other deliveries and had highest priority. The global suppliers generally answered that it was good for the business to supply FM. They also argued that support to PSO with a mandate from UN was in line with their company ethics. It is reasonable to assume that supplier having any doubts in this sense chose not to offer their products to FM. From a customer perspective the situation is black or white; unless the firm is blacklisted by the government FM cannot exclude the supplier from bidding and getting contracts. The positive attitude on ethics seemed to be of very high importance in the relations with FM.

Short-Term Arm's Length Relation

FM bought only limited amounts of supplies through this type of relation. In this study the supply areas transports, satellite communication, services and some consumables dominated the procurement through this type of relation. In these areas the market was the baseline for the procurement decisions. Short-term arm's length relation was also used for a few subsystems when the relation was not expected to continue. FM has chosen to establish short-term relations when the needed supplies occur less frequent. This is also a realistic approach from the sellers' perspective since FM is not an especially important customer to them. This type of relation existed also on the local markets since the long term objective was not established.

Supplier Dependent Relation

Two areas proved to show supplier dependent relations. The first and most important was in the spare parts area. Some suppliers seem to pay limited attention to that the spare part had an urgent need. This created long lead-times for the deliveries, causing availability problems in the operations. The second area is military partner relations. The positive side of these relations was that they often worked without any problems, being both efficient and effective. But on a few occasions, the military partner has not delivered requested support, due to that they have given other priority to the resources.

Durable Arm's Length Relation

LOU puts limitations on the relations. Therefore in the studied case the supplier buyer relations were somewhere between a typical durable arm's length relation and a partnership. The suppliers and FM have accepted the legal framework and try to create a long-term relation within the formal framework of power and dependency, even if trust and interdependency are the factors that smoothen up the relations. This type of relation seems to exist with firms within most supplier groups.

Partnership

FM have not developed a full partnership with any of the suppliers in the studied PSO. The largest hinder for partnership development was LOU, which to a certain degree forced FM into a power oriented relation. Other factors were that some of the relations have not been working for periods long enough, or that FM was a too little customer for the supplier (Håkansson & Snehota, 1995). A third and important reason was that previous mistakes in the relations had created a certain degree of distrust from both sides. But at the same time many persons on both sides argued that they trust their counter partner.

8 Analysing the Sourcing Key Decisions in Peace Support Operations

The one that they did not trust were the one they did not know. Positive effect for partnership creation was the willingness factor, many suppliers, also international suppliers, thought that it was important to support Swedish participation in PSOs. The military partners have shown to a certain degree create more partner like relation where the attention were positive on all management levels.

The first and second order relationship identifiers are summarised in table 8.1. In the table display the most common relational situation between FM and its suppliers in the studied case, described in terms of second order for each type of first order relation. It is apparent that the political requirements hinder the development of the relations into full partnerships. Dependent of the phase in the PSO the relation becomes more or less partnership like. Immediately before deployment many relations function like full partnerships.

Table 8.1 Supplier relations, first and second order aspects.

	Power & Dependence	Trust & Inter-dependence	Willingness
Short-term arm's length relation	Power tools are formulated in the contract and used by FM if necessary	Selling to Swedish public authorities are commercially safe	FM is viewed as any other customer
Durable Arm's length relation	Power tools are formulated in the contract but are rarely used	Trust and interdependency exist in the relations thereby can the power tools be avoided	It is important to support Swedish soldiers in PSO or PSO in general
Supplier dependent relation	Power tools are formulated in the contract and used when found necessary	Varies much with the partner and the relation	Risk of absent or late deliveries
Partnership	Exists in the relation but it is not used	Trust and interdependence exist on several managerial levels	Basis for going into long-term cooperation

In table 8.2 are the first order relation matched with the seven different supplier groups. Many of the suppliers to FM have delivered products for many years, and thereby the durable arm's length relations dominate. During the resource allocation phase some of the relations did show all the secondary constructs to define as partnership relations. To indicate this is partnership marked in the table. During other phases most of these relations showed to be a durable arm's length relation.

Table 8.2 Supplier relations, first order aspects and supplier groups.

	<i>Main equipment supplier</i>	<i>Subsystem suppliers</i>	<i>Supplier of consumables</i>	<i>Supplier of spare parts</i>	<i>Supplier of camp systems and services</i>	<i>Transport supplier</i>	<i>Military partner</i>
Short-term ARL		x	x	x	x	x	
Supplier dependent relation	x			x			x
Durable ARL	x	x	x	x	x		
Partnership	x	x	x		x		x

ARL- Arm's Length relations

8.6 Summary

This chapter started with a discussion about the military supply chain for PSO. Five key properties were identified, and their effect on the supply chain was analysed. The relation between supply groups and supplier groups were discussed. A principal model for the military supply chain in PSOs was analysed, especially was the role of the focal supplier and the NSE discussed.

Thereafter, the sourcing key decisions were discussed. The make or buy decision showed to be important from many perspectives and interesting to note was that the underlying reason for the make or buy decision changed between the logistics phases.

LOU showed to be important for the market decision, generally was the global market used. But when exceptions from the main rule in LOU were possible other and for PSOs more important factors dominated. Proximity and support of the local businesses in the operational area were important.

The decision on number of suppliers depended on the market. On the local market the ambition was to have multiple suppliers. On the domestic or global market the decision varied from single sourcing up to multiple sourcing. The studied case indicates that for PSO single or dual sourcing is beneficial, while the main rule in LOU require open tendering, I the bidding process.

The supplier relations showed to differ mainly between the supply groups but also between phases, where many relations turned partnership like during on-going PSOs.

9. The dynamics and importance of the logistic key decisions

This is the third and final analysis chapter. In the two previous chapters the logistics in PSOs and the sourcing decisions based on the military supply chain are discussed and analysed. In this chapter the analysis continues with two aspects of special interest in this study; the development of the logistic key decisions including the sourcing key decisions in the different phases of PSOs and the logistic consequences of the sourcing key decisions.

9.1 The development of the logistic key decisions in the PSO phases

In a conceptual study, Tatham (2005) suggests that logistics needs to be lean in peace and agile in war, otherwise changes in the logistic key decisions have been rarely discussed in the literature. The case showed that the logistic key decisions changed between phases in PSOs. These changes are presented and discussed below with the support of the model presented in chapter 2 (figure 2.5). The case revealed that on an aggregated level the logistic key decisions go through four changes in the logistic PSO phase-cycle (figure 9.1). The first orientation of the logistic key decisions coincides with the capability creation phase. The change towards the second orientation of the logistic key decisions happens when the PSO enters the negotiation phase and ends with the deployment phase. When the operation phase begins, the logistic key decisions change to a third orientation. Finally the logistic key decisions change to a fourth orientation when the liquidation phase begins. The studied operations differ to some degree in the details for individual types of supplies but on an aggregated level all operations show the same decision pattern. Below each decision change and the relations between the decisions are discussed, followed by the changes of each key decision, which are discussed separately.

During the capability creation phase the outcome of first the logistic key decision is to bring all resources needed. This decision is a planning decision for coming PSOs, and builds on the sustainability requirements defined in operational doctrines, that is to bring what you need for a certain number of days (Berg, 2006). The outcome of the second key decision is to speculate. The reason to speculate is the need to cope with the requirement from the first decision, but this does not mean that all supplies needed must be purchased

and stockpiled just in case. Delivery lead-times to meet the readiness requirements need to be considered, which requires a mainly speculative approach (Pagh & Cooper, 1998). But short product business life cycles can have the consequence that subsystems to main equipment can be delayed (Bowersox & Closs, 1996). The outcome of the third logistic key decision aims towards a lean or an efficient approach. Three aspects are pursued to avoid having supplies in stock that become outdated and to achieve economies of scale through larger orders and to consider the needs for the homeland defence. The focus on lean thinking has a direct connection with the requirement to be efficient (Godsell, et al., 2011). The outcome of the fourth decision is closely related to the requirements in LOU; the international market is used, multiple channels are used in the bidding process, and arm's length relations dominate. To summarise, the decision outcomes in the studied case, which are presented here, show a good unanimity with theory. The only decision that could be questioned, based on theory from an efficiency perspective, is the sourcing decision. The specific aspects of the sourcing decision are further discussed below at the end of the paragraph where the sourcing decision is discussed separately.

During preparation and deployment of PSOs (the negotiation the deployment phase) some changes in the logistic key decisions occur. The first decision remains unchanged, and the underlying reasons have not changed either. The second decision changes to a postponement approach. In order to minimise the logistic footprint in the operational area, only supplies that are identified as needed during the initial period should be procured (Peltz, Robbins, et al., 2005). The second decision is related to the third decision, which changes towards an agile focus. The decision to postpone requires an agile supply chain to handle upcoming needs (Christopher, 2000). Dormant relationships are activated and important actors in the supply chain are contacted and informed about the planned operation and possible needs. All activities should aim at achieving the requested operational capability and prepare for the continuation of the operation. The fourth decision changes to a single supplier and partnership relations, which is necessary in order to be agile (Christopher & Lee, 2004; Fawcett, et al., 2008). This is possible because of a special clause on urgent needs and special requirements in military operations. Naturally all relations do not change in this way, only the key suppliers needed to meet the operational requirements, change their relations with FM. Also this set of decisions identified in the case finds support in theory.

When the operation phase starts, the logistic key decisions' outcomes change a third time. The first decision changes to a combination of the other two choices, obtain resources locally or get them from outside. According to FM the first choice is always to obtain the resources locally. Three arguments were presented in support of local sourcing; cost efficiency, short lead-times, and support of the local business life. These types of arguments have also been identified in the chapter 2 (Kidder, 2006; Oetzel, et al., 2009; Trent &

9 The dynamics and importance of the logistics key decisions

Monczka, 2005). The local situation is the key factor to how much it is possible to supply locally, where the situation in Liberia reduced the possibilities, while in Djibouti most supplies were possible to buy on the local market. Both the second and the third decision remained the same, since the underlying requirements were unchanged. The fourth logistic key decision, the sourcing changed. The total number of suppliers increased from single sourcing to dual or multiple sourcing in order to create redundancy in the supply system. Redundancy in the supply chain might be needed due to limited capacity to deliver among the local suppliers and/or hostile activities in the operational area. Also the relations to the host nation have to be considered due to the fact that a simple thing like customs can delay the delivery of important supplies. In this phase important factors not previously discussed to any larger extent in the military or supply chain literature, showed to be important for the sourcing decisions. These aspects were the political situation in a post-war area and the risk of limited amount of supplies on the local market.

When the decision is made to end an operation (the liquidation phase) the fourth change of the logistic key decisions appears. The first two decisions do not change; the underlying requirements remain the same until the end of the liquidation phase. The third decision changes to a lean approach again. Since the operation is finished, mainly one reason is important and that is to be efficient with the taxpayers' money when withdrawing from the area and restoring the equipment. Linked to both postponement and lean approaches is a practical ambition to reduce the sustainability during the last period in the operational area so that most staple supplies are consumed at the time for the home transportation. The sourcing change also back to what is required by the main rule in LOU. That means that the international market is used, multiple channels are used in the bidding process, and arm's length relations dominate.

The situation in this phase is similar to the capability creation phase, with the important difference that no readiness is required for a new operation or homeland defence.

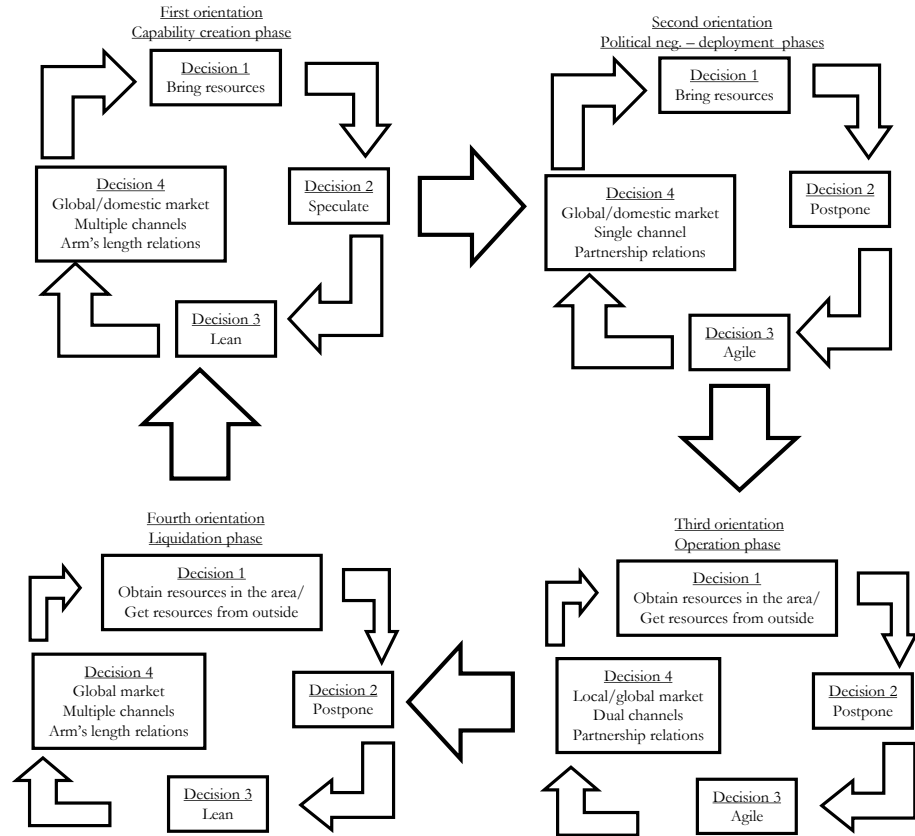


Figure 9.1 Orientation of logistic key decisions during different phases of a PSO

The first logistic key decision concerns the supply choice for the operating unit. The decision gives the guideline for if the deploying units should bring all resources they need, if they should obtain resources in the area of the operation or if they should get resources from outside (Van Creveld, 1977). During the first phases the logistic planning builds on that the unit should bring all it needs. This planning is based on the requirement to have a capability with a limited endurance. Operations that last only for a few weeks have the basic strategy to bring everything needed. In operations that last longer periods, which is the normal situation, the decision changes when moving into the operation phase. The planning is then built on a combination of get resources from the outside and to obtain them locally. The possibilities to bring resources are generally larger for the navy compared to the army or the air force. But also the navy needs to get some new resources after a certain period of time. To

obtain resources locally is an important part of the long-term objectives for longer operations (Korac, 2006; Ohlson, 2008). In the Atalanta operation it was decided to obtain as much as possible locally. In Liberia the unit followed the development of the local business life and tried to obtain some goods and services from local suppliers. For the Afghanistan operation some local supplies have been important. The case has showed that the decisions change over time in PSOs with the possible exception of very short missions. FM had no such short operation during the studied period.

The second logistic key decision concerns how much it is possible to postpone or necessary to speculate in military capability, both between operations and during on-going operations. Linked to the history of the Cold War, FM, as many other Nations' armed forces, had a tradition to speculate for the just-in-case situation (Chefen_för_Armén, 1993; Howard, 2001; Peppers Jr., 1988). Many Swedish officers viewed the renewed FM (after 1996) as a fire brigade, which requires high readiness. This fire brigade should be able to protect Sweden from hostile military interventions and take part in international operations with short notice. Speculation or building military capacity just-in-case has been a tradition to meet the threats against the nation's sovereignty (Howard, 2001; von Clausewitz, 1832-34/1991). Speculation is still the dominant strategy in the capability creation phase between different PSOs for FM. But, as well as speculation, postponement has been a prevalent feature of the logistic strategies (Dorn, et al., 2009). Subsystems known to become outdated at a high pace and other systems which have short lead-times have been postponed partially due to requirements on cost reductions in procurement programs. Postponement has also been used to regulate support costs for stored and used materiel. Some maintenance has been delayed until the systems have been needed for training or for operations. FM's ambition in principle is to speculate, to have the force standing, ready to take care of a military threat the next day. It is neither plausible nor realistic though, mainly due to cost reasons, to have all capabilities or units in such high readiness status. The flexibility in the Swedish defence budget system is relatively low under normal circumstances, which reduces the possibilities to postpone large expenditures. Postponement or speculation in FM is today dependent on economic realities but have not so far actively been used to improve the cost efficiency for PSOs. Postponement of procurement until a PSO is initiated is often based on the idea that when an operation is decided upon, there will be additional funding from another account to install new subsystems and to procure of the shelf products.

But since it is not a unique process for producing units for PSOs, it is also complicated to have a proper planning for postponement and speculation in the capability creation phase, it must balance both homeland defence and PSO requirements. In the preparation of the operations studied the personnel in the units and NSE had a limited speculation strategy. They argued for a certain level of stockpiling in the operational area. Many logistics officers with

experience from PSOs argued along the lines that they did not get positive feedback for being cost effective, but for being able to deliver supplies on time. This perspective is balanced by the officers in the HQ planning staff, who were more concerned about budget constraints. So during the preparations a change started in the balance between speculation and postponement. Postponement grew thereafter in importance for the remaining operation. Risks were reduced and the supplier network improved as the operation went on.

The third logistic key decision concerns the choice between a lean or an agile logistic solution. Lean is about creating customer value and to minimise waste (Jones, et al., 1997). Agile logistics on the other hand allows some waste to create flexibility and responsiveness (Christopher, 2000). It has been argued that the concepts can be combined and that a lean organisation can use agile principles (Hines, et al., 2004). It has also been proved that lean principles can be applied in military logistic operations (Tatham & Worrell, 2010). Military operations are rather flexible in their core and far away from the pillars of lean operations in the car industry (Womack, et al., 1990). FM did not discuss their production or the supply chains in terms of lean or agile. At that time no full-blown lean or agile mentality existed in FM. But indicators were found that pointed to both lean and agile thinking. The larger part of the production in FM more or less aims to create operational capability for PSOs and homeland defence. Much of the work to produce military capability is streamlined and works against predefined dates for a number of years ahead. There is a clear ambition to minimise waste, even if processes and feedback systems do not work totally according to lean principles. Building capability just-in-case is in one perspective a perfect example of the creation of waste. FM tries to orient the work in terms of processes and decision-making in which lean principles are applied (they do not discuss lean, they discuss common sense).

When discussions start about participation in a PSO there is a clear change in the thinking at FM. Activities early in the processes change towards an agile orientation. The preparation for possible operational scenarios includes contacts with preferred suppliers. Dormant supply chains are activated. Some suppliers are engaged in determining needs and preparations also start upstream in the supply chains. The supply chains are integrated to find different solutions for operational needs. The overarching requirement, the closer it comes to a deployment of an operation, is to prioritise the most urgent needs. Before the operation starts the agility of the chains focuses on being as effective as possible and to upgrade the operational capability as much as possible. During the operations hostile activities, problems with transit or customs of military material almost always exists. This can cause breakdowns in some of the supply lines. New operational needs might also appear. Therefore, the whole logistic system strives to be flexible to meet the upcoming needed changes. FM prioritises cooperation with suppliers with short lead-times. The demands can vary much between operations, which requires flexible supply chains, to meet very different needs for different operations. So even if FM

never uses the term agile supply chains it is an obvious ambition to have an agile perspective when preparing and running an operation. FM did not talk in terms of lean and agile, but its logistics had many indicators for lean approaches in the capability creation phase and the liquidation phase while the other phases were dominated by agile principles. This perspective is in line with Tatham's argumentation concerning the requirements on the British defence (Tatham, 2005, 2006).

The fourth logistic key decision concerns the sourcing. The sourcing in this study focused on four aspects; make or buy, which market, number of suppliers, and supplier relations. Details on each aspect are further discussed in the next chapter. Below the discussion is focused on the changes between phases in PSOs.

The first sourcing key decision is to make or buy. The make or buy decision can be about cost minimisation, capability optimisation or value optimisation (Cousins, et al., 2008). In the defence area it seems likely that all three factors are important. To optimise any operation, many argue that core competence or critical success factors are the factors to consider (King, 2001; van Weele, 2005). FM considers its core competences as the capability to train soldiers to create operational units, and to perform operations. The government gives FM a personnel frame and a budget. FM has to take into account international agreements that define which capabilities are required to have. When it comes to logistics, three competence areas are viewed as core or critical. The three competences are the ability to manage the logistics in any activity that FM performs, to train logistic units and to run logistic activities under the threat of hostile action (by FM interpreted to be required in international agreements). When the phases in PSOs change different parts of FM logistic capability become important. But this does not mean that FM changes their view about the overall core competence or key success factors. When FM handles their personnel frame they consider the needs of all phases at the same time, to optimise the overall performance. But there is a difference in the baseline for the decisions where cost efficiency is important during the capability creation and liquidation phases, while during the other phases the critical success factors are crucial, where the most important success factor is the ability to act in a hostile environment. But even with the changes in the motives the personnel capability will determine what will be done with its own resources. Thereby the make or buy decision does not change between phases.

The second sourcing key decision is the choice of market. The three markets discussed for PSOs are the national market, the international market and the local market in the area of the operation (Markowski, et al., 2010; Skoglund & Hertz, 2011). The local market cannot come into discussion before the military units are deployed (before that date the local market is a part of the international market). All procurement activities in the phases follow the basic rules in LOU until the units are deployed. This means that the international market has to be approached. During the operation phase, both the short-term

and long-term objectives become important. The use of the local market supports the fulfilment of these objectives. When entering the liquidation phase, the overall requirement changes back to efficiency and the local market is yet again viewed as a part of the international market.

The third sourcing key decision is the number of channels or suppliers. The industrial network in the defence area is limited with relatively few actors in each product segment (Markowski, et al., 2010). The requirements within LOU when the main rules are used do not allow FM to use only the existing supply chain relations; possibilities to bid must be open to all possible suppliers. FM's interpretation of LOU has the consequence that the main rules must be used during the capability creation phase and the liquidation phase. This means that multiple chains are offering and that the lowest price generally gets the order. In the other phases other security-oriented clauses can be used, which opens up the procurement to other possibilities. During the phases, starting with the negotiation through the deployment, single suppliers are preferred. FM generally knows the market and what they need to prepare the units for the deployment. When the operation starts FM prefers to have at least dual sources of supply, one or several from the local market and at least one from outside.

The fourth sourcing key decision is the supplier relations. The aspects of relations are important and complex patterns for the supplying of PSOs. An analysis model was developed in chapter 3. Relation could be divided into the first level construct. In this paragraph only this level is discussed. Further details about the supplier relations are discussed in the previous chapter. The first level construct was in the third chapter discussed as short-term arm's length relations, long-term arm's length relations, supplier-dependent relations or partnership relations (see also table 3.5). FM argues that there is no time to fight in upstream relations when a soldier or a unit abroad needs support. Good relations are believed to be a prerequisite to be able to act quickly when it is urgent. FM has thereby a general ambition to have close relations with the suppliers of PSOs. The consequence of the ambition is that partnership relations exist with most suppliers from the negotiation phase until the liquidation phase. During the capability creation and the liquidation phases, there is a shift in the relations to a durable arm's length relation with most suppliers. The legal aspects in LOU affecting the sourcing decisions are of importance, especially since they affect all other logistic decisions. In this study it has become apparent that LOU has negative effects on the logistic capability, causing longer lead-times and increases the numbers of suppliers in a way which not always have been positive for the logistic outcome.

9.2 The effect on the logistic outcome of the sourcing key decisions

In the previous chapter the characteristics of the sourcing key decisions and their outcome are discussed. Above in this chapter the relations and the dynamics of all four logistic key decisions are discussed. This part of the analysis points at an interrelation between the different sourcing decisions. But it does not identify how the sourcing key decisions affect the outcome of the logistics in the different PSO phases, this is discussed and analysed below. In the first four sections each decision is discussed separately, and the outcome related to the short-term objectives becomes evident. The outcome related to the long-term objectives is more difficult to interpret and therefore is this discussed in paragraph 9.2.5. below.

9.2.1 *The make or buy decision*

The make or buy decision made a difference for both the short-term and the long-term objectives in the studied case. The short-term goal relates to the decision to only use own resources in the combat logistic area. By prioritising the own resources towards the support of the operating units a high level of operational capability was achieved. In the rear logistic area the external resources contributed positively to better endurance and higher responsiveness. In the rear area (operational level) the suppliers contributed with a variety of services, from highly specialised functions as medical care to more standardised welfare services as running the XP-shop. Having foreign private businesses to engage locally in the operational area can support the stabilisation of peace (Oetzel, et al., 2009). In the studied case FM had limited capacity of its own in some areas and the suppliers improved that capacity.

The achievement of the long-term goal, contribution to the creation of a lasting peace, was more difficult to identify in terms of make or buy. But a prerequisite for supporting local job and business creation, which is important to achieve a lasting peace, is that some services are outsourced, and in this sense, the make or buy decision made a difference (Kidder, 2006; Korac, 2006). In Liberia several local employees were used, as was the case in Afghanistan.

During the early phases, before deployment, FM planned for an efficient use of its own resources. The make or buy decisions during the capability creation phase considered also what core competence will be needed for future PSOs.

The FM ambition to prioritise the use of its own personnel resources to the last mile contributed positively to the fulfilment of both the short-term and the long-term objectives.

9.2.2 The market decision

The market decision definitely had importance for the short-term objectives for the logistics in the studied case.

Based on the requirements in LOU, FM preferred to use the global market during the capability creation phase. This did not create any major problems for the operations studied, though. The main reason why the problems were limited depended on that the majority of the suppliers of the main equipment used in the PSOs were located on the domestic market. The ability to be able to rapidly prepare and conduct updates on the equipment was crucial during the resource allocation phase. This is in line with the importance of proximity in the buyer-supplier relations (Kalfakakou & Tsouros, 2001; Klier, 2005). The proximity showed to be less important for suppliers of subsystems and some types supplies. For many subsystem areas FM argued that quality and technology were more important than distance, and therefore the use of the global market was an advantage for these products, and to achieve the proximity benefits the main equipment suppliers facilities were used for the integration of the subsystems into the main equipment.

To achieve the short-term objective during the studied on-going PSOs all three markets showed to be important in order to create flexibility in the supply chain and to reduce transportation lead-times, which is in line with the argumentation by Hagelin (2010). The respondents argued that flexibility was especially important when it were high levels of uncertainty in the supply chain. The operations studied only gave limited support to this however, partially depending on that only a few occasions occurred when this was relevant. The benefits of the reduction in transportation lead-time were apparent in all three studied operations, supporting the use of the local market.

Concerning the long-term objective the studied PSOs only gave limited support to the theoretically derived possible contributions concerning the stabilisation of the peace through local sourcing (Humphreys & Weinstein, 2007; Kaldor, 2003b). The reason to the limited support differed between the operations. In the Liberia operation FM did not have a clearly stated ambition to source as much as possible locally. Some was sourced locally and the signs of the sourcing were positive, even if the results were too limited to draw any extensive conclusions from. In the Atalanta operation FM sourced as much as possible in Djibouti. Djibouti had peace and the small amounts that the Swedish unit sourced did not have any visible effects on the region or neighbouring countries. In Afghanistan only limited amounts of second hand data was given by officers that had taken part in the operation. According to them, the negative operational results of the overall situation in Afghanistan had nothing to do with FM's logistic operation. The officers argued that it could even have been worse if FM not had sourced anything locally.

9.2.3 Number of suppliers decision

The number of suppliers used by FM differed depending on the supply and the phase in PSO. Skjøtt-Larsen (2007) et al. argue that single sourcing creates better quality, stronger and more durable relationships, higher commitment and effort, better communication, economies of scale, better cooperation on development and services. In most procurements in the studied case, FM used single sourcing for main equipment and subsystems and related services. For these groups higher commitment and effort, better communication, and better cooperation on development and services were identified in the studied case. For the other supply groups the phase of the PSO seemed to dominate the decision on number of suppliers.

What difference does the number of suppliers make on other supply groups? Kouvelis and Li (2008) mean that having more than one supplier reduces the shortage risk, this was confirmed by the case. Also making sure that the suppliers came from different markets showed to be important. As a simple example the crews in the Atalanta operation had to eat fish for several weeks because the suppliers had nothing else to deliver. Primarily dual sourcing with the suppliers from different geographical areas seemed to create higher capacity to meet the short-term objectives of logistics in PSO. If one supplier of some reason was unable to deliver the other could, which happened several times in the case. Liker and Choi (2004) argue that if the suppliers are aware of each other they will also, in most cases, perform better which is improving the logistics. All suppliers that had frame contracts with FMLOG knew which other firms had the same type of contract. The suppliers argued that other aspects, like support of Swedish soldiers abroad was more important, but it is reasonable to believe that by the fact that they were aware of each other it would also affect their performance and pricing.

The long-term objective relates to the use of the local market. Multiple suppliers on the local market seem to be beneficial of several reasons; jobs are created, FM avoids becoming a dominant customer, many business contacts seem to support stability (Lederach, 2005; Skoglund & Hertz, 2011). The results in this study were however too limited to draw any extensive conclusions from in this area.

9.2.4 Supplier relations

The supplier relations have shown to be important for the logistics in PSO. The needs are often urgent in many of the phases in PSOs. This requires that the suppliers prioritise FM's needs.

Public procurement discussions have for several years been dominated by the thoughts about legal aspects, competition, corruption, transparency and efficiency, so have the procurement for PSOs (Alexandersson & Hultén, 2007; Ganuza, 2007). In the studied case, LOU played an important role for the

relations between FM and its suppliers for PSO. Most relations were durable arm's length relations, especially during the capability creation phase. FM's interpretation of LOU and handling of the contract, with the creation of power-tools in the contracts, developed these relations, which also have been discussed earlier in the business literature on power-tools in relations (Cox, 2004a). The durable relation or long-term contacts, created relations between customer and supplier on a personal level. These durable relations served FM with supplies of high quality by suppliers that had a relatively good understanding of FM's needs and requirements, which also have been suggested earlier by Markowski, et al. (2010). Several respondents, both from FM/FMV and the supplier side agreed however that the relations were neither efficient nor effective and generally created low value for money. No measurement supports this but some recent research on public procurement point in a similar direction (Burger & Hawkesworth, 2011; Erridge, 2007). So to sum up, the case indicated a negative outcome of the logistics due to the arm's length relations.

The durable arm's length relations also played an important role for the other phases. When a specific PSO was initiated many of the buyer-supplier relations became partnerships. This was based on the willingness aspect, it was important to support Swedish soldiers abroad, doing something considered as good. The fact that the relations were durable seemed to be the baseline for the change to partnerships relations, since the supplier and the buyer knew each other on a personal level. The partnerships had a positive effect on the logistic outcome, lead-times were reduced and several respondents argued that these relations were a prerequisite for the ability to deploy at the decided date. In the operational area the partnership-like relations were important both for the development of the local business life and for the creation of a dialogue with the local population.

Relations based on trust, interdependency and willingness have showed to make the logistics and the supply chain in PSOs more effective than otherwise. Relations based on a power regime tended to have longer lead-times and lower quality of the supplies. How the price was affected has been difficult to determine, but signals exist that the prices have increased due to the arm's length relations.

9.2.5 The effect on the long-term objectives of the sourcing decisions

In chapter 2 it was discussed how PSOs could contribute to the creation of lasting peace. The main objective was to create security (Boutros-Ghali, 1992). But two other objectives also contributed, to give humanitarian aid and to support the business growth, by sourcing locally (Andersson, 2001; Gourlay, 2000; Jenkins, 2003; Korac, 2006; Ohlson, 2008). Some PSOs are successful

when it comes to support the creation of lasting peace. The three operations studied show very different results so far in this sense. In Liberia the development trend has been positive, and there is high hope for stabilisation of peace. In the Gulf of Aden, the trend has been somewhat positive even though the majority of the underlying problems still remain unsolved. In Afghanistan the trend seems to be negative. The level of violence has increased and the support of the ISAF forces among the population seems to be limited. Since the focus of this study has not been peace-building but logistics and sourcing, it would be unwise to speculate about all the reasons behind the development of the peace situation in different areas. The research question relates to the sourcing decisions and their effect on the logistic outcome. This means that the only way the sourcing decisions can have any direct effect on the long-term objectives, is when FM sources locally. As already discussed the activities within the Swedish NSE were unstructured and did not have the aim to create long-term effectiveness. The discussion below is therefore limited to the activities studied and the indications of these.

In the Liberia operation it was possible to identify activities that, in a small scale, supported the growth of businesses. These relations were collaborative and in many aspects partnership-like. The relations were managed by NSE from FM's side. Other local supplier relations also existed where arm's length sourcing was done. If these relations had any effect on the long-term objective is difficult to tell. But the indications point to a positive attitude towards the Swedish unit and its local sourcing and aid giving. In the Atalanta operation it is difficult to discuss the effects. The NSE was located in Djibouti, which is an important harbour for Africa's Horn. But since this small nation has peace with its neighbours, it is difficult to assess how the sourcing in Djibouti can contribute to a peaceful development in Somalia where the majority of the insecurity problems comes from. In Afghanistan, the negative trends have many reasons. But one important reason, according to the respondents with experience from the operation, is the lack of coordination between the contributing countries about what to do and not to do. This had however very little to do with the sourcing decisions.

9.3 Summary

In this chapter we first discussed the dynamics of the logistic key decisions. The decisions changed due to the change in requirements between to be efficient or effective. It was also a change between creating a capability and to do a specific operation, with unique demands, and to restore the supplies after the operation and to rebuild the basic capability again. An on-going operation mainly built on the decisions to postpone the procurement until a need was identified, which required an agile supply chain that built on partnerships in dual supply relations. The requirement did not work well with the requirements in LOU on how to

handle the efficiency requirements in the other two phases. LOU at least partially forced FM into arm's length relations with the suppliers. It can be questioned if the requirements actually fulfil the aim to be efficient, especially for equipment that has a physical life cycle for up to 50 years that needs spare parts, technical support and upgrading. For all these activities, in most cases only one supplier has the capability to deliver and the case indicates that the cost for these procurements becomes too high, in a competitive bidding process. The studied case showed that the change between efficient and effective worked, mainly because of the willingness parameter. All the studied suppliers thought that it was ethically important to support Swedish soldiers abroad. On the individual level that meant that both FM and the supplier could put aside on-going discussions related to the arm's length relations and enter a partnership-like relation for all activities to support a specific operation.

The other aspect studied in this chapter was the logistic outcome of the sourcing key decisions. The make or buy decision to focus on the last mile, seemed to have a positive impact on the operational capability, this also supported the use of the local business life, and engagement of other suppliers in the rear area (Oetzel, et al., 2009). The geographical markets that proved to be the most important were the domestic and local markets. The proximity aspects of these showed to be important both during the resource allocation phase and the operation phase. The proximity reduced the lead-times and increased the ability to cope with the specific requirements of a new operation. This showed to be important for the ability to deploy on the decided date with the needed capabilities. During the on-going operation the choice of the local market supported the fulfilment of both the short-term and the long-term objectives. The choice of number of suppliers was dependent of the ability to have security of supplies, therefore a dual sourcing solution was chosen for most supplies. Finally, during the on-going operations partnerships were the dominating type of relation, which was, among other positive outcomes, especially important in order to reduce lead-times on the domestic market and to create a positive dialogue between FM and the suppliers in the operational area to support the growing business life.

10. Conclusions, implications and avenues future research

This thesis is about the sourcing decisions for military logistics in peace support operations. The findings of the study are presented in this chapter. The fulfilment of the purpose and theoretical contributions are discussed in the first paragraph and in the following two paragraphs managerial implications and future research are discussed.

10.1 The purpose of the study

The purpose of this study is to analyse how the sourcing decisions impact the military logistics in FM PSOs and the achievement of short-term and/or long-term objectives.

The aim of this analysis is to understand how sourcing decisions upstream in the military supply chain affected the output of the logistics in all phases of PSO. The logistics PSOs phase-cycle consist of six phases; capability creation phase, negotiation phase, resource allocation phase, deployment phase, operation phase, and liquidation phase.

Four sourcing key decision outcomes are analysed in relation to the short and long term objectives. The four sourcing key decisions are, make or buy, geographical market, number of channels, supplier relations.

Short term objectives for logistics in PSO were identified as the ability to support on-going operational tasks and to prepare for the support of coming tasks. In contrast the long term objective was identified as being to contribute to the creation of security and of lasting peace.

With regards to the short term objectives, the decision to make or buy affected the ability to support on-going tasks. The decision to have in-house resources at the NSE, secured the capability to support the operating units when hostile threats were to be considered. The market decision can support the short term objective. The choice to use both the international and the local market created flexibility in the logistics system. The NSE became less sensitive to interruptions in certain parts of the supply chain for a supply group when it was possible to source both locally and internationally.

The decision about the number of suppliers had a similar effect on the logistics as the choice of market in the short term. On the international market single or dual sourcing showed to be the most effective solution. The number

of different types of products in one supply group were reduced compared with a multiple supplier solution, which also simplified logistic support and spare parts handling. Dual sourcing on the other hand created redundancies in the supply chain of the products were exchangeable. During the capability creation phase the Swedish Public Procurement Act (LOU) forced FM to end up in multiple sourcing in some areas. This had a negative effect on the logistics in PSOs. The number of different exchangeable supplies increased and the logistics support system became more complicated.

The case showed that the decision on supplier relations was important in most phases. During the capability creation phase LOU required that any bidder should be considered on equivalent basis. This made it very difficult for FM to create close relations to any supplier. The arm's length relations had negative effects on PSOs. It was not possible for FM to minimise the number of systems in use in PSOs and the need for different spare parts increased. When the negotiation phase started a change occurred in many supplier relations. With the start of a specific PSO specific clauses could be used in LOU. Both FM and its suppliers agreed to apply partnerships when political ambitions to participate were revealed. A combination of time constraints and willingness can explain why this change was possible. The change in the relations was important in order to get the units ready in time for the deployment. Most relations continued to be based on trust throughout the operation phase. The relations had a direct impact in the operations where problems were solved much faster than otherwise would have been the case. The relations turned towards arm's length again when the liquidation phase started. The change was once again related to the requirements in LOU. This change had no notable effect on the PSO.

The case showed that FM had no processes in place with the aim to support the long term objectives. FM did some activities in this area but not with the long term objective in mind. The study indicates that a coherent approach where long term objectives are taken into account can make an important difference in the fulfilment of the long term objectives. The NSE can contribute to the improvement of the security situation by establishing relations with local suppliers. Local sourcing can also contribute to a lasting peace through the creation of new job opportunities and a growth of the local economy. Some domestic or international suppliers deliver directly to the NSE or support the operation on the operational level by other means. If requirements are put to establish subsidiaries in order to have some services or production in the operational area this will also contribute to the growth of the local business life.

An important aspect of this study was to create a descriptive case on military logistics in PSOs. The case describes both central government and headquarter processes for PSO as well as the logistics in two specific operations. Special attention was given to the sourcing and the upstream supplier relations. The

descriptive parts on military logistics resulted also in further development of theoretical constructs for military logistics in PSO.

In the three sub-paragraphs that follow are the findings related to the three research questions presented.

10.1.1 RQ1: What theoretical constructs within military logistics are vital for sourcing in PSOs?

The area of military logistics is not particularly well researched. In order to fulfil the objective within this study it was therefore important first of all to understand what military logistics in PSO is. Through the literature review and a holistic approach on the case it was thereby possible to identify the areas that could be characterised as vital for the sourcing decisions and their outcome. Three areas on different levels were identified to be of special importance; macro structures for the organisation of logistics in PSOs, objectives and requirement on the logistic planning for PSOs, and strategic or key decisions made for logistics in PSOs.

The macro structures

Logistics in PSOs vary considerably in scope and orientation. Building mainly on Tuttle Jr. (2005) and Kress (2002), and analysed through the case data, a logistic PSO phase-cycle was identified by six different phases; Capability Creation phase, Negotiation phase, Resource Allocation phase, Deployment phase, Operation phase and Liquidation phase.

Foxton (1994) identifies logistics in military operations as being built on structures related to the three organisational levels; strategic, operational and tactical. His suggested structure comprises five levels for a Cold War scenario. The five level structure is discussed in relation to other more modern developments in the military logistics area and the structure in the studied PSOs in Liberia and in the Bay of Aden. The analysis identified a three level logistics structure for PSO: the homebase level, the operational level, and the tactical level. The homebase level consists of all actors in the military supply chain outside of the operational area. The operational level is the rear function in the operational area from where all support to the tactical level is managed and coordinated. The tactical level is where the operational units do their operational tasks; generally risk levels are anticipated to be higher in this area.

Objectives and requirement

The objectives for logistics in PSO are divided into short term objectives and long term objectives. They build on the identification of the operational short and long term objectives; short term objectives are for the operational units to finalise the on-going task and prepare for next task, and long term objectives are to create security and contribute to a lasting peace (Boutros-Ghali, 1992; Skoglund & Dorn, 2008; Utrikesdepartementet, 2008a). The objectives are

further developed in the analysis to be valid specifically for the logistics in PSO. It was concluded that the logistics have the same long term objectives as the operating units, and it can be relevant to argue that the second objective to contribute to a lasting peace is more applicable to the logistics than the operating units. The short term objectives are to facilitate the on-going task and the coming tasks.

There are four sets of requirements that are identified as important for logistics in PSO; adjustment to unique operations, capability and capacity, security and safety, and command and control. The first set of requirements relate to sourcing during early phases in PSOs, where a need to have flexibility in the resource allocation phase is identified (EU, 2004b; Försvarmakten, 2009a). The second set of requirements, capability and capacity, clarifies what is expected of FM in terms of military functions, environmental adaptability, and operational sustainability (Försvarsdepartementet, 2009; Försvarmakten, 2002; Utrikesdepartementet, 2008a). The third set of requirements, security and safety, concerns the operation phase and the consequence of having civilian contractors in the operational area (Barge Jr, et al., 2003). Also aspects in the Geneva convention and other military agreements are included in this set (Försvarsdepartementet, 1996a). The fourth set of requirements are command and control. The chain of command for the operational unit will change between different phases. The study showed that a NSE is needed to handle national requirements in the supply chain. It also pointed at the need to have systems to measure the logistics in the operations to motivate both costs and activities (Parapob, et al., 2009).

Logistics Key decisions

In this study, four logistics key decisions are identified which are assessed to be vital for the planning of logistics in PSOs; the basic supply decision, the stockpile decision, the balance decision between lean and agile approaches, and the sourcing decisions (Tatham, 2005; Taylor & Tatham, 2008; Van Creveld, 1977). The basic supply decision concerns where to get the supplies for a PSO during the deployment and in the operation phase. Three supply alternatives are possible; to bring the needed supplies, to obtain the supplies in the operational area, or to get the supplies from outside (Kress, 2002). The stockpile decision has its roots in the just-in-case principle that was developed in the beginning of The Cold War (Peppers Jr., 1988). After the end of The Cold War, most European countries partially turned away from this costly solution (Wither, 2005). Instead the decision turned from pure stockpiling to a decision balance between the two concepts to postpone or speculate, that is, what to have in stock and what to get when a need is identified (Boone, et al., 2007; Dorn, et al., 2009). The third decision is the balance decision between lean and agile (Godsell, et al., 2011). The decision between is to balance between being efficient or effective with taxpayers' money, that is to create the best value for

the money (Mathaisel, 2008; Stratton & Warburton, 2003). The fourth logistic decision is the sourcing decisions. Four sourcing key decisions are identified to be important for PSOs; the make or buy decision, the geographical market decision, the number of suppliers decision, and the supplier relation decision (Choi & Krause, 2006; Ferris & Keithly, 2001; Liker & Choi, 2004; Markowski, et al., 2010; Skoglund & Hertz, 2011).

10.1.2RQ2: What are the outcomes of the logistics key decision process?

This study shows that the logistics key decisions go through changes during the different phases of PSOs. The dynamics depend, to a large extent, on the uncertainties and the complexities in the military logistics and its supply chain in PSOs but also on the requirement to be efficient and effective with taxpayers' money. The logistics key decisions go through four changes during the PSOs phase-cycle.

The first set of decisions coincides with the capability creation phase. The focus of the decisions is to meet the operational requirements from the government, the legal procurement requirements in LOU, and to be efficient with taxpayers' money (Försvarsmakten, 2007a; Utrikesdepartementet, 2008a). The first requirement means that units or capabilities should be created with a certain level of readiness and sustainability.

The second requirement means that the procurement must be done through competitive bidding on the international market. Thereby the first sets of decisions become; bring resources, speculate, lean, international market, multiple channels, and arm's length relations.

The second set of decisions coincides with identifying the need for a specific PSO which is the start of the negotiation phase, and the decisions remain the same throughout the deployment phase. During these phases the activities focus on adopting and deploying the unit or capabilities to the environmental and operational requirements within a limited time period. Only supplies identified as needed should be procured. When a specific operation starts it is also identified that there are changes to the requirements, especially from being efficient to be effective with taxpayers' money. The second set of decisions become; bring resources, postpone, agile, international market, single channel, and partnership relations.

The third set of decisions coincides with the operational phase. The focus is to have the supplies or supplier relations, deemed necessary in order to be able to support the on-going task and coming tasks. Thereby the third set of decisions become; obtain in the area/get from outside, postpone, agile, local/international market, dual suppliers, partnerships.

The fourth set of decisions coincides with the liquidation phase. The most apparent change in the requirements is that when this phase starts, the

requirement to be efficient becomes important again and that the main clauses of LOU guide the procurement activities. Thereby the fourth set of decisions become; obtain in the area/get from outside, postpone, lean, international market, multiple suppliers, arm's length relations.

The make or buy decision did not change on an accumulated level between the studied phases. It was obvious that the core competence and key success factors were important in this decision making. It was argued that military personnel should focus on training between operations and that during operations they should support the tactical area, manage the NSE and handle all formal contact with the Host nation or other military forces. These findings are supported by Peltz et al. (2005; 2005) and results concerning US logistics in Iraq, taking into account the difference in size of the force and, to some degree, the objective with the operations.

10.1.3RQ3: How can the outcome of the sourcing key decisions impact the fulfillment of the logistics objectives in PSOs?

Without any doubt, the four decisions, combined with all the supplies needed for a PSO have great impact on the military capability and the operational objectives.

Make or Buy decision:

FM has decided to only use military personnel up front of the rear area, that is the tactical level. Having own personnel for the resupplying of the operating unit on the tactical level, increases the short term operational capability. On the operational level FM has started to discuss make or buy from a capability and value optimisation perspective. This development improves the capability in some areas with contracted specialists and releases own personnel from unqualified routine work in other areas, which improves the output from the military personnel. Having foreign private businesses to engage locally in the operational area can also support the stabilisation of peace (Oetzel, et al., 2009).

Market decision:

Proximity to the main equipment suppliers have shown to be important in the preparation for a PSO. Equipment needs updates and possibly maintenance before deployment and the proximity showed to speed up the work to get all the equipment ready and in place for deployment. These findings are in line with the results concerning proximity by Kalfakakou and Tsouros (2001). The use of the international market was limited mainly to subsystem suppliers where FM previously had been buying. These international suppliers knew FM's needs and cooperated with the main equipment suppliers for integration. The study indicates that local sourcing can have a substantial impact on military logistics in PSOs. Local sourcing can support the development of the local businesses

and get international suppliers to open new ventures in the operational area (Oetzel, et al., 2009). The ability to source locally often creates redundancy in the supply chain. It can be argued that proximity is the single most important factor for the ability to for the logistics outcome in PSOs.

Number of suppliers:

Kouvelis and Li (2008) mean that having more than one supplier reduces the shortage risk. The case has shown that having more than one supplier for one product or product group in PSOs have reduced the risks of backorders. Due to the transparency in public procurement most suppliers are aware of each other, which seems to make the suppliers more keen on fulfilling the customer's needs. A similar conclusion was presented by Liker and Choi (2004) based on research in the car industry. Having suppliers from different markets has also contributed to the risk reduction, based on, for example, differences in the customs handling. Both these perspectives have shown to be important during on-going PSOs. In the preparation phases before the deployment, single sourcing seemed to be more efficient. During the preparation period FM management was a narrow sector, and a minimisation of the number of suppliers can be a prerequisite to get ready in time for the deployment. In the capability creation phase, LOU requires that the procurements are open to multiple suppliers. This creates certain problems with the relations in other phases when limitations in the supply base are optimal for FM.

Supplier Relations:

The relations in PSO differed depending on supply group and the PSO's phase. LOU forced the FM procuring organisation to approach the industry in a certain way, with the consequences that during the capability creation and liquidation phases, FM was more or less compelled to have arm's length relations with the industry. During the other phases a larger freedom existed to have other types of relations based on certain paragraphs in LOU. Which phase the PSO was in, was very important for the relations. Many relations changed character depending on the phase, going from long term arm's length relations to partnership and back again. The change depended mainly on two reasons. The industry thought it was important to support FM in PSO. This opinion was based on ethic codes within the firms and in the Swedish firms it was also possible to recognise a strong feeling of patriotism. The change in the relations was important for the logistics outcome. Logistics in PSO are often lead-time critical, and having arm's length relations showed to delay the logistics. Administrative delays could be avoided with partnership relations, and joint efforts could minimise lead-times. Trust in the relations was essential in order to fulfil the short term objectives.

10.2 Managerial implications

This is the first research conducted on logistics in Swedish PSOs. Consequently, there are many things to be said based on aspects that both are central and peripheral in this study. But I will point only at some of the implications I think that are of central importance.

10.2.1 Implications for the government

FM is constrained in their sourcing decisions by LOU. The Act does not support effective and flexible procurement which is required for PSOs. Some possibilities have existed to create some flexibility with, for example, frame contracts, but the guidelines recommend a maximum of three years. In other areas the logistics and spare part handling and maintenance become almost impossible when new competitive bidding has to be done if a larger number of the same type of equipment is needed for the same operation, that is two support systems might be needed instead of one. The findings in this research are supported by Markowski, et al. (2010) on the defence markets for small nations. Several researchers question whether competitive bidding is only positive for the defence area, where few suppliers and few customers act (Humphries & Wilding, 2004a; Johnsen, et al., 2009; Markowski, et al., 2010). The market is strongly regulated by few actors, which hinders normal market forces to prevail. The legislation needs also to take into account that defence materiel has a long physical life length (30-50 years), which puts very special requirements on the supply chain. A first step could be for the government to have a dialogue with the FM to obtain a deeper understanding of the requirements in PSOs and other operations and what the commercial limitations are today (some are mentioned in this study). This could then be followed by a discussion on alternatives to competitive bidding in the defence area. Another first step could be to stimulate further research in this area. Where does competition create logistic problems? Is competition always efficient? If not, under what circumstances should other procurement methods prevail, and how could they be designed?

The contribution of logistics to the long term objective cannot be done without costs, especially if forethought is used. When setting a permanent camp facility, it can be designed for later use after the operation has ended, for example, as a school or a hospital. This type of thinking however probably requires both coordination between agencies and coordination from the government. In this area it is also important to discuss FM's obligation to stimulate a supplier to establish a subsidiary in the operational area.

10.2.2 Implications for management of operations

Managing and planning of operations

The logistics key decisions discussed in the thesis can be important tools for the FM planning for logistics in PSOs. It gives suggestions both concerning the specific planning for individual operations and the more general long term planning for FM capabilities both on a national and international level. The decisions discussed in the thesis are identified as the most important questions and they indicate that not one solution is the best but that the management of PSO needs to change the balance during different phases in PSO in order to meet the operational requirements.

Lack of knowledge concerning local sourcing

It has been identified in this study that local sourcing is important for PSO. The problem the Swedish soldiers have encountered in the NSE has been the lack of guidelines on how to evaluate the risk of causing inflation if the suppliers have connection to money emanating from war crimes, and to avoid making the suppliers becoming dependent on FM as a customer. The framework supports the importance of sourcing locally but it also identifies these problems that the Swedish units have encountered (Kaldor, 1999; Kamphuis, 2005; Macrae & Leader, 2000a, 2000b). This study has not provided any answers to this dilemma. Until more studies are done cautiousness is the best guideline to give; learn about the supplier and the connections to the society and avoid becoming a dominant customer. In the operations studied, no problems have appeared, mainly due to careful handling by the purchasing soldiers. It is important to note that not all suppliers in the area are problematic in this sense. Allied forces often have the ability to give some support. Some international suppliers of non-military equipment choose to establish local offices or warehouses in operational areas both with CSR and a supplying perspective, e.g. food suppliers (Oetzel, et al., 2009). Related to this area are also the questions of special interests. This study showed that special interests is a strong factor when Swedish units go abroad. One can argue whether these requirements are always balanced and if they take the holistic picture into consideration. A decision that is correct for a certain function can be wrong from a holistic perspective, both environmentally and operationally.

10.2.3 Implications for management of procurement

In the case studied the tendency has firstly been to fulfil all procedural requirements linked to internal regulations and LOU and then secondly to look on the needs for PSOs. This can probably be done the other way around, to look at the requirements for PSOs first and then look into how this can be solved. When a conflict between the needs and the regulations appear this has

to be taken much further in the discussions to either change operational requirements or change the regulations. In this study it was indicated that the procuring organisations avoided these problems, and focused on meeting the requirements from the Swedish Competition Authority, instead of fulfilling the needs in PSOs.

10.3 Future research

In this area the problem is not to define what needs further research, because loose ends exist everywhere. In the area of military logistics is lacking published research. One of main problems with this study was that it existed only limited amounts of previous research to build on. This also had the effect that this study have many open ends. I will point at five areas for future research below, which are perceived as important in relation to this study. This research has led to a number of issues which this study could not come up with a valid answer, but only suggestions and indications. Some of these are of importance for future research in military logistics.

Firstly, management of building and running military camps in PSO links to local sourcing, contractor engagement in the operational area and long term peace building and development. The camps in military operations are complex. They contain many different types of facilities with very different requirements. It also includes questions like supplier involvement and dual use of the facilities i.e. other use after the military has left the camp. They can also be an important part of the aid planning. After the PSO has left the area, the whole camp can be used for other purposes, for example schools or hospitals. The importance of the camp was identified in this study, but was only studied to a limited degree in the Liberia case.

Secondly, transports to, from and within operational areas are often difficult matters in PSOs. In this study was only limited parts of the customer perspective studied. Transit rules, customs and hostile action, place special requirements on both capacities and the suppliers. Many suppliers choose therefore not to offer their services to military organisations. The transport system for international operations needs further studies, both in terms of the usage of its own resources and the contracting of suppliers.

Thirdly, the importance of the national industry for national defence matters is a complex question. This study clearly indicates that close supplier relations are beneficial for logistics in PSO. But many other matters also come into play when national defence industries' role in the national defence is discussed. These aspects have an important connection to the legal framework for defence procurement. In this study LOU was considered as a major obstacle to achieve effective and efficient logistics in PSOs. Further studies in this area can either create a better understanding for the relevance of the Act and how to adjust logistics or create substantive arguments for a change of the Act.

10 Conclusions, implications and avenues future research

Fourthly, international coordination and cooperation of logistics in PSOs is a frequently discussed area. In the analysis partnership relations, joint logistics command and problems with national requirements were briefly mentioned. The cooperation and coordination of logistics is important for the future development of multinational military operations as PSOs. From a political perspective joint logistics solutions have been discussed for several years, but this study shows that joint solutions can be questioned or at least require a solid framework. Further research in this area is needed to understand more about the different factors that affect joint or separate logistics solutions that build on cooperation.

Fifthly, the military product structure plays an important role for many military logistics areas. In this study the connection upstream to the suppliers was the most important aspect. But other logistics aspects exist when it comes to the planning of PSOs. Product structures and their relation different logistics activities need to be studied further to understand the product's role in the supply chain and the supplier relations. How relevant for military logistics is Kraljic's (1983) portfolio management?

References

- Agndal, H. (2006). The purchasing market entry process—A study of 10 Swedish industrial small and medium-sized enterprises. *Journal of Purchasing & Supply Management*, 12(4), 182-196.
- Agripino, M., Cathcart, T., & Mathaisel, D. (2002). A Lean Sustainment Enterprise Model for Military Systems. *Acquisition Review Quarterly*, 274-297.
- Aitken, J., Childerhouse, P., Christopher, M., & Towill, D. (2005). Desinging and Managing Multiple Pipelines. *Journal of Business Logistics*, 26(2), 73-95.
- Alberts, D. S., & Hayes, R. E. (2003). *Power to the Edge: Command and Control in the Information Age*. Washington: CCRP.
- Alderson, W. (1950). Marketing Efficiency and the Principle of Postponement. *Cost and Profit Outlook*, 3(4), 15-18.
- Alexandersson, G., & Hultén, S. (2007). High and Low Bids in Tenders: Strategic Pricing and Other Bidding Behaviour in Public Tenders of Passenger Railway Services. *Annals of Public and Cooperative Economics*, 78(2), 161-194.
- Alexandra, A., Baker, D.-P., & Caparini, M. (2008). The ethics and governance of private military and security companies. In A. Alexandra, D.-P. Baker & M. Caparini (Eds.), *Private Military and Security Companies: Ethics, policies and civil-military relations* (pp. 1-15). Abingdon: Routledge.
- Alvesson, M., & Sköldberg, K. (2008). *Tolkning och reflektion: Vetenskapsfilosofi och kvalitativ metod* (2nd ed.): Studentlitteratur.
- Andersson, J. (2001). Military Operational Measures of Effectiveness for Peacekeeping Operations. *Military Review*, 36-44.
- Ang, G., Groosman, M., & Scholten, N. P. M. (2005). Dutch Performance-Based Approach to Building Regulations and Public Procurement. *Building research & Information*, 33(2), 107-119.
- Anton, J. J., & Yao, D. A. (1987). Second Sourcing and the Experience Curve: Price Competition. *The Rand Journal of Economics*, 18(1), 57-76.
- Arrowsmith, S. (1998). Towards a multilateral agreement on Transparency in Government Procurement. *International and Comparative Law Quarterly*, 47(4), 793-816.
- Audretsch, D. B., Link, A. N., & Scott, J. T. (2002). Public/private technology partnerships: evaluating SBIR-supported research. *Research Policy*, 31, 145-158.

References

- Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of Age at Entry, Knowledge Intensity, and Imitability on International Growth. *Academy of Management Journal*, 43(5), 909-924.
- Axelsson, B., Hallén, L., & Elbe, J. (2007). Mobilising Marginal Resources for Public Events. *Event Management*, 10(2-3), 175-183.
- Axelsson, B., Rozemeijer, F., & Wynstra, F. (2005). *Developing Sourcing Capabilities*. Chichester: Wiley & Sons.
- Bakken, B. T., & Vamraak, T. (2003). *Misperception of dynamics in military planning: Exploring the counter-intuitive behaviour of the logistics chain*. Paper presented at the 21st System Dynamics Conference, Yew York.
http://www.systemdynamics.org/conferences/2003/proceed/PAPER_S/161.pdf
- Barahona, F., Chowdhary, P., Ettl, M., Huang, P., Kimbrel, T., Ladanyi, L., . . . Swirszcz, G. M. (2007). Inventory Allocation and Transportation Scheduling for Logistics of Network-centric Military Operations *IBM Journal of Research and Development*, 51(3/4), 391-407.
- Barge Jr, H., Davis, M. S., & Schwent Jr, J. T. (2003). *Field level information collaboration during complex humanitarian emergencies and peace operations*. Master of Science in Information Technology Management Master Thesis, Naval Postgraduate School, Monterey.
- Barry, J., & Jeffreys, A. (2002). A bridge too far: aid agencies and the military in humanitarian response. *Humanitarian Practice Network Paper*, (37), 1-36.
 Retrieved from
<http://www.odihpn.org/documents/networkpaper037.pdf>
- Beamon, B. M., & Kotleba, S. A. (2006). Inventory modelling for complex emergencies in humanitarian relief operations. *International Journal of Logistics: Research and Applications*, 9(1), 1-18.
- Beier, F. J., & Stern, L. W. (1969). Power in the channel of distribution. In L. W. Stern (Ed.), *Distribution Channels: Behavioural Dimensions* (pp. 92-116). Boston: Houghton Mifflin Harcourt
- Berg, G. (2006). *Handbok Driftsäkerhet*. Stockholm: Försvarsmakten.
- Bessler, M., & Seki, K. (2006). Civil-Military Relations in Armed Conflicts: A Humanitarian Perspective. *Liaison - A Journal of Civil-Military Humanitarian Relief Collaborations*, 3(3), 4-10.
- Blanchard, B. S. (1992). *Logistics Engineering and Management* (4th ed.). Englewood Cliffs: Prentice-Hall, Inc.
- Blomstermo, A., Eriksson, K., & Sharma, D. D. (2004). Domestic Activity and Knowledge Development in the Internationalization Process of Firms. *Journal of International Entrepreneurship*, 2(3), 239-259.
- Boone, C. A., Craighead, C. W., & Hanna, J. B. (2007). Postponement: an evolving supply chain concept. [Literature Review]. *International Journal of Physical Distribution & Logistics Management*, 37(8), 594-611.
- Boutros-Ghali, B. (1992). *An Agenda for Peace: Preventive diplomacy, peacemaking and peace-keeping*. New York: United Nations.

- Boutros-Ghali, B. (1995). *Supplement to an Agenda for Peace: Position paper of the Secretary-General on the occasion of the fiftieth anniversary of the United Nations*. New York: United Nations.
- Bowersox, D. J., & Closs, D. J. (1996). *Logistical Management; The Integrated Supply Chain Process* (International ed.). Singapore: McGraw-Hill.
- Boyd, J. R. (1987). *A discourse on Winning and Losing*. Atlanta: Air University Press.
- Bucklin, L. P. (1965). Postponement, speculation and the structure of distribution channels. *Journal of Marketing Research*, 2, 26-31.
- Burger, P., & Hawkesworth, I. (2011). How to Attain Value for Money: Comparing PPP and Traditional Infrastructure Public Procurement. *OECD Journal on Budgeting*, 2011(1), 91-146.
- Byrne, E. F. (2007). Assessing Arms Maker' Corporate Social Responsibility. *Journal of Business Ethics*, 74, 201-217.
- Bäckstrand, J. (2007). *Levels of Interaction in Supply Chain Relations*. Lic., Chalmers University of Technology, Göteborg.
- Caparini, M. (Ed.). (2007). *Private Military And Security Companies: Ethics, Policies and Civil-military Relations*. London: Taylor & Francis Ltd.
- Cardinali, R. (2001). Does the future of military logistics lie in outsourcing and privatization? Accountants - the new gatekeepers of war-time operations. *Work Study*, 50(3), 105-110.
- Carter, J. (2008). Reconstructing the Rule of Law: Post-conflict Liberia. *Harvard International Review*, 30(3), 14-18.
- Chappell, A., & Peck, H. (2006). Risk management in military supply chains: Is there a role for six sigma? *International Journal of Logistics: Research and Applications*, 9(3), 253-267.
- Chefen_för_Armén. (1993). *Underhållsreglemente för Armén Teknisk Tjänst*. Stockholm: Chefen för Armén.
- Chefen_för_Armén. (2001). *Teknisk Tjänst Reglemente Grunder*. Stockholm: Chefen för Armén.
- Choi, T. Y., & Krause, D. R. (2006). The supply base and its complexity: Implications for transaction costs, risks, responsiveness, and innovation. *Journal of Operations Management*, 24, 637-652.
- Chopra, S., & Meindl, P. (2007). *Supply Chain Management: Strategy, Planning & Operations 3rd Ed.* (3rd ed.). Upper Saddle River: Pearson Education Inc.
- Christopher, M. (2000). The Agile Supply Chain: Competing in Volatile Markets. *Industrial Marketing Management*, 29, 37-44.
- Christopher, M., & Lee, H. (2004). Mitigating supply chain risk through improved confidence. *International Journal of Physical Distribution & Logistics Management*, 34(5), 388-396.

References

- Christopher, M., & Towill, D. (2001). An integrated model for the design of agile supply chains. *International Journal of Physical Distribution & Logistics Management*, 31(4), 235-246.
- Claro, D. P., de Oliveira Claro, P. B., & Hagelaar, G. (2006). Coordinating collaborative joint efforts with suppliers: the effects of trust, transaction specific investment and information network in the Dutch flower industry. *Supply Chain Management: An International Journal*, 11(3), 216-224.
- Cousins, P. D., Lamming, R., Lawson, B., & Squire, B. (2008). *Strategic Supply Management: Principles, Theories and Practice*. Harlow: Pearson Education Limited.
- Cox, A. (2004a). The art of the possible: relationship management in power regimes and supply chains. *Supply Chain Management: An International Journal*, 9(5), 346-356.
- Cox, A. (2004b). Business relationship alignment: on the commensurability of value capture and mutuality in buyer and supplier exchange. *Supply Chain Management: An International Journal*, 9(5), 410-420.
- Cox, A., Watson, G., Lonsdale, C., & Sanderson, J. (2004). Managing appropriately in power regimes: relationship and performance management in 12 supply chain cases. *Supply Chain Management: An International Journal*, 9(5), 357-371.
- CSCMP. (2010). Supply Chain Management; Terms and Glossary Retrieved from <http://cscmp.org/digital/glossary/glossary.asp>
- Dahl, R. A. (1957). The Concept of Power. *Behavioral Science*, 201-215.
- Danermark, B., Ekström, M., Jakobsen, L., & Karlsson, J. C. (2003). *Att förklara samhället* (second ed.). Lund: Studentlitteratur.
- Dankbaar, B. (2007). Global Sourcing and Innovation: The Consequences of Losing both Organizational and Geographical Proximity. *European Planning Studies*, 15(2), 271-288.
- Davidson, A. L. (2006). *Key Performance Indicators in Humanitarian Logistics*. Master of Engineering in Logistics Master Thesis, Massachusetts Institute of Technology, Massachusetts.
- De Jomini, A.-H. (1838/2007). *The Art of War (Précis del'art de la guerre)*. Mineola: Dover Publications, Inc.
- Deutsch, M. (1958). Trust and suspicion. *The Journal of Conflict Resolution*, 2(4), 265-280.
- Donnelly, T. (2004). *Operation Iraqi Freedom: A Strategic Assessment*. Washington DC: AEI Press.
- Dorn, M., Nysten, M., & Skoglund, P. (2009). *Adoption of Postponement and Speculation to a Military context* Paper presented at the NOFOMA 2009, Jönköping, Sweden.
- Drogendijk, R., & Slangen, A. (2006). Hofstede, Schwartz, or managerial perceptions? The effects of different cultural distance measures on

- establishment mode choices by multinational enterprises. *International Business Review*, 15(4), 361–380.
- Dubois, A., & Araujo, L. (2007). Case research in purchasing and supply management: Opportunities and challenges. *Journal of Purchasing & Supply Management*, 13, 170-181.
- Dubois, A., Hulthén, K., & Pedersen, A.-C. (2004). Supply chains and interdependence: a theoretical analysis. *Journal of Purchasing & Supply Management*, 10, 3-9.
- Dubois, A., & Pedersen, A.-C. (2002). Why relationships do not fit into purchasing portfolio models: a comparison between the portfolio and industrial network approaches. *European Journal of Purchasing & Supply Management*, 8, 35-42.
- Dubois, A., & Wynstra, F. (2005). Organising the Purchasing Function as an Interface between Internal and External Networks. Retrieved from <http://impgroup.org/uploads/papers/4683.pdf>
- Dyer, J. H., Cho, D. S., & Chu, W. (1998). Strategic Supplier Segmentation: The Next "Best Practice" in Supply Chain Management. *California Management Review*, 40(2), 57-77.
- Dyer, J. H., & Chu, W. (2000). The Determinants of Trust in Supplier-automaker Relationships in the U.S., Japan, and Korea. *Journal of International Business Studies*, 31(2), 259-285.
- Eccles, H. E. (1959). *Logistics in the National Defence*. Westport: Green Press, Publishers.
- Edwards, J. E. (2004). *Combat Service Support Guide* (4th ed.). Mechanicsburg: Stackpole Books.
- Eide, E. B., Kaspersen, A. T., Kent, R., & von Hippel, K. (2005). Report on Integrated Missions: Practical Perspectives and Recommendations. New York.
- El-Ansary, A. I., & Stern, L. W. (1972). Power Measurement in the Distribution Channel. *Journal of Marketing Research*, 9(1), 47-52.
- Ellram, L. M. (1996). The use of the case study method in logistics research. *Journal of Business Logistics*, 17(2), 93-138.
- Emerson, R. M. (1962). Power-Dependence Relations *American Sociological Review*, 27, 31-41.
- Engelbrekt, K. (2011). EU Enlargement and the Emboldening of Institutional Integrity in Central and Eastern Europe: The 'Tough Test' of Public Procurement. *European Law Journal*, 17(2), 230-251.
- Erridge, A. (2007). Public Procurement, Public Value and the Northern Ireland Unemployment Pilot Project. *Public Administration*, 85(4), 1023-1043.
- Etgar, M. (1976). Channel Domination and Countervailing Power in Distributive Channels. *Journal of Marketing Research*, 13(3), 254-262.
- EU. (2004a). *GREEN PAPER: Defence procurement*. Brussels: Retrieved from http://europa.eu.int/comm/internal_market/consultations.

References

- EU. (2004b). *Headline Goal 2010*. Brussels: EU Retrieved from <http://www.consilium.europa.eu/uedocs/cmsUpload/2010%20Headline%20Goal.pdf>.
- EU. (2011). *EU Concept for Logistic Support for EU-Led Military Operations* (8641/11). Brussels: Council of the European Union Retrieved from <http://register.consilium.europa.eu/pdf/en/11/st08/st08641.en11.pdf>
- Evans, J., & Bridson, K. (2005). Explaining retail offer adaptation through psychic distance. *International Journal of Retail & Distribution Management*, 33(1), 69-78.
- Evans, J., Treadgold, A., & Mavondo, F. (2000). Explaining export development through psychic distance. [Comment]. *International Marketing Review*, 17(2), 164-168.
- Faes, W., & Matthyssens, P. (2009). Insights into the process of changing sourcing strategies. *Journal of Business & Industrial Marketing*, 24(3/4), 245-255.
- Fawcett, S. E., Magnan, G. M., & McCarter, M. W. (2008). Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal*, 13(1), 35-48.
- Ferris, S. P., & Keithly, D. M. (2001). Outsourcing the Sinews of War: Contractor Logistics. *Military Review*(Sept.), 72-83.
- Fisher, M. L. (1997). What Is the Right Supply Chain for Your Product? *Harvard Business Review*, 75(2).
- Flens, A., Rietjens, B., de Leeuw, S., & van Amstel, W. P. (2008). *Complex Emergency Supply Chains and Local Participation*. Paper presented at the Military Logistics Symposium, Stockholm.
- Ford, D., Gadde, L.-E., Håkansson, H., & Snehota, I. (2003). *Managing Business Relationships* (Second ed.). Chichester: John Wiley & Sons Ltd.
- Forsgren, M., Hägg, I., Håkansson, H., Johansson, J., & Mattsson, L.-G. (1988). *Firms in Networks: New Perspective on Competitive Power*. Stockholm: SNS.
- Fort, T. L. (2007). The Corporate Contribution to One Planet Living in Global Peace and Security: Introduction. *The Journal of Corporate Citizenship*(26), 20-24.
- Foxton, P. D. (1994). *Powering War: Modern Land Force Logistics*. London: Brassey's Ltd.
- French, J. R. P. J., & Raven, B. (1959). The Bases of Social Power. In D. Cartwright (Ed.), *Studies in Social Power* (pp. 150-165). Ann Arbor: The University of Michigan.
- Freytag, P. V., & Mikkelsen, O. S. (2007). Sourcing from outside – six managerial challenges. *Journal of Business & Industrial Marketing*, 22(3), 187-195.
- Frost, T., Stimpson, D. V., & Maughan, M. R. C. (1978). Some correlates of trust. *Journal of Psychology*, 99(1), 103-108.
- Försvarsdepartementet. (1996a). *Krigets Lagar* (2.1 ed.). Stockholm: Fritzes.

- Försvarsdepartementet. (1996b). *Regeringens Proposition 1996/97:4 Totalförsvar i förnyelse - etapp 2*. Stockholm: Regeringen Retrieved from <http://regeringen.se/content/1/c4/34/39/6fd2280d.pdf>.
- Försvarsdepartementet. (2009). *Regeringens proposition 2008/09:140: Ett användbart försvar*. Stockholm: Regeringen Retrieved from www.regeringen.se/content/1/c6/12/29/57/853ca644.pdf.
- Försvarsmakten. (1997). *Joint Military Doctrine: Peace Support Operations*. Stockholm: Försvarsmakten.
- Försvarsmakten. (2002). *Militärstrategisk doktrin*. Värnamo: Fälth & Hässler.
- Försvarsmakten. (2007a). *Grundsyn Logistik* Stockholm: Försvarsmakten.
- Försvarsmakten. (2007b). *Strategi för Försvarsmaktens materielförsörjning*. (23 383:61994). Stockholm: Försvarsmakten.
- Försvarsmakten. (2009a). *Expeditionär Förmåga*. (HKV 01 400:66483 Bil 1). Stockholm: Försvarsmakten.
- Försvarsmakten. (2009b). *Försvarsmaktens strategiska OPS-plan 2009-2011, samt riktlinjer för det fortsatta arbetet (FM strategy for PPP 2009-2011)*. (25100:53840). Stockholm: Försvarsmakten.
- Försvarsmakten. (2011). *Militärstrategisk doktrin* (2 ed.). Stockholm: FMLOG APSA Grafisk produktion.
- Gadde, L.-E., & Håkansson, H. (2001). *Supply Network Strategies*. Chichester: Wiley.
- Galbraith, J. K. (1957/1997). *American Capitalism : The Concept of Countervailing Power* (New ed.). Somerset: Transaction Publishers.
- Ganuza, J.-J. (2007). Competition and Cost Overruns in Procurement. *The Journal of Industrial Economics*, 55(4), 633-660.
- GAO. (1991). Desert Shield/Storm Logistics (U. S. G. A. O. N. S. a. I. A. Division., Trans.) (pp. 58). Washington: General Accounting Office.
- García-Dastugue, S. J., & Lambert, D. M. (2007). Interorganizational time-based postponement in the supply chain. *Journal of Business Logistics*, 28(1), 57-81.
- Gaski, J. F. (1984). The Theory of Power and Conflict in Channels of Distribution. *Journal of Marketing*, 48(1), 9-29.
- Gelderman, C. J., & van Weele, A. J. (2005). Purchasing Portfolio Models: A Critique and Update. *The Journal of Supply Chain Management*, 19-28.
- Gelderman, K., Ghijsen, P., & Schoonen, J. (2010). Explaining Non-Compliance with European Union Procurement Directives: A Multidisciplinary Perspective. *Journal of Common Market Studies*, 48(2), 243-264.
- Gertler, M. S. (1993). Implementing advanced manufacturing technologies in mature industrial regions: towards a social model of technology production. *Regional Studies* 27(7), 665-680.
- Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

References

- Godsell, J., Diefenbach, T., Clemmow, C., Towill, D., & Christopher, M. (2011). Enabling Supply Chain Segmentation through Demand Profiling. *International Journal of Physical Distribution & Logistics Management*, 41(3), 296-314.
- Goldsby, T. J., Griffis, S. E., & Roath, A. S. (2006). Modeling Lean, Agile, and Leagile Supply Chain Strategies. *Journal of Business Logistics*, 27(1), 57-80.
- Golicic, S. L., Davis, D. F., McCarthy, T. M., & Mentzer, J. T. (2002). The impact of e-commerce on supply chain relationships. *International Journal of Physical Distribution & Logistics Management*, 32(10), 851-871.
- Goodhand, J., & Humle, D. (1999). From wars to complex political emergencies: understanding conflict and peace-building in the new world disorder. *Third World Quarterly*, 20(1), 13-26.
- Gourlay, C. (2000). Partners Apart: Managing Civil-Military Co-operation in Humanitarian Interventions. *Disarmament Forum*(3), 33-44.
- Griffin, W. (2008). The Future of Integrated Supply Chain Management Utilizing Performance Based Logistics. *Defense Acquisition Review Journal*, 2-17.
- Gullander, S., & Larsson, A. (2000). *Outsourcing and Location*. Paper presented at the the Conference on New Tracks on Swedish Economic Research in Europe, Mölle.
- Haack, S. (2009). *Evidence and Inquiry: A Pragmatic Reconstruction of Epistemology*. Amherst: Prometheus Books.
- Hagelin, B. (2010). From Certainty to Uncertainty: Sweden's Armament Policy in Transition. In S. Markowski, P. Hall & R. Wylie (Eds.), *Defence Procurement and Industry Policy: A Small Country Perspective*. Milton Park: Routledge.
- Halinen, A., & Törnroos, J.-Å. (2005). Using Case Methods in the Study of Contemporary Business Networks. *Journal of Business Research*, 58, 1285-1297.
- Hall, P., Markowski, S., & Wylie, R. (2010). Supply: Defence Industry. In S. Markowski, P. Hall & R. Wylie (Eds.), *Defence Procurement and Industry Policy*. Milton Park: Routledge.
- Hallen, L., & Wiedershiem-Paul, F. (1982). Psychic Distance in International Marketing - an Interaction Approach (D. o. B. Administration, Trans.) (pp. 1-39). Uppsala: University of Uppsala
- Hammersley, M. (1990). *The Dilemma of Qualitative Method: Herbert Blumer and the Chicago Tradition*. London: Routledge.
- Harland, C. (1997). Supply chain operational performance roles. *Integrated Manufacturing Systems*, 70-78.
- Hartley, K., & Sandler, T. (Eds.). (1995). *Handbook of Defence Economics* (Vol. 1). Amsterdam: North-Holland.
- Hartley, K., & Sandler, T. (Eds.). (2007). *Handbook of Defence Economics* (Vol. 2). Amsterdam: North-Holland.

- Henderson, J. H. (2006). *The Process of Military Distribution Management*. Bloomington: AuthorHouse.
- Henderson, J. H. (2008). *Military Logistics Made Easy; Concept Theory and Execution*. Bloomington: AuthorHouse.
- Herberg-Rothe, A. (2007). *Clausewitz's Puzzle: The Political Theory of War*. Oxford: Oxford University Press.
- Herberg-Rothe, A., & Echevarria II, A. (2007). Clausewitz in the Twenty First-Century: Primacy of policy and a new containment. Retrieved from http://www.worldsecuritynetwork.com/showArticle3.cfm?article_id=14985
- Hines, P., Holweg, M., & Rich, N. (2004). Learning to evolve A review of contemporary lean thinking. *International Journal of Operations & Production Management*, 24(10), 994-1011.
- Hofmann, C.-A., & Hudson, L. (2009). Military responses to natural disasters: Last resort or inevitable trend? *Humanitarian Exchange*(44), 29-31.
- Hofstede, G. (2001). *Culture's Consequences* (Second ed.). Thousand Oaks: Sage Publications Inc.
- Holmen, E., Pedersen, A.-C., & Jansen, N. (2007). Supply network initiatives – a means to reorganise the supply base? *Journal of Business & Industrial Marketing*, 22(3), 178-186.
- Howard, M. (2001). *War in European History* (Updated ed.). Oxford: Oxford University Press.
- Hubner, M. E., & Ditzler, T. F. (2004). Humanitarian military medical mission in a postconflict environment: lessons from Cambodia. *Public Health*, 118, 421-425.
- Huemer, L. (2004). Balancing between stability and variety: Identity and trust trade-offs in networks. *Industrial Marketing Management*, 33, 251-259.
- Hultman, J. (2007). *Rethinking adaptation*. Phd, Jönköping International Business School, Jönköping.
- Humphreys, M., & Weinstein, J. M. (2007). Demobilization and Reintegration. *Journal of Conflict Resolution*, 51(4), 531-567.
- Humphries, A., & Wilding, R. (2004a). Sustained monopolistic business relationships: A UK defence procurement case. *European Journal of Marketing*, 38(1/2), 99-120.
- Humphries, A., & Wilding, R. (2004b). UK defence supply chain relationships: A study of sustained monopoly. *Management Decision*, 42(1/2), 259-276.
- Hunt, S. D., & Nevin, J. R. (1974). Power in a Channel of Distribution: Sources and Consequences. *Journal of Marketing Research*, 11, 186-193.
- Håkansson, H. (1989). *Corporate technological behaviour: co-operation and networks*. London: Routledge.
- Håkansson, H. (Ed.). (1982). *International Marketing and Purchasing of Industrial Goods: An Interaction Approach*. Chichester John Wiley & Sons, Ltd.
- Håkansson, H., & Snehota, I. (1989). No Business is an Island: The Network Concept of

References

- Business Strategy. *Scandinavian Journal of Management*, 5(3), 187-200.
- Håkansson, H., & Snehota, I. (1995). *Developing Relationships in Business Networks*. London: Routledge.
- Håkansson, H., & Wootz, B. (1975). Supplier Selection in an International Environment—An Experimental Study. *Journal of Marketing Research*, 12(feb), 46-51.
- Inderst, R. (2008). Single sourcing versus multiple sourcing. *The RAND Journal of Economics*, 39(1), 199-213.
- Jahre, M., Navangul, K. A., Dieckhaus, D., Heigh, I., & Gomez-Tagle Leonard, N. (2011). *Predicting the unpredictable: Demand forecasting in international humanitarian response*. Paper presented at the Nofoma 2011, Harstad.
- JDCC. (2004). *The Military Contribution to Peace Support Operations*. Shrivenham: Ministry of Defence.
- Jenkins, L. (2003). A CIMIC contribution to assessing progress in peace support operations. *International Peacekeeping*, 10(3), 121-136.
- Johanson, J., & Vahlne, J.-E. (1977). The Internationalization Process of the Firm—A Model of Knowledge Development and Increasing Foreign Market Commitments. *Journal of International Business Studies*, 8(1), 23-32.
- Johanson, J., & Vahlne, J.-E. (1990). The Mechanism of Internationalisation. *International Marketing Review*, 7(4), 11-24.
- Johanson, J., & Vahlne, J.-E. (2003). Business Relationship Learning and Commitment in the Internationalization Process. *Journal of International Entrepreneurship*, 1(1), 83-101.
- Johanson, J., & Vahlne, J.-E. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership. *Journal of International Business Studies*, 40(9), 1411-1431.
- Johnsen, T., Howard, M., & Miemczyk, J. (2009). UK Defence Change and the Impact on Supply Relationships. *Supply Chain Management: an International Journal*, 14(4), 1-29.
- Jones, D. T., Hines, P., & Rich, N. (1997). Lean logistics. *International Journal of Physical Distribution & Logistics Management*, 27(3/4), 153-173.
- Järvensivu, T., & Törnroos, J.-Å. (2010). Case Study Research with Moderate Constructionism: Conceptualization and Practical Illustration. *Industrial Marketing Management*, 39, 100-108.
- Kaldor, M. (1999). *Nya och Gamla Krig: Organiserat våld under globaliseringens era*. Gothenburgh: Daidalos AB.
- Kaldor, M. (2003a). Civil Society and Accountability. *Journal of Human Development*, 4(1), 5-27.
- Kaldor, M. (2003b). *Global Civil Society; an answer to war*. Cambridge: Polity Press.
- Kalfakakou, R., & Tsouros, C. C. (2001). Determining the size and location of suppliers for a minimum total distribution route problem. *International Journal of Production Economics*, 71, 401-405.

- Kallock, R. W., & Williams, L. R. (2004). DoD's Supply Chain Mandate: From Factory to Foxhole. *Supply Chain Management Review*, 8(4), 46-53.
- Kamphuis, B. (2005). Economic Policy for Building Peace. In G. Junne & W. Verkoren (Eds.), *Postconflict Development: Meeting New Challenges* (pp. 185-210). Boulder: Lynne Rienner Publishers, Inc.
- Kashiwagi, D. T., & Al-Sharmani, Z. (1997). A performance-based procurement system used by the state of Wyoming. *Cost Engineering*, 39(12), 37-41.
- Kidder, R. M. (2006). Businesses for Middle East peace-building: a framework for engagement. *The Journal of Business Strategy*, 27(3), 30-37.
- King, W. R. (2001). Guest Editorial Developing a Sourcing Strategy for IS: A Behavioral Decision Process and Framework. *IEEE Transactions on Engineering Management*, 48(1), 15-24.
- Kinsey, C. (2006). *Corporate Soldiers and International Security; The rise of private military companies*. London: Routledge.
- Klier, T. (2005). Determinants of supplier plant location: Evidence from the auto industry. *Economic Perspectives*, 2-15.
- Konkurrensverket. (2012). Ordlista Retrieved 5/4 2012
- Korac, M. (2006). Gender, conflict and peace-building: Lessons from the conflict in the former Yugoslavia. *Women's Studies International Forum*, 29, 510-520.
- Kotabe, M., & Murray, J. Y. (2001). Outsourcing Service Activities. *Marketing Management*(Spring), 40-445.
- Kotler, P., Armstrong, G., Saunders, J., & Wong, V. (2001). *Principles of marketing* (3rd ed.). Harlow, Essex: Pearson Education Limited.
- Kouvelis, P., & Li, J. (2008). Flexible Backup Supply and the Management of Lead-Time Uncertainty. *Production and Operations Management*, 17(2), 184-199.
- Kovács, G., & Spens, K. M. (2005). Abductive reasoning in logistics research. *International Journal of Physical Distribution & Logistics Management*, 35(2), 132-144.
- Kovács, G., & Spens, K. M. (2007). Logistics Theory Building. *The Icfai Journal of Supply Chain Management*, 4(4), 7-27.
- Kraljic, P. (1983). Purchasing must become supply management: How managers can guard against materials disruptions by formulating a strategy for supply. *Harvard Business Review*, 109-117.
- Kress, M. (2002). *Operational Logistics: The Art and Science of Sustaining Military Operations*. Dordrecht: Kluwer Academic Publishers.
- Kwant, R. C. (1965). *Phenomenology of social existence*. Pittsburgh: Duquesne University Press.
- Lakemond, N. (2001). *Managing across organisations, Intra- and interorganisational aspects of supplier involvement in product development projects*. Phd, Linköpings Universitet, Linköping.

References

- Lambert, D. M., Cooper, M. C., & Pagh, J. D. (1998). Supply chain management: Implementation issues and research opportunities. *The International Journal of Logistics Management*, 9(2), 1-19.
- Lambert, D. M., & Knemeyer, A. M. (2004). We're in This Together. *Harvard Business Review*, 82(12), 114-122.
- Lambert, D. M., Stock, J. R., & Ellram, L. M. (1998). *Fundamentals of Logistics Management*. McGraw-Hill Higher Education.
- Larson, P. D., Poist, R. F., & Halldórsson, Á. (2007). Perspectives on Logistics VS. SCM: A Survey of SCM Professionals. *Journal of Business Logistics*, 28(1), 1-24.
- Lederach, J. P. (2005). *The Moral Imagination, the art and soul of building peace*. New York: Oxford University Press, Inc.
- Lee, M.-D. P. (2008). A review of the theories of corporate social responsibility: Its evolutionary path and the road ahead. *International Journal of Management Reviews*, 10(1), 53-73.
- Levine, H. (2006). Stockpile Stewardship in the United States: A Primer. Retrieved from <http://www.cdi.org/PDFs/Haninah%20Levine%20Stockpile%20Stewardship%20Primer.pdf>
- Liddell Hart, B. H. (1954/1991). *Strategy* (2nd revised ed.). New York: Plume Books.
- Liker, J. K., & Choi, T. Y. (2004). Building Deep Supplier Relations. *Harvard Business Review*, 82(12), 104-113.
- Lincoln, Y. S., & Guba, E. G. (2003). Paradigmatic Controversies, Contradictions and Emerging Confluences In N. K. Denzin & Y. S. Lincoln (Eds.), *The Landscape of Qualitative Research*. Thousand Oaks: Sage Publications Ltd.
- Lindskog, H., Brege, S., & Brehmer, P.-O. (2010). Corruption in Public Procurement and Private Sector Purchasing. *Journal of Organisational Transformation and Social Change*, 7(2), 167-188.
- Lindstrom, G. (2007). Enter the EU Battlegroups. *Chaillot Paper*. Retrieved from <http://www.iss.europa.eu/uploads/media/cp097.pdf>
- Listou, T. (2008). Postponement and Speculation in Noncommercial Supply Chains. *Supply Chain Forum: an International Journal*, 9(2), 56-64.
- Lloyd, R. E., & McCue, C. P. (2004). *What is Public Procurement? Definitional Problems and Implications*. Paper presented at the International Public Procurement Conference, Fort Lauderdale.
- Losch, R. (2007). *Competitive Dialogue and Negotiated Procedure in the Public Sector*. Paper presented at the 3rd Public Procurement Ph.D. Conference Nottingham University, Nottingham.
- Lundmark, M. (2011). *Transatlantic Defence Industry Integration*. Phd, Stockholm School of Economics, Stockholm. (ISBN 978-91-7258-857-8)
- Lynn, J. A. (Ed.). (1993). *Feeding Mars; Logistics in Western Warfare from the Middle Ages to the Present*. Colorado: Westview Press.

- Lyon, T. P. (2006). Does Dual Sourcing Lower Procurement Costs? *The Journal of Industrial Economics*, 54(2), 223-252.
- Macrae, J., & Leader, N. (2000a). The Politics of Coherence: The UK government's approach to linking political and humanitarian responses to complex political emergencies. *HPG Research in Focus*(1), 1-3.
- Macrae, J., & Leader, N. (2000b). Shifting sands: The search for 'coherence' between political and humanitarian responses to complex emergencies. In H. P. Group (Ed.), *HPG Report* (pp. 1-84). London: Overseas Development Institute.
- Mahmudi-Azer, S. (2006). Arms Trade and its Impact on Global Health. *Theoretical Medicine and Bioethics*, 27, 81-93.
- Markowski, S., Hall, P., & Wylie, R. (Eds.). (2010). *Defence Procurement and Industry Policy*. Milton Park: Routledge.
- Mason-Jones, R., Naylor, B., & Towill, D. R. (2000a). Engineering the leagile supply chain. *International Journal of Agile Management Systems*, 2(1), 56-61.
- Mason-Jones, R., Naylor, B., & Towill, D. R. (2000b). Lean, agile or leagile? Matching your supply chain to the marketplace. *International Journal of Production Research*, 38(17), 4061-4070.
- Mathaisel, D. F. X. (2008). *Sustaining The Military Enterprise: An Architecture for a Lean Transformation*. Boca Raton: Auerbach Publications, Taylor & Francis Group.
- Matthyssens, P., Quintens, L., & Faes, W. (2003). A Process Model of Global Purchasing. *Journal of Customer Behaviour*, 2(3), 305-327.
- McDougall, P. P., Shane, S., & Oviatt, B. M. (1994). Explaining the formation of international new ventures: The limits of theories from international business research. *Journal of Business Venturing* 9(6), 469-487.
- McGinnis, M. A. (1992). Military Logistics: Insights for Business Logistics. *International Journal of Physical Distribution & Logistics Management*, 22(2), 22-33.
- Mellewigt, T., Madhok, A., & Weibeld, A. (2007). Trust and Formal Contracts in Interorganizational Relationships - Substitutes and Complements. *Managerial and Decision Economics*, 28, 833-847.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, 22(2), 1-25.
- Mentzer, J. T., & Kahn, K. B. (1995). A Framework of Logistics Research. *Journal of Business Logistics*, 16(1), 231-250.
- Meyer, K. E., & Gelbuda, M. (2006). Process perspectives in international business research in CEE. *Management International Review*, 46(2), 143-164.
- Michelson, G., Wailes, N., van der Laan, S., & Frost, G. (2004). Ethical Investment Processes and Outcomes. *Journal of Business Ethics*, 10, 1-10.

References

- Mintzberg, H. (1983). *Power in and around organizations* Englewood Cliffs: Prentice-Hall.
- Mitra, K., Rice, S. J., & LeMay, S. A. (1997). Postponement and Speculation in exchange relationships: A transaction cost approach. Retrieved from <http://sbaer.uca.edu/research/sma/1997/PDF/03.pdf>
- MoD. (2005). *Defence Industrial Strategy: Defence White Paper*. (cm6697). London: Retrieved from http://www.mod.uk/NR/rdoonlyres/F530ED6C-F80C-4F24-8438-0B587CC4BF4D/0/def_industrial_strategy_wp_cm6697.pdf.
- Molina-Morales, F. X., & Martinez-Fernaández, M. T. (2003). The Impact of Industrial District Affiliation on Firm Value Creation. *European Planning Studies*, 11(2), 155-170.
- Monczka, R. M., Handfield, R. B., Giunipero, L. C., Patterson, J. L., & Waters, D. (2010). *Purchasing & Supply Management*. Andover: Cengage Learning EMEA.
- Mookherjee, S. N. (2008). Strategic Sourcing: Need for a Disciplined Approach. *The Icfai University Journal of Business Strategy*, 5(2).
- Morgan, K., & Sonnino, R. (2007). Empowering Consumers: The Creative Procurement of School Meals in Italy and the UK. *International Journal of Consumer Studies*, 31(1), 19-25.
- Moshe, M. (2001). Peace building: a conceptual framework. *International Journal of Social Welfare*, 10(1), 14-26.
- Murray, J. Y. (2001). Strategic Alliance-Based Global Sourcing Strategy for Competitive Advantage: A Conceptual Framework and Research Propositions. *Journal of International Marketing*, 9(4), 30-58.
- NATO. (2003). Allied Joint Logistic Doctrine *AJP-4(A)* Retrieved from www.nato.int/docu/stanag/ajp4/ajp-4.pdf
- NATO. (2007). NATO Logistics Handbook Retrieved from www.nato-otan.org/docu/logi-en/logistics_hndbk_2007-en.pdf
- Naylor, J. B., Naim, M. M., & Berry, D. (1999). Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal Production Economics*, 62, 107-118.
- Nordin, F. (2008). Linkages between service sourcing decisions and competitive advantage: A review, propositions, and illustrating cases. *International Journal of Production Economics*, 114(1), 40-55.
- O'Grady, S., & Lane, H. W. (1996). The Psychic Distance Paradox. *Journal of International Business Studies*, 27(2), 309-333.
- O'Hanlon, M. E. (2009). *The Science of War, Defense Budgeting, Military Technology, Logistics, and combat Outcomes*. Princeton: Princeton University Press.
- O'Konski, M. J. (1999). Revolution in Military Logistics: An Overview *Army Logistician*, 31(1), 11-14.
- Oesterle, M.-J. (1997). Time-Span until Internationalization: Foreign Market Entry as a Built-In-Mechanism of Innovations. *MIR. Management International Review*, 37(2), 125-149.

- Oetzel, J., Westermann-Behaylo, M., Koerber, C., Fort, T. L., & Rivera, J. (2009). Business and Peace: Sketching the Terrain. *Journal of Business Ethics*, 89(Mars, Supplement), 351-373.
- Ohlson, T. (2008). Understanding Causes of War and Peace. *European Journal of International Relations*, 14(1), 133-160.
- Ohno, T. (1988). *Toyota Production System: Beyond Large-scale Production*. Portland: Productivity Press.
- Osarenkhoe, A. (2008). A study of the enablers of non-sequential internationalization process among small and medium-sized firms. *International Journal of Business Science and Applied Management*, 3(2), 1-20.
- Osarenkhoe, A. (2009). An integrated framework for understanding the driving forces behind non-sequential process of internationalisation among firms. *Business Process Management Journal*, 15(2), 286-316.
- Pagh, J. D., & Cooper, M. C. (1998). Supply chain postponement and speculation strategies: How to choose the right strategy *Journal of Business Logistics*, 19(2), 13-33.
- Pagonis, W. G. (1992). *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*. Boston: Harvard Business School Press.
- Palmujoki, A., Parikka-Alhola, K., & Ekroos, A. (2010). Green Public Procurement: Analysis on the Use of Environmental Criteria in Contracts. *Review of European Community & International Environmental Law*, 19(2).
- Parapob, S., Suthikarnnarunai, N., & Buranaprapa, P. (2009). *The Survey of Thailand's Military Logistics: Key Performance Indicators*. Paper presented at the World Congress on Engineering and Computer Science, San Francisco.
- Pashev, K. V. (2011). Corruption and Accession: Evidence from Public Procurement in Bulgaria. *Public Management Review*, 13(3), 409-432.
- Pearce, J. (2005). The International Community and Peacebuilding. *Development*, 48(3), 41-49.
- Peltz, E., Halliday, J. M., Robbins, M. L., & Girardini, K. J. (2005). *Sustainment of Army Forces in Operation Iraqi Freedom: Battlefield Logistics and Effects on Operations*. Santa Monica: Rand Corporation.
- Peltz, E., Robbins, M. L., Girardini, K. J., Eden, R., Halliday, J. M., & Angers, J. (2005). *Sustainment of Army Forces in Operation Iraqi Freedom: Major Findings and Recommendations*. Santa Monica.
- Penrose, E. (1959/1995). *The Theory of the growth of the Firm* (Third ed.). Oxford: Oxford University Press.
- Peppers Jr., J. G. (1988). *Military Logistics a History of United States Military Logistics 1935-1985*. Huntsville: Logistics Education Foundation Publishing.
- Pettit, S. J., & Beresford, A. K. C. (2005). Emergency relief logistics: an evaluation of military, non-military and composite response models. *International Journal of Logistics: Research and Applications*, 8(4), 313-331.

References

- Piggee, A. F. (2002). Transformation – Revolution in Military Logistics (pp. 1-32). Carlisle Barracks: U.S. Army War College.
- Popper, K. (1959/2010). *The Logic of Scientific Discovery*. Milton Park: Routledge.
- Porter, M. E. (1990). *The Competitive Advantage of Nations*. London: Macmillan.
- Prahalad, C. K., & Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review*, 68(3), 79-91.
- Prier, E., & McCue, C. P. (2009). The Implication of a Muddle Definition of Public Procurement. *Journal of Public Procurement*, 9(3 & 4), 327-370.
- Pyman, M., Wilson, R., & Scott, D. (2009). The Extent of Single Sourcing in Defence Procurement and its Relevance as a Corruption Risk: A First Look. *Defence and Peace Economics*, 20(3), 215-232.
- Rietjens, S. J. H. (2006). *Civil-Military Cooperation in Response to a Complex Emergency: Just another drill?* PHD Thesis, University of Twente, Enschede.
- Rietjens, S. J. H., Voordijk, H., & De Boer, S. J. (2007). Co-ordinating humanitarian operations in peace support missions. *Disaster Prevention and Management*, 16(1), 56-69.
- Rietze, S. M. (2006). *Case Studies of Postponement in the Supply Chain*. Master Thesis, Massachusetts Institute of Technology, Massachusetts.
- Rockart, J. F. (1979). Chief executives define their own data needs. *Harvard Business Review*, 57(2), 81-93.
- Sari, A. (2008). The European Union Status of Forces Agreement (EU SOFA). *Journal of Conflict and Security Law*, 13, 353-391.
- Sarin, P. (2000). *Military Logistics: the third dimension*. New Dehli: Manas Publications.
- Seale, C. (1999). *The Quality of Qualitative Research*. London: SAGE, Publications Ltd.
- Seldén, D. (2005). *Om det som är: Ontologins metodiska relevans inom positivism, relativism och kritisk realism*. Phd, Göteborg University, Göteborg.
- Singer, P. W. (2008). *Corporate Warriors* (Updated ed.). Ithaca, New York: Cornell University Press.
- SIPRI. (2011). Military expenditure by region.
- Sjöstrand, C. (2007). *Swedish international forces in the service of peace : international missions undertaken by the Swedish Armed Forces*. Malmö: Bokförlaget Arena.
- Skjøtt-Larsen, T., Schary, P. B., Mikkola, J. H., & Kotzab, H. (2007). *Managing the Global Supply Chain* (Third Edition ed.). Gylling: Copenhagen Business School Press.
- Skoglund, P., & Dorn, M. (2008). *What is Military Logistics?* Paper presented at the Military Logistics Symposium 2008, Stockholm.
- Skoglund, P., & Hertz, S. (2007). *Local Sourcing in Peacekeeping Operations: A case study of swedish military sourcing*. Paper presented at the CCHLI2007, Farnham.

- Skoglund, P., & Hertz, S. (2011). Local Sourcing in Peacekeeping: A Case Study of Swedish Military Sourcing. In G. Kovács & K. M. Spens (Eds.), *Relief Supply Chain Management for Disasters: Humanitarian, Aid and Emergency Logistics*. Hershey: IGI Global.
- Stannack, P. (1996). Purchasing power and supply chain management power--two different paradigms? a response to Ramsay's 'Purchasing power' (1995). *European Journal of Purchasing & Supply Management*, 2(1), 47-56.
- Steinle, C., & Schiele, H. (2008). Limits to global sourcing? Strategic consequences of dependency on international suppliers: Cluster theory, resource-based view and case studies. *Journal of Purchasing & Supply Management*, 14(1), 3-14.
- Stentoft Arlbjørn, J., & Halldorsson, A. (2002). Logistics knowledge creation: Reflections on content, context and processes. *International Journal of Physical Distribution & Logistics Management*, 32(1), 22-40.
- Stephens, D. C. (Ed.). (2000). *The Maslow Business Reader: Abraham H. Maslow*. New York: John Wiley & Sons, Inc.
- Stevens, B. (2008). Corporate Ethical Codes: Effective Instruments For Influencing Behavior. *Journal of Business Ethics*, 78, 601-609.
- Stratton, R., & Warburton, R. D. H. (2003). The strategic integration of agile and lean supply. *International Journal Production Economics*, 85(2), 183-198.
- Strickland, L. H. (1956). Surveillance and trust. *Journal of Personality*, 26(2), 200-215.
- Stuart, I., McCutcheon, D., Handfield, R., McLachlin, R., & Samson, D. (2002). Effective Case Research in Operations Management: A Process Perspective. *Journal of Operations Management*, 20(5), 419-433.
- Stöttinger, B., & Schlegelmilch, B. B. (1998). Explaining export development through psychic distance: enlightening or elusive? *International Marketing Review*, 15(5), 357-372.
- Swan, J. E., Trawick, I. F., & Silva, D. W. (1985). How Industrial Salespeople Gain Customer Trust. *Industrial Marketing Management*, 14, 203-211.
- Svensson, G. (2004). Vulnerability in business relationships: the gap between dependence and trust. *Journal of Business & Industrial Marketing*, 19(7), 469-483.
- Swift, J. S. (1999). Cultural closeness as a facet of cultural affinity: A contribution to the theory of psychic distance. *International Marketing Review*, 13(3), 182-201.
- Tabish, S. Z. S., & Jha, K. N. (2011). Analyses and Evaluation of Irregularities in Public Procurement in India. *Construction Management and Economics*, 29, 261-274.
- Talluri, S., & Narasimhan, R. (2005). Technical Management Notes A Note on "A Methodology for Supply Base Optimization". *IEEE Transactions on Engineering Management*, 52(1), 130-139.

References

- Tatham, P. (2005). Efficient in Peace but Effective in War: Meeting the Challenge of the Military Supply Chain - An Agenda for Research. *Supply Chain Practice*, 7(2), 42-57.
- Tatham, P. (2006). *Meeting the Challenge of the 21st Century Military Supply Chain – An Agenda for Research*. Paper presented at the NOFOMA 2006, Oslo.
- Tatham, P. (2009). *Confidence in United Kingdom Defence Logistics – Rhetoric versus Reality*. PhD, Cranfield, Shrivenham.
- Tatham, P., & Worrell, D. (2010). Lean Thinking in an Uncertain Environment: The Implications for UK Defence Acquisition. *International Journal of Defence Acquisition Management*, 3, 1-22.
- Taylor, T., & Tatham, P. (2008). Five Key Challenges for the Management of UK Defence: An Agenda for Research? *International Journal of Defense Acquisition Management*, 1, 22-28.
- Thompson, J. D. (1967). *Organizations in action : social science bases of administrative theory*. New York: Mc Graw-Hill.
- Thorpe, G. C. (1917). *Pure Logistics: The Science of War Preparation* (1986 ed.). Honolulu: University Press of the Pacific.
- Thunholm, P. (2005). Planning Under Time-Pressure: An Attempt Toward a Prescriptive Model of Military Tactical Decision Making. In H. Montgomery, R. Lipshitz & B. Brehmer (Eds.), *How Experts Make Decisions*. New Jersey: Lawrence Erlbaum.
- Towill, D., & Christopher, M. (2002). The Supply Chain Strategy Conundrum: To be Lean Or Agile or To be Lean And Agile? *International Journal of Logistics: Research and Applications*, 5(3), 299-309.
- Treleven, M., & Bergman Schweikhart, S. (1988). A risk/benefit analysis of sourcing strategies: Single vs. multiple sourcing. *Journal of Operations Management*, 7(4), 93-114.
- Trent, R. J., & Monczka, R. M. (2003a). International Purchasing and Global Sourcing - What are the Differences? *Journal of Supply Chain Management*, 39(4), 26-37.
- Trent, R. J., & Monczka, R. M. (2003b). Understanding integrated global sourcing. *International Journal of Physical Distribution & Logistics Management*, 33(7), 607-629.
- Trent, R. J., & Monczka, R. M. (2005). Achieving Excellence In Global Sourcing. *MIT Sloan Management Review*, 47(1), 24-32.
- Trim, P. R. J. (2003). Disaster management and the role of the intelligence and security services. *Disaster Prevention and Management*, 12(1), 6-16.
- Tuttle Jr., W. G. T. (2005). *Defense Logistics for the 21st Century*. Annapolis: Naval Institute Press.
- Tysseiland, B. E. (2008). Life cycle cost based procurement decisions: A case study of Norwegian Defence Procurement projects. *International Journal of Project Management*, 26(4), 366–375.
- UN. (2008a). *Civil-Military Guidelines & Reference for Complex Emergencies*. New York: Retrieved from

- <http://ochanet.unocha.org/p/Documents/Civil-Military%20Guidelines%20and%20Reference,UN-IASC,%2021%20Oct%2008,English.pdf>.
- UN. (2008b). *United Nations Peacekeeping Operations: Principles and Guidelines*. New York.
- UNHCR. (1997). *The State of the World's Refugees 1997-98: A Humanitarian Agenda*. Oxford: Oxford University Press.
- UNSC. (2001). *Resolution 1386*. New York: United Nations Retrieved from <http://www.un.org/Docs/sc/>.
- UNSC. (2003). *Resolution 1509*. New York: United Nations Retrieved from <http://www.un.org/Docs/sc/>.
- UNSC. (2008a). *Resolution 1814*. New York: United Nations Retrieved from <http://www.un.org/Docs/sc/>.
- UNSC. (2008b). *Resolution 1816*. New York: United Nations Retrieved from <http://www.un.org/Docs/sc/>.
- Utrikesdepartementet. (2008a). *Nationell strategi för svenskt deltagande i internationell freds- och säkerhetsfrämjande verksamhet*. (2007/08:51). Stockholm: Regeringen.
- Utrikesdepartementet. (2008b). *Regeringens skrivelse 2007/08:51: Nationell strategi för svenskt deltagande i internationell freds- och säkerhetsfrämjande verksamhet*. Stockholm: Retrieved from www.regeringen.se/content/1/c6/10/09/87/e611b8f5.pdf.
- Waara, F. (2008). Mitigating Contractual Hazards in Public Procurement: A Study of Swedish Local Authorities. *Construction Management and Economics*, 26, 137–145.
- Vafidis, D. (2007). *Approaches for Knowledge and Application Creation In Logistics: An Empirical Analysis Based on Finnish and Swedish Doctoral Dissertations Published Between 1994 and 2003*. Doctor, Turku School of Economics Turku.
- Walden, J. L. (2006). *Velocity Management in Logistics and Distribution: Lessons from the Military to Secure the Speed of Business*. Boca Raton: CRC Press.
- Van Crevald, M. (1977). *Supplying War Logistics from Wallenstein to Patton*. New York: Cambridge University Press.
- van Hoek, R. I. (1998). Reconfiguring the supply chain to implement postponed manufacturing. *International Journal of Logistics Management*, 9(1), 95-110.
- Van Wassenhove, L. (2006). Blackett Memorial Lecture Humanitarian aid logistics: supply chain management in high gear. *Journal of the Operational Research Society*, 56, 457-489.
- van Weele, A. J. (2005). *Purchasing & Supply Chain Management: Analysis, Strategy, Planning and Practice* (4th ed.). London: Thomson Learning.
- Wang, M. Y. D. (2000). *Accelerated Logistics: Streamlining the Army's Supply Chain*. Santa Monica: Rand.

References

- Warden III, J. A. (1998). *Air Campaign, Planning for Combat* (Revised edition ed.). Lincoln: iUniverse.com.
- Vázquez-Bustelo, D., Avella, L., & Fernández, E. (2007). Agility drivers, enablers and outcomes: Empirical test of an integrated agile manufacturing model. *International Journal of Operations & Production Management*, 27(12), 1303-1332.
- Welch, L. S., & Luostarinen, R. (1988). Internationalization: Evolution of a Concept. *Journal of General Management*, 14(2), 34-64.
- Verkuil, P. R. (2007). *Outsourcing Sovereignty; Why Privatization of Government Functions Threatens Democracy and What We Can Do About It*. New York: Cambridge University Press.
- Williamson, O. E. (1975). *Markets and Hierarchies*. New York: The Free Press.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York: The Free Press.
- Williamson, O. E. (1993). Calculativeness, Trust, and Economic Organization. *Journal of Law and Economics*, 31(1), 453-486.
- Wither, J. (2005). Expeditionary Forces for Post Modern Europe: Will European Military Weakness Provide An Opportunity for the new Condottieri? (D. A. o. t. U. Kingdom, Trans.). Camberley: Conflict Studies Research Centre.
- Vlasak, M. E. (2007). The Paradox of Logistics in Insurgencies and Counterinsurgencies or Why a "Little Bit" Goes a Long Way and a "Whole Lot is Never "Enough". *Military Review*, 86-96.
- Womack, J. P., & Jones, D. T. (2005). Lean Consumption. *Harvard Business Review*, 1-12.
- Womack, J. P., Jones, D. T., & Roos, D. (1990). *The Machine that Changed the World* (345 ed.). New York: Free Press.
- von Clausewitz, C. (1832-34/1991). *Om Kriget (Vom Kriege)*. Stockholm: Bonniers Fakta Bokförlag AB.
- Wouters, M., Anderson, J. C., & Wynstra, F. (2005). The adoption of total cost of ownership for sourcing decisions—a structural equations analysis. *Accounting, Organizations and Society*, 30(2), 167-191.
- Wouters, M., van Jarwaarde, E., & Groen, B. (2007). Supplier development and cost management in Southeast Asia—Results from a field study. *Journal of Purchasing & Supply Management*, 13, 228-244.
- Yang, B., & Burns, N. D. (2003). Implications of postponement for the supply chain. *International Journal of Production Research*, 41(9), 2075-2090.
- Yang, B., Burns, N. D., & Backhouse, C. J. (2004a). Management of uncertainty through postponement. *International Journal of Production Research*, 42(6), 1049-1064.
- Yang, B., Burns, N. D., & Backhouse, C. J. (2004b). Postponement: a review and an integrated framework. [Literature review]. *International Journal of Operations & Production Management*, 24(5/6), 468-487.

- Yin, R. K. (1981). The Case Study Crisis: Some Answers. *Administrative Science Quarterly*, 26(1), 58-65.
- Yin, R. K. (2003a). *Applications of case study research* (Second ed.). Thousand Oaks: SAGE Publications Inc.
- Yin, R. K. (2003b). *Case Study Research: Design and Methods* (Third ed.). Thousand Oaks: Sage Publications Inc.
- Young, L. (2006). Trust: looking forward and back. *Journal of Business & Industrial Marketing*, 21(7), 439-445.
- Young, L., & Daniel, K. (2003). Affectual trust in the workplace. *The International Journal of Human Resource Management*, 14(1), 139-155.
- Zi, S. (~500 BC/1997). *Sun Zis Krigskonst*. Stockholm: Försvarshögskolan.
- Zinn, W., & Bowersox, D. J. (1988). Planning Physical Distribution With The Principle Of Postponement. *Journal of Business Logistics*, 9(2), 117-136.
- Åkesson, J., Jonsson, P., & Edanius-Hällås, R. (2007). An assessment of sourcing strategies in the Swedish apparel industry. *International Journal of Physical Distribution & Logistics Management*, 37(9), 740-762.

Appendix I - List of respondent groups

Due to requests for anonymity only the respondent groups are presented.

Liberia - UNMIL

- 5 Respondents from FM HQ
- 6 Respondents from FM operational level
- 3 Respondents from FMV
- 3 Respondents from suppliers (2 local + 1 domestic)
- 2 Respondents from partners

Bay of Aden – EU NAVFOR

- 1 Respondent from FM HQ
- 3 Respondents from FM operational level
- 8 Respondents from FMV
- 12 Respondents from suppliers

Afghanistan - ISAF

- 3 respondents from FM
- 3 respondents from FMV
- 2 respondents from suppliers

Central processes

- 1 respondent from FMV
- 11 respondents from FM HQ
- 2 group interviews with 6+2 respondents from FM/FMV

Appendix 2 Interview guide on operations FM/FMV

The interviews were planned with open-ended questions, with follow-up questions based on the knowledge gained in the on-going interview and related to earlier interviews.

1. Present yourself and what you have been working with the last ten years
2. How do you define logistics?
3. Can you describe the planning of the operation?
4. Can you describe the organisation of the operation both in the preparation phase and during the operation itself?
5. Have there been any incidents in the operation where logistics have played a role?
6. Can you describe the planning of logistics for the operation? Can you describe the logistics organisation?
7. Can you give some detail on what the baseline was? Equipment, objectives, personnel? Did all supplies exist or did you have to get new supplies? How was it decided what to bring, and where did the funding come from? Who is/are putting together the needs for the units? Which level decides - the government or the unit...?
8. What did you do when a need was identified? Did it differ between the preparation before deployment and during the operation, or for the home transportation?
9. How often was it in stock? Were there any strategies behind the products that weren't in stock? Did you use substitutes? Who did procurements? Based on what? How was the procurement done? Bidding or single supplier or based on frame contract or...? On which market was the supplier acting?
10. What changes were made to the main equipment and subsystems; on what grounds?
11. Did any of these notations play a role in the procurement and logistics processes? Delivery frequency, price, product type, lead-times, commercial of the shelf or tailored, stored goods at the supplier, supplier location?
12. Have you worked with the suppliers? How long have you known them? Have you ever met outside work? Social activities in connection to work?

Appendix 3 Interview guide to Suppliers

The interviews were planned with open-ended questions, with follow-up questions based on the knowledge gained in the on-going interview and related to earlier interviews.

1. Present yourself and what you have been working with the last ten years
2. Can you present the firm?
3. How long has your firm been selling to FM/FMV?
4. When did you come in contact with the PSO?
5. How do you define logistics?
6. Can you describe your firm's role for the operation?
7. Can you describe your organisation and who you worked with?
8. Have there been any incidents in the operation where your firm has played a role?
9. Can you describe your planning for your support of the operation?
10. What did you do when a need was identified? Did it differ between the preparation before deployment and during the operation, or for the home transportation?
11. Were your supplies in stock in stock? Were there any strategies behind the products that weren't in stock? Did you have any substitutes? Did you work with any other actors when delivering to FM/FMV for the operation? What relation did you have? How was the procurement done by FM/FMV? Bidding or single supplier or based on frame contract or...? Do you know any competitors that are working with FM? In this operation?
12. What changes were made to your products, and on what grounds?
13. Did any of these notations play a role in your relation to FM/FMV? Delivery frequency, price, product type, lead-times, commercial of the shelf or tailored, stored goods, operational location?
14. Personal relations: Have you worked with the customer? How long have you known them? Have you ever met with them outside work? Social activities in connection to work? Do you trust them? What do you think about delivering to a PSO?

Appendix4 Interview guide for Central processes

The interviews were planned with open-ended questions, with follow-up questions based on the knowledge gained in the on-going interview and related to earlier interviews.

1. Present yourself and give a brief description of your working background the last 10 years.
2. What is your definition of logistics?
3. Describe the process concerning decision making for a PSO.
4. What are the political decisions and what are the military decisions?
5. What short term and long term military objectives exist for participation in PSO?
6. What short term and long term political objectives exist for participation in PSO?
7. What role does logistics have in strategic planning for PSO?
8. What logistic considerations are shown in the political force contribution decisions?
9. Is end-state discussed in the planning process for a military PSO?
10. What legal requirement must PSO fulfil? At HQ and in the operational area?
11. What FM requirement must PSO fulfil? At HQ and in the operational area?

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