Align operations to cope with hostility: Managing Uncertainty and Variability

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Executive Summary

After the fall of the Berlin Wall, which marked the end of cold war, the Dutch government assumed that an invasion of Dutch soil by an aggressor was something of the past and began to reduce the armed forces. This has led to several budget cuts over the past two decades since the fall off the wall. However, the reduction of the armed forces has never led to an adjustment of the mission statement and the armed forces where now more than ever involved in crisis response operations then it has been in its whole past. These deployments gradually teared down the organization and crippled it. This degradation is particularly visible in the peace time operations during which the military executes training & exercises but lacks the means to adequately prepare for her task. However, times are changing, and budgets are slightly increasing but in response to the increased budget the military relapses into the old habits of stockpiling to cope with uncertainty and variability. This approach, however, exonerates her from thinking and developing an operations and supply chain strategy which guarantees the effectiveness of the organization but also provides an efficient management system. The purpose of this research was to describe how uncertainty and variability in the operating environment of the military play a role in the choice for a supply chain strategy. To answer this question a qualitative study based on a grounded theory combined with a multi/comparative case study approach was used. Cases for data gathering where selected within the Ministry of Defense. Main findings of this study implicate that power play, silos, trust and strategic intent are causing variability and uncertainty in the operating environment and effecting the supply chain strategy. Practical implications are that variability and uncertainty are not only created by demand and supply but are also the product of the lack of strategic intent, power and politics, organizational silos and distrust within the organization. The contribution to science is that this research adds to the field of operations management by extending its context to the hostile military environment.

List of definitions

ACSA:	Air Crossing and Servicing Agreement. A US framework to provide support to NATO partners during a CRO.
BU:	Business Unit
CoD:	Chief of Defence
CRO:	Crisis response operations.
JiC:	Just in Case
JiT:	Just in Time
PTO:	Peace time operations.
DMO:	Defence Materiel Organization
DoM:	Directorate of Management
DOPS:	Directorate of Operations. This is the executing body of the Chief of Defence in charge of CRO
DOPS J4:	Directorate of Operations Logistic Branch
MoD:	Ministry of Defence
NATO:	North Atlantic Treaty Organization
RNLAF:	Royal Netherlands Airforce

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1. Introduction

The fall of the Berlin Wall in 1989 announced the end of the cold war and at the same time reduced the likelihood of a conflict between East and West and thereby it was safe to assume that an invasion of Dutch soil by an aggressor was not likely in the near future. This was the signal for the Dutch government to start reducing the armed forces (Hoffenaar, 2009). However, these cuts did not lead to an adjustment of the mission statement of the armed forces (Hoffenaar, 2009). The result of the many years of degradation is that on all fronts (personnel, equipment, inventories and investments) the flexibility to undertake multiple missions has been reduced. The organization has adjusted to the changing environment and became very resourceful in dealing with the challenges imposed upon it.

In the meantime, the government has come to realize that further reductions on the Defence budget are no longer feasible. Hence restoration of the defence budget has commenced. This, however, does not mean that the armed forces are in the clear. It merely means less reduction. Nevertheless, the armed forces can work to improve its material readiness. One of the activities is stockpiling of spare parts to improve the up time of the various systems. However, by doing so the armed forces are falling back into old habits where the abundance of resources and supplies exonerates her from thinking and developing an operations and supply chain strategy which guarantees the effectiveness of the organization but also provides an efficient management system.

"The cost versus response trade-off is a growing issue due to many markets being increasingly characterized by demand uncertainty and shorter product life cycles" (Stratton & Warburton, 2006). According to Stratton and Warburton (2006) many companies are not paying enough attention to the impact of managerial decisions on moving supply to global low-cost suppliers. This often leads to the, afterwards, adaptation of measures in order to cope with the influence of demand uncertainty and variation. The issue of addressing the implication of the strategic and/or cost implication due to corporate decisions still remains intangible. A frequent explanation given for the misalignment which occurs as a result of the lack to

addressing the matter on forehand used to be search in the incremental nature of such changes (Hill et al., 1998). However, this is an insufficient explanation for the mismatch occurring because of the decision to outsource. Baines stated in his speech at the Joint International Conference of EUROMA and POMS of 2003 that outsourcing decisions often lack a holistic perspective and therefore lead to sub-optimal cost focus. This view is supported by Nair and Closs (2006). Their study showed that when demand is stable and thus predictable a cost focus is in order but, when demand is variable and therefore unpredictable the cost focus no longer is the right strategy. Hence it is necessary to understand the operating environment prior to making strategic decisions which impacts the supply chain and the companies results. Organizations should therefore consider the trade-off between cost and responsiveness.

The cost versus response trade-off is particularly relevant for the military since military operations can be typified as both stable and simultaneously unpredictable at the same time. Military operations can be divided in peace time operations (PTO) and crisis response operations (CRO). PTO and CRO are characterized by the following aspects (table 1) which also depict the differences between them.

TABLE 1: PTO VS. CRO

Peace Time Operations	Crisis Response Operations
• Training (education) and exercises • Just in Time planning • Stable and predictable demand • Advance planning • Steady and well-defined requirements • Non-hostile environment • Low political, human and financial risks • Fixed scenarios	• Mission deployment • Unstable and unpredictable demand • Short-notice deployment times • Ill-defined and/or fast changing requirements • Hostile environment • High political, human and financial risks • Unexpected - and unpredictable scenarios • Information deficiencies • The need for flexibility • Just in Case planning • Complex and long lines of communication

In summary CRO can be described as a highly unpredictable and variable environment which requires a different supply chain approach than the PTO.

Companies traditionally focus their operations on either efficiency or responsiveness. Some companies focus on a combination of both but, this leads to sub optimizations since it is impossible to compete on both scopes of customer value at the same time Simchi-Levi (2010). They thus need to make choices whether to strive for efficiency or responsiveness since both have different implications for the supply chain strategy to adopt. Choosing for efficiency means adopting a low-cost strategy throughout the whole company where as a responsive strategy focuses on speed. Despite the challenges the cost or responsiveness trade-off poses

to organizations they need to strive in finding ways to deal with this trade-off and improve performance.

The search for finding ways to manage cost and response has led researchers to explore the available strategies and methods looking for means to improve stability within the supply chain (Stratton & Warburton, 2006; Skinner, 1969; Burns & Stalker, 1961). The need for alignment of operations to meet market requirements was exposed and brought to light that market needs where not restricted to only price. Since then numerous efforts have been undertaken to address the misalignment of the supply chain and have been reported on by (Fisher et al., 1994; Feitzinger & Lee, 1997). Despite all these efforts Fisher et al. (1997), Fisher et al. (2000), Geary et al. (2006) and Ferdows (2003) discovered that the propensity to think functionally rather than holistically perseveres, meaning that organizations when developing strategy usually only take into account certain functions of the organization instead of looking at the organization as a whole.

While the cost versus responsiveness trade-off is already challenging for businesses, it is even more challenging for the armed forces. This is because of the equivocal operating environment, earlier described as PTO and CRO, in which these forces operate in. Since the collapse of the Soviet Union the armed forces have participated in a number of conflicts such as, Former Yugoslavia, Kosovo, Sierra-Leon, Eritrea, Iraq and Afghanistan. These conflicts are characterized by the increased asymmetrical nature (Kirkels et al., 2004) meaning that regular armed forces will more and more be engaged with opponents that make use of hit-and-run tactics, guerilla technics and are hard to distinguish from civilians. This has a huge impact on the local communities and therefore a huge humanitarian influence on the international community to intervene and is visible through the involvement of almost every government, either as a donor or recipient of CRO support (Kovacs et al., 2010). To be able to provide the desired humanitarian aid, the armed forces participating at an CRO need to undertake tremendous logistic efforts. Kovacs & Spens (2007) stated that logistic support account for almost 80 percent of the CRO and thus the only way to the CRO will be successful is through a cost – effective

supply chain management. Research has unfortunately pointed out that supply chains in CRO mostly underperform (Pettit & Beresford, 2005). This is due to the number of stakeholders involved, cultural differences, poorly available infrastructure, problematic border crossings, violence and criminality which typify the operating environment and resulting in an unstable supply chain (Oloruntoba & Gray, 2006). Therefore, the CRO supply chain cannot be compared to that of the regular business environment such as the PTO and is hardly an option (Christopher & Peck, 2004). Thomas & Kopczak (2005) state that the CRO supply chain is based on sense-and-response and thus needs to be resilient and agile.

Over the last two decades empirical research on trade-offs in operational management was focused mainly on cost, quality, flexibility and delivery which are considered as the four basic competitive capabilities (Schmenner & Swink, 1998; Ward et al, 1998). And according to Skinner (1969) managers need to choose one competitive priority because each competitive capability (cost, flexibility, quality and delivery) require a different operational structure support infrastructure and then focus all efforts in achieving this goal. However, most of the research done on this topic only looked at what choices' managers should make in order to outsmart the competition so that revenues can be maximized. Another significant observation is that most of these studies were conducted at only for-profit organizations operating in a single market environment. The armed forces, however, can be seen as a part of the service industry but with the distinction that it simultaneously operates in a PTO and a CRO environment and finally, where maximizing revenues is not the goal, but saving lives is. In order to do this, it is of the utmost importance that soldiers, deployed in a CRO, are equipped with equipment's and materiel on which they can rely on and that is available when needed. Thus, the equipment needs to have a high readiness and it always needs to be kept at this high readiness level (during the CRO). This, however, contrasts with the PTO where a high materiel readiness is important as well but is not a matter of live and dead and thus is quite possible and necessary to focus on cost since the armed forces are being financed by tax payers. As research on this topic

is very limited if not absent this research will elaborate on the existing theory on variability and uncertainty in operations management as part of the choice for a supply chain strategy

The main research question this research seeks to answer is:

How does variability and uncertainty in the operating environment of the military play a role in the choice for a supply chain strategy?

Research objective

The objective of this research is to build theory by investigating the different requirements the Peace Time Operation and Crisis Response Operation impose on the supply chain of the armed forces and adding this to the existing supply chain management knowledge. The findings of this research will enhance the understanding of managers on how to align product with supply chain processes and supply chain strategy. This can lead to a better supply chain design which suits both the PTO environment as well as the CRO environment.

Scientific relevance

The relevance of this research lies in the fact that it will add to the field of operations management by extending its context to the military environment. This environment can be depicted as a very turbulent environment which possesses extreme challenges to decision makers who are trying to improve the operation performance by being both efficient and responsive in order to achieve a state of operational excellence.

Practical relevance

The findings of this research provide management of companies such as the armed forces with insights regarding the effects of strategic choices on the supply chain when confronted with both demand – and supply uncertainty. But it also provides insights on how to identify and manage these challenges. These insights are based on the findings according to the existing literature and conclusions drawn from the case study findings.

2. Literature review

Uncertainty and variability in supply chains

The objective of supply chain management is to design a supply chain which is both effective and efficient. In other words, build a supply chain which can provide the best customer service at the lowest cost. But, due to the increased demand - and supply uncertainty this is a challenging task. Lovejoy (1998) states that there are three ways an organization can deal with uncertainty: hold safety capacity, hold safety stock or reduce variability. The latter through the use of enhanced information. These three ways are revered to, by Lovejoy, as the Operations Management Triangle. Fisher (1997) provided a model for dealing with supply chain design. He makes the distinction between functional and innovative goods and points out the necessity to design the supply chain for these goods differently. Functional goods can be characterized by stable demand, low variability and predictable demand and thus are served best by a supply chain which focuses on cost and efficiency. Innovative goods on the other hand are characterized by high variability, high demand uncertainty and thus require a responsive supply chain. In other words, the effect that uncertainty has on the supply chain is that it requires a swift response to new problems. Thus, it can be stated that designing a supply chain to effectively deal with uncertainty is of the utmost importance.

Uncertainty

Uncertainty is "a state that exists when an individual defines himself as engaging in directed behavior based upon less than complete knowledge." as stated by Downey & Slocum (1975) in their contingency theory. In this theory an organizations performance depends on how well its structure, processes and environment fit together and is a more psychological dimension of uncertainty, perceived uncertainty. Perceived uncertainty can be described as a persons' perceived inability to fully understand how the external environment will develop, how these changes will impact the means-end relationship and whether the actions taken will be successful to cope with the changes of the external environment. An environment that is seen as very uncertain can lead to a lack of confidence on decision makers because incorrect decisions can lead to problems and thus slow

down the decision-making process. Yang et al (2004) linked uncertainty with risk and thus deal with uncertainty by managing risk. This has led to the development of supply chain risk management. Sanchez-Rodrigues et al (2010) added to this view by stating that risk is a consequence of and thus follows from uncertainty. Risk, as it is a function of outcome and probability, can be predicted. When the likelihood of an event taking place is low, but the outcome of that event can have a high impact on the supply chain. Whereas decision makers can neither predict the outcome nor can they foresee the probability of it happening. Another definition for uncertainty is provided by Van der Vorst and Beulens (2002): "Supply chain uncertainty refers to decision making situations in the supply chain in which the decision maker does not know definitely what to decide as he is indistinct about the objectives; lacks information about (or understanding) of the supply chain or its environment; lacks information processing capacity; is unable to accurately predict the impact of possible control actions on supply chain behavior; or lacks effective control actions (non-controllability)". Sources of uncertainty within the supply chain are: Suppliers, Customers, Manufacturers and Control system (Davis, 1993; Geary et al. 2002). Van de Horst and Beulens also provide their view on sources of uncertainty: **Inherent characteristics** causing fluctuations, **Characteristics features** of the chain causing disturbances and **Exogenous phenomena** disturbing the systems such as governmental regulations.

Variability in supply chains

Variability means the lack of consistency or the liability to vary or change (Oxford, 2018). Germain et al. (2008) refers to supply chain variability as the amount of inconsistency in the material flow as well as the unevenness of production times and output rates. This view can be supplemented by adding transportation times to it, since transportation time is subjected to weather conditions and congestion on route. Variability can, according to Swamidass (2000), be divided into two types; Common causes and Special causes. Where common causes derive from process variation and can never be fully eliminated, special causes are not predictable and therefore cannot be eliminated. Hopp & Spearman (2007) differentiate between

controllable – and random variation. Controllable variation is related to decision-making and thus controllable and random variation such as breakdowns and customer demand is not within direct control. Another approach towards variability is provided by queuing models. From this perspective two sorts of variability can be distinguished: demand variability and supply variability.

Demand variability

Demand variability is a phenomenon related to customer behavior and is the most obvious and most important source of variability. The order behavior of customers is the least certain, almost impossible to predict and very difficult to influence. Despite its difficulties there are ways in dealing with demand variability. A leading model for designing a supply chain suitable for dealing with this type of variability is that designed by Fisher (1997). His model makes the distinction in efficient and responsive supply chains based on the characteristics of functional and innovative products (see figure 1).

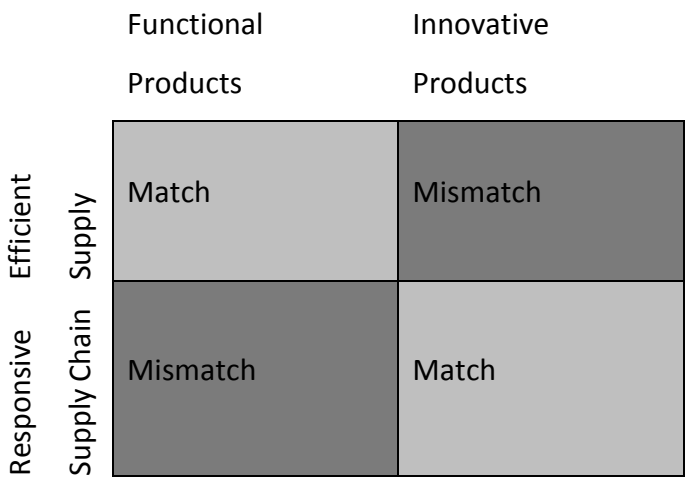

FIGURE 1: MATCHING SUPPLY CHAINS WITH PRODUCTS (FISHER, 1997)

Supply variability

Supply variability can be divided into internal process variability and supplier variability. Both can be further dissected into production variability and delivery variability. Supply variability consist out of all sorts of supply disturbances of the production process. Lee (2002) expanded the framework developed by Fisher by adding supply uncertainties to it. He differentiates in a stable and evolving supply process. “A stable supply process is one where the manufacturing process and the

underlying technology are mature, and the supply base is well established. An evolving supply process is where the manufacturing process and the underlying technology are still under early development and are rapidly changing, and as a result the supply base may be limited in both size and experience" (Lee, 2002). From this differentiation, and that of Fisher, four supply chain strategies to reduce uncertainty on both the customers and/or suppliers' side (see figure 2) are proposed.

		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Efficient supply chain	Responsive supply chain
	High (Evolving Process)	Risk-Hedging supply chains	Agile supply chains

FIGURE 2: MATCHED STRATEGIES **(LEE, 2002)**

Trade-offs

When senior management creates a business strategy, they in fact seek to take in a unique market position and thus make a choice of either being highly efficient and thereby focus on low prices or being very responsive and thus focus on satisfying customers demand. However, companies cannot be both at the same time hence they need to make choices (Simchi-Levi, 2010). The concept of trade off in strategy development originates from Skinner (1969) rudimentary research. In this research he states that "a production system inevitably involves trade-offs and compromises and must be designed to perform a limited task well, with that task defined by corporate strategic objectives" and "like a building, a vehicle or a boat a production system can be designed to do somethings well, but always at the expense of other abilities". With this statement he emphasizes the importance of trade-offs and additionally states that there seems to be a lack of recognition from senior management for trade-offs and their effect on operations. The lack of

acknowledgement for the existence of the impact of trade-offs on the operating and production system is astonishing. As the company's environment get more complex and multi-faceted Hahn et al. (2010) argue that the need to manage trade-offs is rule rather than exception. Bygget & Hochschoner (2006) defined trade-offs as a situation where on the one hand a sacrifice is made in a certain area in order to achieve benefits in another area.

Another important remark in Skinners research is that "variables like cost, time, quality, technological constraints and customer satisfaction place limits on what management can do, force compromises, and demand an explicit recognition of a multitude of trade-offs and choices". This means that at any given point in time managers are confronted with the decision to do one thing at the cost of something else (Boyer & Lewis, 2002). A meta-analysis conducted by Rozenzweig & Eaton (2010) on this subject note that other research on this topic looked at quality, delivery, flexibility and cost. As quality, delivery and flexibility account for customer experience. These are presented as responsiveness.

Cost & Responsiveness

Cost and responsiveness can be translated to the supply chain strategies of LEAN and AGILE and are seen as the two main strategies in supply chain management (Hull, 2005). LEAN aims at eliminating all waste or as Womack & Jones (Womack & Jones, 1996) stated "enhancement of value by the elimination of waste" in order to be as efficient as possible. Agile on the other hand aims at flexibility in the supply chain in order to be able to respond to changes occurring both within and outside the company (Christopher & Towill, 2000).

Lean

The term lean production was first introduced by John Krafcik (1988) and means a production process that, in comparison to mass production, uses less of all resources. It is based on the idea to create value for the customer by reducing and eliminating waste through a systematic identification process from the production process (Christopher, 2000). Womack & Jones (1996) state that for any organization Lean is the most powerful tool to create more customer value while reducing waste at the same time. Lean also means creating a value stream which allows an

organization to eliminate all kind of waste (including time) to be able to create a steady schedule (Naylor et al., 1999). Lean find its bases in the Toyota production system (TPS) which was developed as a reaction on the resource scarcity Japan was facing after WW II and is considered to be one of the most competitive benefits for companies who adopted this operating paradigm (Recht & Wilderom, 1998).

Lean production consists out of five principles which when clearly understood and tied together can allow management to maintain a steady course (Womack & Jones, 1996). These five principles are; identify what value means for the customer, map the value stream, create a non-interrupted value flow, establish pull and finally pursue perfection. As a strategy Lean focusses on reducing waste, eliminating all non-value adding activities across the supply chain which includes time, labor and inventories (Corbett & Klassen, 2006). Lean has a positive effect on markets where cost plays a major role in the costumers' choice (Hill, 1993) and suits an environment where demand is stable, predictable and with a low variety but with a high volume (Christopher & Towill, 2001).

Agile

Where the objective of a lean supply chain is to reduce cost and improve efficiency in a stable environment by eliminating waste within the supply chain an agile supply chain strives to get products faster to the market and so meet customer demand in a fast-changing environment. To be able to deal with the contests of an ever more unstable and dynamic environment Kidd (1994) and Goldman, Nagel and Preiss (1995) came up with agility as a new paradigm. In 1999 Yusuf, Sarhadi and Gunasekaran stated that agility is "the successful exploration of competitive bases (speed, flexibility, innovation proactivity, quality and profitability) through the integration of reconfigurable resources and best practices in a knowledge-rich environment to provide customer-driven products and services in a fast changing market environment". Later Christopher (2000) broaden the idea of agile and described it as "business-wide capability that embraces organizational structures, information systems, logistics prosses and, in particular, mindset". As mentioned, before it is about the ability of an organization to adapt to changes in the

environment (Van Hoek et al., 2001). This strategy focuses on a quick and proactive adaptation, short lead times, flexible deployable capacity and adaptation to the customer. Agility is not the same as "leanness". According to the dictionary (Oxford, 2018) lean, as an adjective, is defined as "containing little fat" whereas agile is defined as "able to move quickly and easily". (Naylor et al. (1999) provided a translation of these definitions into supply chain description in order to better understand them, "Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace. Leanness means developing a value stream to eliminate all waste, including time, and to enable a level schedule". Bal et al. (1999) provides an almost similar definition: "Agility is the basis for achieving competitive advantage in changing market conditions".

In the recent past there have been several cases which pointed out the vulnerability of supply chains. Known examples are the 9-11 terrorists' attacks, the monetary crisis of 2008. But also, catastrophic events hitting a supplier can lead to problems if an organization lacks the capacity to adapt quickly. A perfect example of such an event involved Ericsson. When their suppliers' factory burned down Ericsson did not have the ability to respond on time and had to stop production after a while but at the same time Nokia who relied on the same supplier immediately responded by searching for a substitute supplier and was therefore able to continue its production. When markets are turbulent and unpredictable it all comes down to the ability of a company to match supply and demand. The agile paradigm seems to deal best with this challenge (Hill, 1993; Christopher & Towill, 2001).

Leagile

Out of all strategies within an organization the supply chain strategy is considered to be the most important and should therefore be aligned with the competitive and operation strategy. This is revered to as "strategic fit" (Ferdows, 2003). Quality, cost, availability and lead time are usually the aspect a supply chain strategy is based on (Johansson, 1993) but, lately hybrid strategies prove to be very successful. The successfulness of a supply chain strategy is determined by its ability to maintain the sustainability and how resilient it is to external factors. Hence the need for a

continuous adjustment of the company's supply chain strategy. According to Christopher (2000) this is the reason for the rise and fall of companies in a competitive market and can be seen as a cyclical interchange which is related to the development of the lean paradigm and later followed by the agile paradigm. As time progresses and global supply chain strategies emerges, hybrid strategies are developed (Murakoshi, 1994). These hybrid supply chain strategies are based on combining lean and agile into what is called "leagile" (Naylor et al., 1999). The leagile strategy is based on the idea that an organization can better manage its supply chain by combining the key aspects of lean and agile. As Bruce et al (2004) states "Leagile takes the view that lean and agile approaches shall be combined at a decoupling point for optimal supply chain management". This can be done by operating cost-effectively or efficient in the upstream chain and responsively to volatile demand in the downstream chain (Bruce et al., 2004). The leagile supply chain is "agile enough to respond to what is actually selling with availability as market winner" (Christopher, 2006). The Lean and Agile paradigm do not exclude each another but can rather complement each other (Christopher & Towill, 2000). Combining them can lead to the creation of a cost-effective supply chain which can be helpful in certain situations (Mason-Jones et al., 2000). According to Mason-Jones et al. (2000) a supply chain can, up to a certain point, be Lean and beyond that point be Agile and so increases productivity while reducing costs on the one hand and achieve high customizations levels through responsive processes on the other hand. Despite the fact that authors have proven this concept of leagile to be successful for certain companies it is important to take notice of the fact that it can be very challenging for some organizations to incorporate the leagile strategy since it is necessary to master two different managerial styles which can sometimes be of conflicting interest. Organizations operating on a supply chain frontier, whether it is efficiency or effectiveness, need to be aware of the fact that to combine efficiency with responsiveness they need to master two different conflicting managerial styles (Selldin & Oldhager, 2007).

3. Methodology

3.1.Research strategy

The aim of this study is to extent existing and well-established theoretical frameworks concerning cost versus responsiveness trade-off to the military operations environment. To minimize the risk of uncertainty, since there is not much known, rich and detailed data needs to be collected in order to understand the phenomenon. In order to be able to get a good understanding of the research topic interviews with open ended questions and observations will be used to study the phenomenon. Hence, the scale of this research will be small in other words a small *n* of interviews will be conducted. The small *n* makes it possible to reach depth, explanation, complexity and soundness in the research. Although the results of this small-scale research are presumed to be generalizable to a lesser extent it allows the researcher to describe this specific phenomenon in much more detail and so contribute to literature on this topic (Verschuren & Doorewaard, 2015). Furthermore, this research is based on empirical data gathering supplemented by desk research.

For this research specifically the grounded theory (Glaser & Strauss, 1967) approach combined with a multi/comparative case study (Yin, 1984) will be followed. a multi/comparative case study will be conducted since this research is exploratory (Yin, 1984; Meredith, 1998) and thus context and experiences of managers are critical because it increases the practical relevance of the research findings (Benbasat, 1987; (Fisher M. L., 2007). The focus lies on understanding the dynamics within the selected cases and context (Dul & Hak, 2008). The advantages of a case study as research strategy is that it allows for a better understanding of the research object, it does not require as much pre-structuring as for instance a survey or experiment and is therefore more flexible and finally, the results from a case study are easier to acknowledge, understand and accept because of the interaction between researcher and interviewee in comparison to surveys and experiments.

Despite the advantages there is also one major concern about case studies. That is that of external validity of the findings. The question raised is that of the

applicability of the findings for other groups. By being explicit in the way the data is gathered and assessed the researcher can strengthen the belief in the findings (Benbasat et al., 1987). To alleviate the presumed low generalizability, due to the small *n* of cases, of this research the cases where not randomly selected but, selected based on their role within the supply chain of the armed forces, their top to bottom representation of the organization and knowledge of both the PTO and the CRO environment (see 2.3. case selection).

3.2.Research design

The research design is about organizing activity which includes the gathering of data in ways that are most likely to achieve the research aims (Easterby-Smit et al., 2015). In order to organize the research activity, which include the gathering of data, the research will be broken down into five stages as has been defined by (Stuart, I., McCutcheon, D., Handfield, R. & Samson, D., 2002): *define the research question*, *instrument development*, *data gathering*, *analyze data* and *disseminate*.

To determine and explore the core concepts regarding the effect of uncertainty and variability on the development of a supply chain strategy a literature review was conducted. This review has led to the development of an a priori construct (figure 3) which outlines the concepts likely to be important in this research (Eisenhardt, 1998).

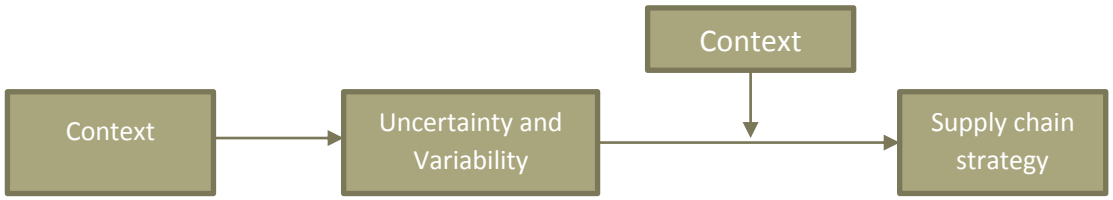

FIGURE 3: A PRIORI CONSTRUCT

As mentioned earlier this research aims at determining how uncertainty and variability play a role in the development of a supply chain strategy. The development of a suitable supply chain strategy is a process which outcome leads to a better performance of the organization. In the conceptual model uncertainty and variability effects the supply chain development process and thus the supply chain strategy. Therefore, uncertainty and variability can be seen as the action or

independent variable and the supply chain strategy as the reaction or dependent variable to achieve the organizations goals.

Every organization operates in a certain environment which influences the development of strategy. In this research the environment has been depicted as CRO and PTO. As is shown in the a priori construct the operating environment can either have a determining effect on uncertainty and variability as can it have a moderating effect on the development of the supply chain strategy. Therefor the context has two positions in figure 3.

3.3.Case Background

The fall of the Berlin Wall in 1989 announced the end of the cold war and at the same time reduced the likelihood of a conflict between East and West and thereby it was safe to assume that an invasion of Dutch soil by an aggressor was not likely in the near future. This was the signal for the Dutch government to start reducing the armed forces (Hoffenaar, 2009). The first reduction measures concerned the suspension of the attendance obligation for military service succeeded by several reorganizations. This step was based upon the believe that the West had won the Cold War and thus the need to hold a great military force was no longer justified (Van den Broek, 2013). There were other more pressing issues, such as ensuring the welfare state, which demanded attention. Although the terrorist attacks in America on 11 September 2001 proved that world peace was a utopian thought, the government in 2002 announced a cut of 805 million euros (10%) on the defence budget. Budget cuts were not the only reduction measures imposed on the armed forces. In 2003 a reduction of 11.700 jobs was announced. A period of relative rest in austerity follows. But, in 2007 again a budget cut of 500 million euros (7% of the current budget which according to dr. Ko Colijn would lead to a 30% reduction of fighting power of the armed forces (Digibron, 2003)) is imposed on the armed forces.. When in 2008 the monetary crisis starts, and everyone believes that further reductions of the defence budget is not feasible, the government still finds room for another 1 million euros cut. Even though the instability of the world is becoming increasingly visible and the fact that the armed forces are more often being

deployed internationally (Bosnia, Eritrea, Iraq and Afghanistan), does not withholds the government (Rutte 1) to further cut the defence budget by one billion euros. However, these cuts do not lead to an adjustment of the mission statement of the armed forces (Hoffenaar, 2009). The result of the many years of deforestation is that on all fronts (personnel, equipment, inventories and investments) the flexibility to undertake multiple missions has been reduced.

Another issue with perhaps an even greater impact on the current state of the armed forces is the fact that there is an ongoing power battle concerning the control over the armed forces. Through the years the departments Army, Airforce and Navy had a direct link to the Ministry of Defence (MoD) (known as the Ministerie van Oorlog en Marine) and therefore a central position in the control of the armed forces and decision making within the MoD. The first step to reduce the influence of the military departments in the development of policy and control over their department was by introducing a new command level which was situated between de MoD and the military departments. This new level was named the Chief of Defence and housed the highest-ranking military officer. In the following years the role of the chairman (known as Commandant der Strijdkrachten) was rather small and the military departments still had a lot of influence in policy matters and control over their departments (see figure 4). This, however, was much to the dislike of politicians who after the fall of the Berlin War wanted to cut back the defence spending's (Reijling, 2015). What followed was a transfer of authority and a change in responsibilities. Where the military departments where responsible for the whole spectrum of military operation (PTO and CRO) they were now ordered to hand over authority over the CRO part to the Chief of Defence. They where now only responsible for the readiness process which consist out of personnel readiness, material readiness and the level of practice. Command over missions/operations which included deployment, execution/sustainment and re-deployment was laid down at the Chief of Defence. A problem arising from this split-up of responsibilities is that the military departments are only awarded the means (budget) necessary to

execute the readiness process. The responsibility for missions/operations lie with the Chief of Defence but without the means to put this in practice. This means that when a military unit is being deployed for a CRO the personnel, material, provisions and are expected to support the sustainment during a CRO.

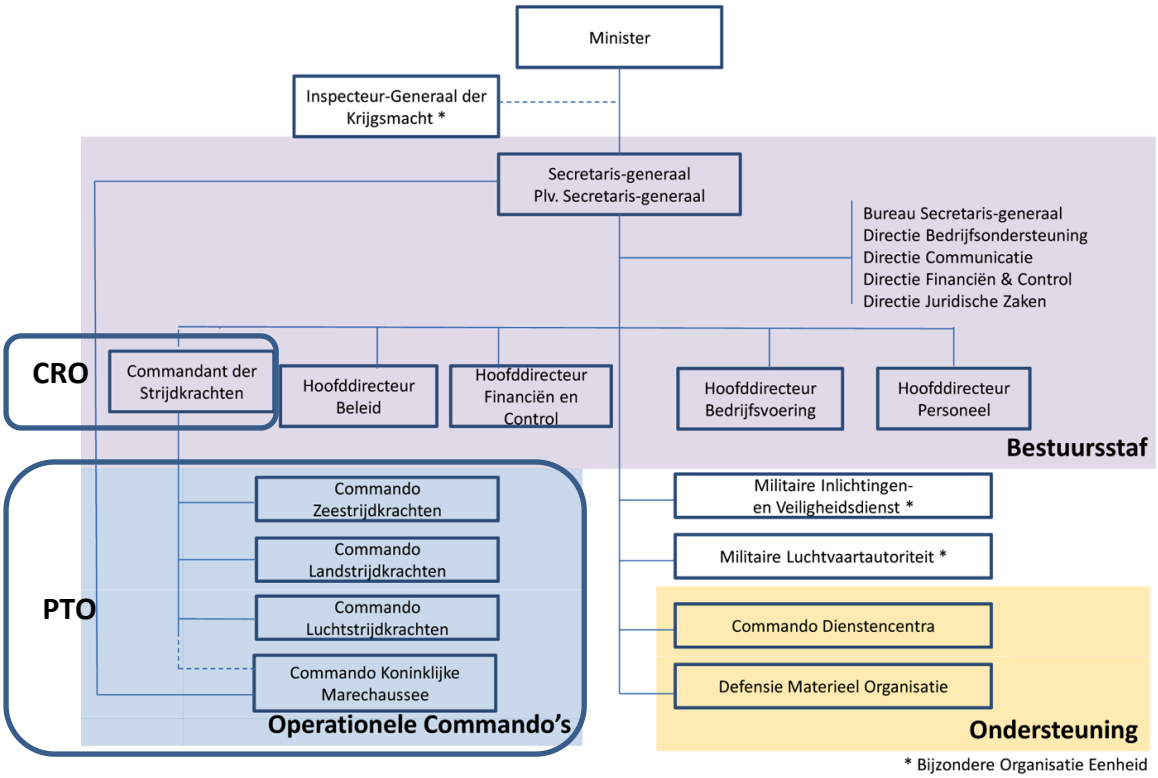

FIGURE 4: ORGANIZATION CHART MINISTRY OF DEFENCE INCL. RESPONSIBILITIES (BELEID, 2017)

One would think that after all the budget cuts combined with the numerous reorganizations to get control over the defence departments the armed forces would collapse but according to De Natris (2016) and Wildering (2014) the reason why this is not happing is because of the loyalty and the strong "can do" or "make it happen" mentality of the personnel which acts as a lubricant for the organization. The organization has adjusted to the changing environment and became very resourceful in dealing with the challenges imposed upon it. Former minister of defence, De Grave endorsed this resourcefulness with his 2002 statement in the parliament "If, for the last decade, there is an organization that has proven to be creative and has gained enormous experience in dealing with austerity, it is the

armed forces". This adaptivity is visible through the number of alliances both with foreign armed forces as with suppliers. Examples are the outsourcing of military logistic capacity due to lack of own logistic capacity. While outsourcing has advantages it also has disadvantages such as dependability. The advantage is that the resource or capacity only needs to be acquired when necessary. The disadvantage, however, is that of the dependability on the supplier that arises to deliver the right amount at the right place, time, quantity and quality.

In the meantime, the government has come to realize that further reductions on the Defence budget are no longer feasible. Hence restoration of the defence budget has commenced. However, this does not mean that the armed forces are in the clear. It merely means less reduction. Nevertheless, the armed forces can work to improve its material readiness. Something it has greatly lost over the last few decades. Activities are now being deployed to get the materiel readiness in order so that capabilities can be built up again. One of the activities is stockpiling of spare parts to improve the up time of the various systems. By doing so, however, the armed forces are falling back into old habits where the abundance of resources and supplies exonerates her from thinking and developing an operation strategy which guarantees the effectiveness of the organization but also provides an efficient management system. Hence the need for the armed forces to consider the cost versus response trade-off consequences on operations and its supply chain in particular.

3.4.Case selection

Cases for conducting this multi case study where selected within the Ministry of Defence (MoD). The unit of analyses is the organization and the strategic choices made by its management which affect the supply chain strategy. The cases selected are business units (BU) within the MoD. These BU's are the Royal Netherlands Airforce (RNLAF), the Defence Materiel Organization (DMO), the Directorate of Management (DoM) and the Directorate of Operations section J4(DOPS J4). Selection of these BU's was based on theoretical sampling which means that they were selected for theoretical reasons (Glaser & Strauss, 1967) because they are

likely to extend the emergent theory (Eisenhardt, 1998). The BU's were selected based on their involvement in the development – and/or the execution of the developed supply chain strategy. From the RNLAF two members were interviewed. One from the helicopter group and one from the RNLAF staff. Both involved with the sustainment of helicopters. From the other BU's, DMO, DoM and DOPS, one member was interviewed. The DMO and DoM are involved with the establishment of the supply chain and development of supply chain policy for the whole of the defence organization. The DOPS J4 is responsible for the sustainment of CRO.

3.5.Case study questions

As this research aims on developing theory concerning the supply chain strategy for the service industry, more specifically for the armed forces, it is important to understand what causes uncertainty and how to manage these uncertainties. Therefore, the interview questions will be constructed upon the following six topics:

- Which aspects of the operating environment effects uncertainty and variability in the supply chain?
- Which context elements effects the development of a supply chain strategy?
- Which aspects describe uncertainty and variability within supply chain strategy development?
- How does the context/operating environment effect uncertainty and variability?
- How does uncertainty and variability effect the development of a supply chain strategy?
- How does the context elements moderate the influence of uncertainty and variability on the supply chain strategy?

To operationalize these topics, several questions are formulated. These questions are:

Concept	Question	Source
Operating environment	1. Hoe ziet de huidige supply chain in uw organisatie eruit? 2. Is deze supply chain onder alle omstandigheden geschikt? 3. Wordt er onderscheidt gemaakt tussen vredestijd (PTO) en missies (CRO)?	
Cost versus Responsiveness	1. Welke factoren hebben een rol gespeeld bij het ontwerpen van de huidige supply chain strategie? 2. Waar moet een voor uw organisatie geschikte supply chain strategie aan voldoen? 3. In hoeverre spelen kosten en/of flexibiliteit een rol binnen uw organisatie? 4. Hoe gaat u daarmee om bij het bepalen van de geschikte supply chain strategy? 5. Wordt er bij het kiezen van een supply chain strategie ook gekeken naar het type product/artikel? 6. Welke invloed heeft het type product/artikel op de supply chain strategy voor dit product?	Skinner (1969) Rozenzweig & Eaton (2010) Naylor et al (1999) Fisher (1997)
Uncertainty	1. In hoeverre is de klantvraag voor uw organisatie voorspelbaar? 2. Hoe wordt binnen uw organisatie de klantvraag bepaald? 3. Welke maatregelen zijn er binnen uw organisatie genomen om de onvoorspelbare klantvraag het hoofd te kunnen bieden? 4. Heeft dit invloed op de huidige supply chain strategie?	Lovejoy (1998); Van der Vorst & Beulens (2002); Lee (2002);
Variability	1. Heeft u binnen uw supply chain weleens te maken met levertijd problemen? 2. Wat is de oorzaak van deze levertijd fluctuaties? 3. Wat zijn de effecten hiervan op de operating environment? 4. Heeft u maatregelen getroffen om “nee” verkopen te voorkomen? 5. Op welke wijze wordt er in de supply chain rekening gehouden met levertijd fluctuaties?	Fisher (1997); Lee (2002)

3.6.Data collection & analyses

This research makes use of primary data as well as secondary data. The primary data was collected through semi-structured interviews with the two members within each case. Interviews are a very efficient way to gather rich empirical data (Eisenhart & Greabner, 2007). The literature research conducted on fore hand provided the input for the interview questions. Secondary data was collected from websites, procedures and other relevant documents and served as a means to triangulate the data from the interviews in order to enhance the validity of the findings. The collected data was analyzed by making use of the grounded analysis approach. This meant that the theory derived from the comparison of different statements with each other. In order to be able to process the large amount of data collected a database was used to categorized, sort, store and retrieve the collected data for analysis. Storing the data in a comprehensive and systematic manner supported the analysis of the data so that congregating lines of analysis and patterns could be established. It also aided the proses of identifying causal factors. After the data collection the interviews where analyzed using the grounded analyses method. This method allowed the researcher to get familiarized with each case. The aim of the analysis was to find relations between the researched objects and the findings. In order to be able to draw conclusions coding of the gathered data was essential. Therefor the data was analyzed using the systematic approach designed by Gioia et al (2012). This design consists out of tree steps. The 1st being data coding with respect to 1st order terms. Secondly organizing the 1st order codes into the 2nd order themes and finally distill theoretical dimensions out of the 2nd order themes. To present the outcomes of these tree steps a data structure was created. The use of a data structure to present the outcomes also serves as a prove of rigor in this qualitative research since this is one of the main critiques from positivist researchers (Easterby-Smith, Thorpe & Jackson, 2015).

4. Findings & analyses

After conducting the interviews, the data collected was transcribed and statements where derived. These statements where then transformed into quotes which formed the 1st order codes. Some examples of the 1st order codes are, 'lack of trust', 'disrupting the supply chain', 'lack of long-term strategy', 'efficiency still thrives over effectiveness' or 'personal goals before organization goals'. The next step was to come from the 1st order codes to 2nd order themes. This was done by interpreting the codes through comparison with the statements. This led to 2nd order themes such as 'negative effect on the organizations strategy', 'change is difficult' or 'exercising power'. Lastly, the 2nd order themes could be categorized into aggregate dimensions, the theoretical dimensions. Examples are 'Intra-organizational trust', 'silos', 'strategic intent' or 'intraorganizational power play'. All these findings are presented in a data structure or coding table (see appendix 1). From the coding table dimensions where found which impact the development of a supply chain strategy. The dimensions found are organizational power play, intra-organizational trust, organizational silos and strategic intent. In the following paragraphs, the dimensions will be analyzed. This will be done with the use of the data collected through the interviews.

4.1. Organizational power play

Power play in the organization is one the findings of this study and is a factor that affects the development of a supply chain strategy. Powerplay is the attempt of a person, group or organization to get or do something by exercising power (Merriam-Webster, 2019). This power has been acquired through either the development of their careers or by the culture within an organization where certain groups have a higher status then others and can thereby exercise power over the others. Power play can be subdivided into **intraorganizational** and **interorganizational** use of power. The latter involves the business to business use of power and the former is within one organization between departments, groups or persons.

Intraorganizational power play

Intraorganizational power play is a common phenomenon in day to day business where trade-offs are part of the job and making these decisions or choices involve a kind of politics to get one's choice or decision accepted but is also affected by the internal culture. Organizations offer individuals a platform to develop a career and express their interest and motivations. "No matter how you look at it the real power lies with the pilots and unit commanders" (FN, 2018). "The chief of defence is also responsible for PTO, however, there are other departments calling the shots when it concerns acquiring new material and deciding on how the sustainment should be arranged" (MR, 2018). "The effects of a commander's decision on the supply chain strategy is always subject of discussion but to our opinion it's a non-discussion" (AA, 2018). Career development of an individual plays an important role in deciding what choices to make. "A commander can overrule the outcomes of supply chain demand analyses and insist on taking more stocks to a CRO thereby creating a problem elsewhere" (AA, 2018). "For pilots and technicians working towards achieving an efficient supply chain is fine as long as it does not hamper them" (FN, 2018). Other statements which elucidate the effect of intraorganizational power play on the supply chain are "the power over the supply chain lies with the pilots and by extension their technicians" (FN, 2018) and "Regulations to which the BU's are bound to are used as arguments against standardization of the supply chain" (AA, 2018). Maintaining power over each other within an organization can also be accomplished through distraction of means, such as budget, from the other. As the importance of air coverage during a CRO is essential to ground forces it is overly clear that securing the availability of airframes has a higher priority and as one interviewee stated "The Acquisition and Cross-Servicing Agreement [a collaboration agreement] only works when you have the same type of equipment with the same state of upgrades" (DO, 2018) and "It goes without saying that your operational capacity will also be strengthened when certain upgrades are carried out" (DO, 2018).

Interorganizational power play

This encompasses the use of power between organizations in order to influence decisions and/or create a form of dependency and affects the formation of a supply chain strategy. As one interviewee (FN, 2018) stated “Amongst our suppliers there are monopolists”. “In the past we decided to use our own radio's in the Apache helicopters but, with every upgrade the helicopter had to undergo we had to make additional expenditures for the radio to work with the upgrade. So, we finally decided to switch to the standard radio configuration Boeing prescribed” (DO. 2018). In some cases, organizations are using rules and regulation to exercise power over the others. “We cannot just buy something at the corner of the street because of airworthiness regulations and are therefore dependent of the manufacturer” (DO, 2018). Another factor that amplifies the dependency between organizations is the imbalance of knowledge. “We are not very business minded and I sometimes have the feeling that those parties, think of the government in terms of a cash cow” (FN, 2018). Other statements which illustrate the power of dependencies are “An example of the impact a seemingly simple thing as the Acquisition and Cross-Servicing Agreement [a collaboration agreement] has on decision making is the authorization of the block 3 upgrade of the Apache helicopters” (DO, 2018) and “To be able to use the Acquisition and Cross-Servicing Agreement [a collaboration agreement] also substantiate why we should carry out certain midlife upgrades” (DO, 2018). Other means of manipulating dependencies and/or force decisions is by using a collaborating partner. “The down side of ACSA, however, is that you need to implement all upgrades [advised by the manufacturer] they [the US] carry out [on their airframes] [if you want to be able to acquire spare parts and services during a CRO from the US]” (DO, 2018). To break cycle of interorganizational dependency an interviewee (FN, 2018) stated “We are also working on contract management. which is quite new for the entire government, I think”. “if [spare parts or services] not delivered on time there is a penalty. Which I think is very normal within the civil society”, “So, if you impose that penalty, they [suppliers and/or manufacturers] will improve because they do not want to [be penalized or formally

be reprimanded], so you make them a reliable partner" (FN, 2018). "We are now setting up contracts with new parties where we say that this is the delivery time for you (we agree on this) and measure it" (FN,2018).

Intra-organizational trust

Large organizations usually have a hierarchical structure and consist out of multiple departments and business units. For the organization to perform effectively it is a necessity for departments and business units to work together and that they can rely on each other. Lack of trust is one of the findings from this research that has an effect on the development of a supply chain strategy and thereby on business performance. "Gaining trust from our units that an efficient SC works may take up to two years to achieve" (FN, 2018). "And even when the SC would be reliable for a 100%, technicians will still hoard supplies" (FN, 2018). The ability to learn from previous experiences also influences trust. "In the supply chain we are not learning from past CRO. We are making the same mistakes over and over again" (MR, 2018).

4.2.Trust in the supply chain

Trust in the supply chain is essential and prevents units or persons from disrupting it. "The pilots decide how the organization operates" and "the power over the supply chain lies with the pilots and by extension their technicians" are statements from an interviewee (FN, 2018) to signify what happens when trust in the supply chain is lost. When A depends on B for achieving its goals trust is very relevant (Lane, 1998). Being dependent implies that A assumes a position which makes him vulnerable to opportunistic behavior of B (Hosmer, 1995; Whitener, 1998). To break the cycle of distrust and powerplay "Transparency is key to execute a change process and gain trust" (FN, 2018) stated. FN (2018) further stated that to create transparency "We created a KPI tree and projected it on the entire supply chain to show what data we generate and steer on" and "We needed to convince the units that data collection was needed in order to improve supply chain performance and was not going to be used against them". Other factors affecting trust are uncertainty and variability in the supply chain.

Uncertainty

Uncertainty is a factor which has a tremendous effect on the supply chain and ultimately affects trust. There's, however, a distinction between uncertainty during PTO and CRO that can be made. As MR (2018) stated "The sustainment for PTO does not align with the sustainment requirements of a CRO". This is further supported by AA (2018) who stated that "Logistic operations during PTO should be the same as during CRO". For the service provider demand uncertainty during a CRO poses a challenge because "Unpredictability is one of the key aspects of CRO" and "CRO increases uncertainty because the effects of a different environment on equipment is unknown" (DO, 2018) stated. This unpredictability leads to (demand) uncertainty and "Uncertainty ultimately means a higher risk and within logistics you think the higher the risk the more stock you will need in terms of sustainment" (DO, 2018). But, "When dealing with monopolists it becomes very difficult to manage CRO demand uncertainty" (FN, 2018) thus "When deployed for CRO we cope with uncertainty by deploying more aircrafts than needed in order to guarantee the mission" (DO, 2018). However, MR (2018) states "What we notice is, certainly the last period, that we leave for a CRO with systems where for some articles / spare parts the lead times are tremendous but still we have chosen for a Just in time sustainment construction and so we have no spares or supplies". DO (2018) stated that "When spare parts are not available, we decommission air crafts from the PTO to provide in the CRO demand". Even though decommission of equipment to cover the need of the necessary spare parts can provide a solution it has its limits. As MR (2018) stated this is because "For many years we have been forced to focused on efficiency and do more with less even though our operations require responsiveness and so now is difficult to change that way of thinking because there's shortage on all levels and you can't just loot a BU of its assets". And because "Decommissioning has a negative effect on the combat readiness of personnel and thus the sustainment of the mission [the continuation of a CRO for a longer period of time]" (DO, 2018). Another way of dealing with uncertainty is by "Gathering data from specific PTO environments to forecast demand in case of CRO" (FN, 2018).

“Exercises and training in certain environments can also be used to gather system performance information and to create a scenario for supply chain planning purposes” but, “The odd thing is that the focus of exercise and training always lies on training the pilot. But, it's also very interesting for the logistic. It helps to develop a SC strategy for a certain scenario” FN (2018) stated.

Variability

As mentioned before variability in the supply chain is the level of inconsistency in the material (spare parts and supplies) flow (Germain et al, 2008). “One of our main concerns are the long lead times we're facing” (DO, 2018). “When purchasing new equipment, we often face the trade-off of more [in numbers] equipment vs spare parts [stocks] and usually choose for more [in numbers] equipment instead of spare parts [stocks]. Combined with the knowledge that “The provision of spare parts for aircrafts revolves around the aircraft manufacturer [and that] the aviation industry is characterized by monopolists and long lead times, which is supported by FN (2018) “Amongst our suppliers there are monopolists”, I do not think we as a company are aware of this strategic deficit. Things are done everywhere, but whether these choices are made consciously is doubtful” (DO, 2018). Adding to this view AA (2018) stated “Within the defence organization nobody is worrying about the big picture and responsibility for bad results are hard to pin on a single unit's manager”.

To deal with variability requires demand data and “Demand forecasting is done by reviewing historical customer order data and discuss the findings with the service provider” (FN, 2018). Also “The results of the failure mode and effect analysis linked to a specific check are included in the scheduled preventive maintenance for that specific check [because] Aircraft maintenance is primarily based on scheduled preventive maintenance referred to as "checks" and thus parts needed are known on forehand” DO, 2018). However, “The air force [and other BU’s] is responsible for the PTO part so we try to do that as efficient as possible” (DO, 2108). This view is supported by FN (2018) “Establishing an efficient supply chain is something we are striving for but since we're not there, yet we lay down stocks were the action is to

minimalize downtime" But he also ads "By maintaining an extra depot we are straining the supply chain and prevent it to be ran efficient".

4.3.Silos

Silos in organizations are a result of decentralized management and common in large organizations. In the process managers are held responsible for a certain performance and successively develop KPI's to measure their objectives "We created a KPI tree and projected it on the entire SC to show what data we generate and steer on" (FN, 2018). It's then just a matter of time for a department, division or unit to lose track of the common organizational goals "the staff of the business unit and the logistic unit need to work together but that's not always the case" (FN, 2018) and only focus on their own performance which is well illustrated by de following statement made by MR (2018) "The DOPS only focusses on the CRO and not with PTO because of its limited capacity" and "The responsibility for arranging the sustainment of equipment or to have sufficient supplies lies with the BU". It is inevitable that the forming of silos has a negative effect on the forming of a supply chain strategy. As AA (2018) describes: "The defence supply chain consist out of silos. Decisions in the silos are taken without looking at the consequences they impose on the chain". An example of this is given by FN (2018) "At the time I was at unit level and due to a reorganization had to close my Petrol Oil & Lubricant section. But the unit chief wanted the guarantee that this would not hamper his conduct of business, so we kept the POL section and held decentralized stocks".

Integrality

To manage "A supply chain implies that there's some kind of integral single chain of command. But I doubt if that's the case", for example, "The chief of defence is also responsible for PTO, however, there are other departments calling the shots when it concerns acquiring new material and deciding on how the sustainment should be arranged" (MR, 2018). This view is supported by AA (2018) as he states, "a very important observation is that there's no single chain of command over the supply chain because of the silos". Another statement supporting the lack of an integral approach is given by FN (2018) as he states, "strictly speaking we should coordinate

our SCM activities and act as a team to restore control over the SC but sadly we are not there yet". One interviewee takes it step further by saying "Within the defence organization nobody is worrying about the big picture and responsibility for bad results are hard to pin on a single unit's manager [and] "We as an organization fail in standardizing [supply chain] procedures through the whole of the organization" [because] every defence unit is hanging on to its own way of working" (AA, 2018).

4.4.Strategic intent

Strategic intent is the envisioning of a future state, the path to getting to that future state and requires active management to focus the organization (Hamel & Prahalad, 1989). "To develop a vision, you need powerful leaders who are willing to put aside their own personal ambition and carriers. Another thing that hinders the development of a long-term strategy is the swift change of board members, even that of politicians, and so does the political and organizations ambition" (AA, 2018). This view is supported by DO (2018) as he states, "When purchasing new equipment, we often face the trade-off of more equipment [tangible assets] vs spare parts [non-tangible] and usually choose for more equipment [tangible assets] instead of spare parts". For an organization it's important to have a clear strategy as it aligns all actions within the organization towards reaching that the strategic intent. "A supply chain strategy also makes clear what your ambitions as an organization are [and] not having a supply chain strategy is a shame because, it's like a dot on the horizon from there we want to stand 15 years from now" (AA, 2018). However, "We lack a supply chain strategy because there's no updated strategic vision. The last one dates back to 2011 but since then world politics has changed tremendously [and] I suppose that not having a strategic vision has to do with the time we live in where managers on the holding level, even politicians, are rather reactive instead of proactive" [and] "Examples of reactive instead of proactive behavior are the current safety issues. These could have been prevented if there was a long-term strategic vision" (AA, 2018). Another example of how reactive behavior of management impacts the focus of the organization is "Two years ago material readiness was on top of the agenda. Now it's safety. As a

consequence, the sense of urgency to improve material readiness has faded" (AA, 2018).

5. Conclusion and discussion

5.1.Conclusion

The importance of aligning operations in an organization to meet market requirement is something many researchers have reported on in previous research (Feitzinger, E. & Lee, H. L., 1997; Fisher, M. L., Hammond, J. H. & Obermeyer,W. R., 1994). Organizations need to understand the operating environment prior to making strategic decisions because failing to do so will impact the supply chain and thus performance. As Simchi-Levi (2010) pointed out companies traditionaly focus their actions on either efficiency or responsiveness and that companies trying to focus on both will under perform and thereby exposing the need to align operations. Despite all efforts to address the misalignment of the supply chain the focus has been on organizations/companies operating in a single market environment with a profit orientation. However, aligning operations within an organization who simultainiously operates in multiple environments and where gaining profit is not the objective but saving lives is, has never received much attention before. The goal of this research was to contribute to science by answering the question “How does variability and uncertainty in the operating environment of the military play a role in the choise for a supply chain strategy?”.

This research identifies four major implications that are causing variability and uncertainty in the operating environment and effecting the supply chain strategy. These are; power play, intraorganizational trust, silos and the lack of a strategic intent. As a result its difficult to chose the right supply chain strategy to support business goals. As to how these factors affect the supply chain strategy a distinction can be made between effects on the CRO and the PTO which are included in table 1. Many organizations and/or companies do not pay enough attention to the impact of managerial decisions which neccisatate afterward action to cope with uncertainty and variability. Within the military the tendency to chose for an functional instead of an holistic approach perseveres. Which means that when developing strategy only a limited functions are taking into account instead of looking at the organziation as a whole.

TABLE 2: ASPECTS AFFECTING SUPPLY CHAIN STRATEGY

		Operating environment	
		PTO	**CRO**
Aspects affecting supply chain strategy	**Power Play**	Powerplay does not only have a negative effect on the supply chain strategy for CRO but also for PTO because providing means for troops in a CRO will always be the primary task. So, they will be distracted from the PTO but by doing so it jeopardizes the readiness preparation of relief troops.	Powerplay has a negative effect on the designed CRO supply chain strategy because commanders in a CRO have the power to impose changes on it and because of the high turnover of commanders it is a challenge, from a supply chain point of view, to get a grip on demand uncertainty. This also distresses the PTO
	Trust	The supply shortages combined with an efficiency focus instead of effectiveness leads to distrust. As a result, it triggers opportunistic behavior because PTO commanders will seize every opportunity to get their hand on scares supplies in order to pursue their own objectives	
	Silos	The existence of silos in the organization have a negative effect on the supply chain for both the PTO as for the CRO since the silos are only concerned with their own objectives and performances instead of the output of the supply chain as a whole	Silos also have a negative effect on CRO because the responsibility for a CRO lies with another department. However, this department does not participate in the way the sustainment of supplies and equipment is organized.
	Strategic Intent	The absence of a strategic intent has a negative effect on the supply chain strategy and/or on the development of it for PTO. Because it leaves room for people to put their personal objectives before those of the organization. It requires leadership to develop one and to maintain it.	Strategic intent is also missing for the CRO and has a negative effect on the supply chain strategy. CRO commanders are asked to perform under difficult circumstances and therefore have the liberty to make decisions on how to achieve their objectives. However, they also take the liberty to deviate from a designed supply chain strategy and for instance use/deploy equipment that is classified as logistic reserve and serves as a buffer to cope with long lead times.

5.2.Discussion

This research has set out to find out how uncertainty and variability in the operating environment of the military play a role in the choice for a supply chain strategy. And as stated in the introduction paragraph this operating environment comprises out of a PTO and CRO part which in many cases coexist alongside each other. The findings indicate that besides product related uncertainty and variability there are other aspects in the operating environment affecting the choice for supply chain strategy. These aspects are power play, trust, silos and strategic intent. While extensive research has been done on these aspects in relation to supply chain management the focus was always limited to the business to business side of the relationship. This research, however, shows that the afore mentioned aspects are also present in a non-profit organization such as the military.

5.2.1. Power play

In general, it is safe to say that organizations consist out people and materials and that people in the organization is the one resource that transforms materials and generates output for the organization (Omisore & Nweke, 2014). This conversion however demands that choices have to be made. In the proces of deciding which choices to make power comes in play. A person or a department using it's influence to manipulate the decision making into their favor. Power as a concept has different meanings. So, it can be defined as the means and personal traits a person possess in order to influence others (Gupta & Sharma, 2008). It also gives a person the ability to influence behavior, to change the course of an event, to make people do things they would normally not do (Pfeffer, 1992). Another point of view on power play is given by Abraham Zaleznik (1970) as he states that "organizations are political structures and operate by distributing authority and setting a stage for the exercise of power". Both variants of powerplay and politics are present within the military as can be deducted from the following statements "the power over the supply chain lies with the pilots and by extension their technicians" (FN, 2018); "[the] Acquisition and Cross-Servicing Agreement [a collaboration agreement with the US] only works when you have the same type of equipment with the same state

of upgrades" (DO, 2018); "For pilots and technicians working towards achieving an efficient supply chain is fine as long as it does not hamper them [because then they would apply their power to influence the others and safeguard their interests]" (FN, 2018) and "The effects of a commander's decision on the supply chain strategy is always subject of discussion but to our opinion it's a non-discussion" (AA, 2018). As mentioned, before we can distinguish two forms of power play. One which occurs within an organization referred to as intraorganizational power play and one that involves the application of power in the business to business environment. Both are present in the military.

Intraorganizational power play

Many articles have been written on power, its concepts and behavioral implications (e.g. Donnely, 2001; Leonidou et al, 2007; Steyrer, Schiffinger & Lang, 2008; Sue-Chan & Ong, 2002; Keashly et al, 1994). Research on the power impact of organizational culture has pointed out that the precence of organizational culture can determine wether an organization is succesfull or not (Deal & Kennedy, 1982) . However, there is little research to be found covering the aspect of multiple cultures within one oragnization. When speaking of the power of multiple cultures in an organization this research has shown that it is a not to be neglected factor with great effect on the organization's performance. Certain groups in an organization historically have more power than others. "The pilots decide how the organization operates" (FN, 2018). This translates into direct or indirect influence on how the organization performs. "The chief of defence is also responsible for PTO, however, there are other departments calling the shots when it concerns acquiring new material and deciding on how the sustainment should be arranged" (MR, 2018). "When purchasing new equipments we often face the trade-off of more equipments vs spare parts and usually choose for more equipments instead of spare parts" (DO, 2018) this statement illustrates the different views on what is beneficial for the organization and the influence of cultures on this view. As a certain group prefer to have a greater number of equipment versus the view of the logisticians who rather go for less equipment but with spare parts to foresee in its

sustainment. But, as in many cases the latter draws the short straw. Another example of the effect of multiple cultures is the power of the commander. “A commander can overrule the outcomes of supply chain demand analyses and insist on taking more stocks to a CRO thereby creating a problem elsewhere” (AA, 2018). This especially is a problem during CRO where units and their commanders are deployed and reliefed within four or six months. By allowing the commanders to impose changes on the designed supply chain strategy, in combination with the high turnover, it is difficult to develop a supply chain strategy because a CRO is one of the primary tasks of the military and the suistainment of troops in a CRO has the higest priority It specifically effects the availability of supplies and equipment for the PTO and as a result effects the readiness preparation of troops. But, as the following statement makes clear it is the perrogative of a commander who has to little supply chain knowledge “The effects of a commanders decission on the supply chain strategy is always subject of discussion but to our opinion it's a non discussion” (AA, 2018) and is persuing his own agenda “Another thing that hinders the devolpement of a long term strategy is the swift change of board members, even that of politicians, and so does the political and organizations ambition”

Proposition 1: The existence of multiple cultures within one organization who all seek to better their position amplifies intraorganizational power play and have a negative effect on the supply chain strategy for the PTO.

Inter-organizational power play

As stated in the previous paragraph power is the ability of one to apply their will over others in order to manipulate the other’s decisions and benefit from it (Buchanan & Badham, 2000). The ability to exercise power over others can originate from different sources such as, social status and institutional status. Most of the equipment used in the military are built specifically for military use and can only be produced by or be purchased at a handful of manufacturers/suppliers. After the decision has been made of which manufacturer will be awarded the production order automatically a relationship is established. However, in many cases this is an

unequal relationship as FN (2018) stated “Amongst our suppliers there are monopolists”. This is one way the manufacturer and or supplier can exercise power over the purchaser. Another way is through the use of its status. Manufacturers often have the status of original equipment manufacturer (OEM) or have obtained a status through the implementation of certain regulations. This means that the equipment owner is limited in its options for the purchasing of spare parts. We cannot just buy something at the corner of the street because of airworthiness regulations and are therefore dependent of the manufacturer” (DO, 2018). Other ways of influencing one partner is through another collaborating partner. If two organizations collaborate, for example by sharing spare parts, it almost immediately forces the other to follow upgrades carried out by the other to maintain the possibility to continuate the collaboration. “The down side of the Acquisition and Cross-Servicing Agreement [a collaboration agreement], however, is that you need to implement all upgrades [advised by the manufacturer] they [the US] carry out [on their airframes] [if you want to be able to acquire spare parts and services during a CRO from the US]” (DO, 2018). Although the acquisition and cross-servicing agreement provides a solution to cope with long lead times during a CRO it, however, does not solve the supply issues faced during PTO.

Proposition 2: Purchasing equipment requires a clear corporate strategic vision in order to deal with variability in the supply chain. Therefore, developing a strategic purchasing strategy can have a positive influence on the supply chain strategy and availability of means for both PTO as for CRO.

5.2.2. Intra-organizational trust

The role that trust plays in relationships, especially between organizations, has gained much attention from researchers due to the positive effects it’s supposed to have. Relationships build on trust function better, it prevents parties to display opportunistic behavior, it reduces complexity and coordination and cooperation prosper more than what can be achieved through contracts or normative frameworks (Zand, 1972; Lewis, 1985; Zucker, 1986; Lane, 1998; Rousseau et al,

1998). However, research has shown that trust does not always lead to positive returns, is very difficult to build or maintained (Stevens et al, 2015) and has identified three reasons why it's difficult. The first is that building trust involves two or more parties who through interaction are learning to trust each other. The second one involves feedback on previous behavior and the third is the uncertainty that a displayed behavior will be honored (Zand, 1972; Zucker et al, 1996).

Large organizations usually have a hierarchical structure and consist out of multiple departments and business units, as is the case in the military. For the organization to perform effectively it is a necessity for departments and business units to work together and that they can rely on each other. Lack of trust, as the following statements depict "Gaining trust from our units that an efficient SC works may take up to two years to achieve" (FN, 2018). "And even when the SC would be reliable for a 100%, technicians will still hoard supplies" (FN, 2018), is one of the findings from this research that has an effect on the development of a supply chain strategy and thereby on business performance. In addition, the ability to learn or better put the absence of it from previous experiences also influences trust. "In the supply chain we are not learning from past CRO. We are making the same mistakes over and over again" (MR, 2018). As Six (2007) stated situations that encourage distrust must be eliminated; parties should, on a regular basis, do something to enhance the relation; when there is an issue between parties, they should refrain from actions that can worsen the relationship and finally that the organization should develop policies to reflect on the relationship. Stevens et al (2015) have referred to this as a process of recalibration and have developed a path to work towards optimal trust. Factors that have affected trust negatively within the military are the efficiency focus of the organization "For many years we have been forced to focused on efficiency and do more with less even though our operations [CRO] require responsiveness and so now is difficult to change that way of thinking because there's a shortage on all levels and you can't just loot a BU of its assets" (MR, 2018). But "What we notice is, certainly the last period, that we leave for a CRO with systems where for some articles / spare parts the lead times are

tremendous but still we have chosen for a Just in Time sustainment construction and so we have no spares or supplies" (MR, 2018) and in order to deal with these shortages we "When deployed for CRO we [have to] cope with uncertainty by deploying more aircrafts [equipment] than needed in order to guarantee the mission" (DO, 2018). Although these actions can be regarded as trust enhancing for troops in a CRO it is not the case for those in PTO because they are still confronted with a very strong and hard to change focus on efficiency as the following statement shows "Establishing an efficient SC is something we are striving for but since we're not there yet we lay down stocks were the action is to minimalize downtime [but] by maintaining an extra depot we are straining the SC and prevent it to be ran efficient" (FN, 2018). Within the military everyone agrees that troops in a CRO should not be deprived of the means necessary to perform their duties but for PTO this is not the case. Military commanders have a responsibility towards their troops and are therefore seeking ways to provide the means to their personnel to enable them to prepare for readiness which ultimately leads to opportunistic behavior. Based on the findings from this research the following proposition can be made.

Proposition 3: Opportunistic behavior exists as a result of distrust and hinders the effective use and assignment of spare parts and or stocks during PTO. Therefore, introducing policies to improve trust will have a positive influence on the supply chain strategy and its effectiveness during PTO.

Uncertainty

Previous research has shown that uncertainty is a state that exists due to the inability of a person to fully comprehend how the external environment will develop, its effect on the organization and if the actions taken will be successful. (Downey & Slocum, 1975). As unpredictability is one of the key aspects of CRO it increases uncertainity. The increased uncertainty also increases the risks of not making the right decision to deal with it. This is in particular the case for the supply chain strategy as the way PTO are sustained differ from that of CRO (MR, 2018). This mis-alignment between the sustainment of PTO and CRO is due to the fact that

there is no supply chain strategy in place, which in turn is a direct consequence of lacking a strategic vision (AA, 2018). Since uncertainty in the sustainment of CRO is an unwanted situation it's being dealt with by asigning more assets then neccesary to the CRO and by decomisioning assets to provide the required parts. The extra asigned assets or decomissioning of assets in turn has an negative effect on PTO. Hence the units in PTO have less assets to conduct the required tasks and readiness preparation. As a result this leads to increased distrust in the supply chain and supports opportunistic behavior. One can argue, based on the findings of this research, that the sustainment misalignment feeds the uncertainty and is a consequence of the lack of a corporate strategic vision. Therefore the following proposition can be formulated:

Variability

As research on variability has shown it is the inconsistency in material flow. Causes for variability can be divided in controllable – and random variation (Hopp & Spearman, 2007; Germain et al, 2008). Controllable relates to decision making and random to fluke. The latter cannot be anticipated on, but the former can but comes down to making choices. As Skinner (1969) and Simchi-Levi (2010) have stated a company cannot be efficient and effective at the same time. Thus, it is necessary to make choices. These choices are to be made by senior management and failing to do so will affect operations. "When purchasing new equipment, we often face the trade-off of more [in numbers] equipment vs spare parts [stocks] and usually choose for more [in numbers] equipment instead of spare parts [stocks]. Combined with the knowledge that "The provision of spare parts for aircrafts revolves around the aircraft manufacturer [and that] the aviation industry is characterized by monopolists and long lead times, it is just a matter of time for the supply problems to occur" DO (2018). According to AA (2018) no one within the organization is aware of or worries about the consequences of strategic deficit. One can argue that developing a strategic vision is crucial for choice making and so has an effect on variability and thus on the supply chain. Therefor the following proposition can be framed:

Proposition 4: Trade-offs are based on the strategic vision of an organization, thus lacking a strategic vision has a negative influence on uncertainty and variability and thus trust.

5.2.3. Silos

The general definition for silo is "A trench, pit or especially a tall cylinder (as of wood or concrete) usually sealed to exclude air and used for making and storing silage" (Merriam-Webster, 2019). The word silo also means "A system, process, department etc. that operates in isolation from others" (Oxford-dictionaries, 2019) and is used as a metaphor to address the way large organizations behave because most of them have been organized hierarchically (Greenberg & Baron, 2003). In a hierarchical organization horizontal and vertical layers are typical. Where the horizontal layers depict the top down position according to the ones with the most power and influence on the ones with non and where the boundaries of the vertical layers are based on specialization. It is widely recognized that the organizational structure of large organizations often is the cause for disfunctioning because of the fragmentation (Greenberg & Baron, 2003). According to Diamond & Alcorn (2004, 2009), Diamond, Stein & Alcorn (2002) and Diamond, Alcorn & Stein (2004) organizational silos are vast psychological spaces of compartmentalization, segregation and differentiation and serve as an invisible container for collective unconscious teams. The silo as an invisible fence keeps others out and provides safety and comfort to team members and thereby creating a family type of bond between team members. What follows is a typical "us and them" attitude and splinters the organization. As FN (2018) stated "the staff of the business unit and the logistic unit need to work together but that's not always the case" According to Patrick Lencioni (2006) Silos are a result of the lack of focus. Managers failing to provide focus causes their employees to lose their way and notice that they are ad hoc being ordered to things. It's just a matter of time before employees start noticing that within the organization everybody or 'silo' has a different focus. "The

DOPS only focusses on the CRO and not with PTO because of its limited capacity" (MR, 2018). After a while presumed colleagues start to work against each other. "The defence supply chain consist out of silos. Decisions in the silos are taken without looking at the consequences they impose on the chain" (AA, 2018).

Integrality

According to the Oxford dictionary (2019) integral means "Having all the parts that are necessary to be complete". In business organizations it is used to signify that all relevant parties for a task are included to acomplish it. It stems from the priciples of management Fayol formulated and in particular unity of direction meaning "one head and one plan for a group of activities having the same objective" (Wren & Bedeian, 2009). Through unity of direction an organization can coordinate and focus its efforts towards achieving a certain goal. An integral approach to align action in an organziation is supposed to be beneficial for achieving a certain objective. Failing to have unity of direction leads to suboptimal performance of a system. "A supply chain implies that there's some kind of integral single chain of command. But I doubt if that's the case" (MR, 2018) and thus"We as an organization fail in standardizing [supply chain] procedures through the whole of the organization" [because] every defence unit is hanging on to its own way of working" (AA, 2018). As the statements "Within the defence organization nobody is worrying about the big picture and responsibility for bad results are hard to pin on a single unit's manager"and "a very important observation is that there's no single chain of command over the supply chain because of the silos" (AA, 2018) implies that there is no unity of command over certain processes and certainly not over the supply chain and thus action are not coordinated. "strictly speaking we should coordinate our SCM activities and act as a team to restore control over the SC but sadly we are not there yet" (FN, 2018). Refraining to adapt to an integral approach of supply chain objectives will effect trust in the supply chain.

Based on the findings of this research it's safe to say that silos within an organization are inevitable but it's a management's job to provide the needed focus and thus the following proposition can be formulated:

Proposition 5: Leadership and an unambiguously stated strategy reduce power and politics battles between the silos and thus most likely will have a positive effect on the development of a supply chain strategy.

5.2.4. Strategic intent

"The principal impediment to changing an organizations strategic direction is its existing culture" (Smith, 1994). A prerequisite to improve an organizations performance or change its strategy is to have a long-term strategic intent. The absence of a long-term strategic intent, or an out dated one, makes it difficult to align actions towards achieving the desired goals. "We lack a supply chain strategy because there's no updated strategic vision. The last one dates back to 2011 but since then global politics has changed tremendously" (AA, 2018). Another essential factor to improve or bring about change in an organization is leadership (Hamel & Prahalad, 1989). Leadership to develop a long-term strategic intent and leadership to persue this intent regardless of the personal agenda and ambition. "I suppose that not having a strategic vision has to do with the time we live in where managers on the holding level, even politicians, are rather reactive instead of proactive. To develop a vision, you need powerful leaders who are willing to put aside their own personal ambition and carriers. Another thing that hinders the development of a long-term strategy is the swift change of board members, even that of politicians, and so does the political and organizations ambition" (AA, 2018). This swift change gives room to opportunistic behavior and causes turbulence within the organization. Placed against the background of the military where budget cuts and power struggles, displayed as reorganizations which followed each other rapidly, consumed the attention of its personnel focus on and leadership over the supply chain was lost. This created the opportunity for opportunist pursuing their own

ambitions to replace a Just In Case (JIC) approach with one of Just In Time (JIT). Based on the perception that after the fall of the wall there would be world peace it was a justified decision. But, shortly after the fall of the wall world peace not only seemed to be but also was even further away and the military was deployed to places and situations it had never encountered before. The great demand for supplies, equipment and personnel during a CRO were tremendous but, still this did not ring a bell to adjust the lean approach which was embraced. On the other hand, the chiefs of the military departments felt compelled to provide the units in a CRO with the necessary means to perform their duties and did not speak out against the chosen approach of JIT instead of JIC even if it meant that by doing so, they would jeopardize the PTO. Units in PTO would not be able to prepare themselves to follow up and relief troops in CRO. The training deficit of the relief troops would then be straightened during the CRO making the demand for supplies and equipment even greater and deprive them from troops in PTO. A strategic intent was obviously missing as it provides clarity over the long-term orientation of the organization and thereby creates stability within. It furthers allows the development of a supply chain strategy through alignment of actions within the organization. “A supply chain strategy also makes clear what your ambitions as an organization are” (AA, 2018). Based on the findings of this study, the following propositions can be formulated:

Proposition 6: Strategic intent is a determining factor for an organization to achieve alignment between the CRO and PTO supply chain.

Proposition 7: Strategic intent has a positive influence on mitigation actions towards opportunistic behavior of organization leaders and therefore on the supply chain strategy for CRO and PTO.

6. Limitations, recommendations and managerial implications

6.1. Limitations

The advantages of a case study as research strategy is that it allows for a better understanding of the research object, it does not require as much pre-structuring as for instance a survey or experiment and is therefore more flexible and finally, the results from a case study are easier to acknowledge, understand and accept because of the interaction between researcher and interviewee in comparison to surveys and experiments. Despite the advantages there is also one major concern about case studies. That is that of external validity of the findings. The question raised is that of the applicability of the findings for other groups. By being explicit in the way the data is gathered and assessed the researcher can strengthen the belief in the findings (Benbasat et al., 1987). To alleviate the presumed low generalizability, due to the small *n* of cases, of this research the cases where not randomly selected but, selected based on their role within the supply chain of the armed forces, their top to bottom representation of the organization and knowledge of both the PTO and the CRO environment.

6.2. Recommendations for future research

Recommendations for future research are first enlarging the number of cases to enrich the data. Secondly to test the suggested proposition in a larger scale whether this is done within the army or within another type of organization does not matter. Neither does it matters if testing the propositions in done through qualitative or quantitative research. Thirdly this study pointed out that although power and politics are part of social interaction and thus part of organizational behavior it is recommended to further investigate the how power and politics are affected by culture when there are more than one cultures present in one organization.

When speaking of the power of multiple cultures in an organization this research has shown that it is a not to be neglected factor with great effect on the organization's performance and needs further research to .

6.3.Managerial implications

Besides the contribution this theory-elaborating research makes to academic science it also has implication for managers. As a result, this study brings new insights to the theory of supply chain management strategy. Uncertainty and variability in the supply chain are not only created by demand and supply but are also an outcome of the lack of strategic intent, power and politics, organizational silos and distrust within the organization.

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Appendices

Appendix 1 – Coding table

Appendix 1 – Coding table

Statements	1st order concepts	2nd order themes	Aggregate dimensions
if not delivered on time there is a penalty. Which I think is very normal within the civil society	force change	exercising power	interorganizational power play
So, if you impose that penalty, they will improve because they do not want to, so you make them a reliable partner	force change	exercising power	interorganizational power play
We are also working on contract management. which is quite new for the entire government, I think	force change	exercising power	interorganizational power play
We are not very business minded and I sometimes have the feeling that those parties, think of the government in terms of a cash cow.	force change	exercising power	interorganizational power play
We are now setting up contracts with new parties where we say that this is the delivery time for you (we agree on this) and measure it	implementing performance-based contracts and management	improve delivery reliability	interorganizational power play
Amongst our suppliers there are monopolists	bargaining power of supplier	negative effect on trust in the supply chain	interorganizational power play
To be able to use the ACSA also substantiate why we should carry out certain midlife upgrade	use cooperation to influence decision making	exercising power	interorganizational power play

An example of the impact a seemingly simple thing as ACSA has on decision making is the authorization of the block 3 upgrade of the Apache helicopters	use cooperation to influence decision making	exercising power	interorganizational power play
In the past we decided to use our own radio's in the Apache helicopters but, with every upgrade the helicopter had to undergo we had to make additional expenditures for the radio to work with the upgrade. So, we finally decided to switch to the standard radio configuration Boeing prescribed	use cooperation to influence decision making	exercising power	interorganizational power play
The down side of this, however, is that you need to implement all upgrades they carry out	cooperation creates dependence	exercising power	interorganizational power play
We cannot just buy something at the corner of the street because of airworthiness regulations and are therefore dependent of the manufacturer	bargaining power of supplier	negative effect on trust in the supply chain	interorganizational power play
For pilots and technicians working towards achieving an efficient SC is fine as long as it does not hamper them.	commander's role undermines SC strategy	exercising power	intraorganizational power play
No matter how you look at it the real power lies with the pilots and unit commanders	lack of trust	exercising power	intraorganizational power play

the power over the supply chain lies with the pilots and by extension their technicians	lack of trust	exercising power	intraorganizational power play
the pilots decide how the organization operates	lack of trust	exercising power	intraorganizational power play
It goes without saying that your operational capacity will also be strengthened when certain upgrades are carried out	use cooperation to influence decision making	exercising power	intraorganizational power play
ACSA only works when you have the same type of equipment	improve effectivity through collaboration	reduces variability	intraorganizational power play
Regulations to which the BU's are bound to are used as arguments against standardization of the supply chain	regulation as an argument against standardization chain	exercising power	intraorganizational power play
A commander can overrule the outcomes of supply chain demand analyses and insist on taking more stocks to a CRO thereby creating a problem elsewhere	commander's role undermines SC strategy	exercising power	intraorganizational power play
The effects of a commander's decision on the supply chain strategy is always subject of discussion but to our opinion it's a non-discussion	commander's role undermines SC strategy	exercising power	intraorganizational power play
The chief of defence is also responsible for PTO, however, there are other departments calling the	strict separation of responsibilities	exercising power	intraorganizational power play

shots when it concerns acquiring new material and deciding on how the sustainment should be arranged			
Transparency is key to execute a change process and gain trust	be transparent about the goals	building trust in the supply chain	Intra-organizational trust
we created a KPI tree and projected it on the entire SC to show what data we generate and steer on	be transparent about the goals	building trust in the supply chain	Intra-organizational trust
Transparency is key to execute a change process and gain trust	share supply chain performance outcomes	building trust in the supply chain	Intra-organizational trust
establishing an efficient SC is something we are striving for but since we're not there, yet we lay down stocks were the action is to minimalize downtime	Placing supplies close to the customer	building trust in the supply chain	Intra-organizational trust
we needed to convince the units that data collection was needed in order to improve SC performance and was not going to be used against them	involve users in the supply chain process	building trust in the supply chain	Intra-organizational trust
By maintaining an extra depot, we are straining the SC and prevent it to be ran efficient.	disrupting the supply chain	consequence of organization silo's	Intra-organizational trust
the power over the supply chain lies with the pilots and by extension their technicians	lack of trust	building trust in the supply chain / exercising power	Intra-organizational trust

the pilots decide how the organization operates	lack of trust	building trust in the supply chain / exercising power	Intra-organizational trust
Gaining trust from our units that an efficient SC works may take up to two years to achieve	supply chain optimization takes time	intra organizational trust	Intra-organizational trust
and even when the SC would be reliable for 100% technicians will still hoard supplies	people are still suspicious about supply chain performance	intra organizational trust	Intra-organizational trust
Amongst our suppliers there are monopolists	bargaining power of supplier	Variability	Intra-organizational trust
When dealing with monopolists it becomes very difficult to manage CRO demand uncertainty	bargaining power of supplier	negative effect on trust in the supply chain	Intra-organizational trust
the odd thing is that the focus of exercise and training always lies on training the pilot. But, it's also very interesting for the logistic. It helps to develop a SC strategy for a certain scenario.	exercises during PTO are of great value for the supply chain	reduces uncertainty	Intra-organizational trust
exercises and training in certain environments can also be used to gather system performance information and to create a scenario for SC planning purposes	gather data from PTO to be better prepared for CRO	reduces uncertainty in the supply chain	Intra-organizational trust

gathering data from specific PTO environments to forecast demand in case of CRO	Build scenario's for future deployment	reduces uncertainty in the supply chain	Intra-organizational trust
Demand forecasting is done by reviewing historical customer order data and discuss the findings with the service provider	improve forecasting by proactively approaching customers	reduces uncertainty in the supply chain	Intra-organizational trust
When deployed for CRO we cope with uncertainty by deploying more aircrafts than needed in order to guarantee the mission	deploying spare systems to deal with long lead times	building trust in the supply chain	Intra-organizational trust
To manage the uncertainty of system break down we carry out failure mode and effect analysis	Managing uncertainty through FMEA	building trust in the supply chain	Intra-organizational trust
The air force is responsible for the PTO part, so we try to do that as efficient as possible.	distinction between financing PTO and CRO	consequence of organization silo's	Intra-organizational trust
CRO increases uncertainty because the effects of a different environment on equipment is unknown	CRO demand uncertainty poses a risk for logistics	CRO amplifies demand uncertainty	Intra-organizational trust
Unpredictability is one of the key aspects of CRO	CRO demand uncertainty poses a risk for logistics	CRO amplifies demand uncertainty	Intra-organizational trust
Aircraft maintenance is primarily based on scheduled preventive maintenance which is referred to as "checks" and thus parts needed are known on forehand	preventive maintenance to reduce demand uncertainty	dealing with variability	Intra-organizational trust

The results of the failure mode and effect analysis linked to a specific check are included in the scheduled preventive maintenance for that specific check.	failure analysis to increase mean time between failure	dealing with variability	Intra-organizational trust
Decommissioning has a negative effect on the combat readiness of personnel and thus the sustainment of the mission	cannibalizing systems in NL	negative effect on continuity	Intra-organizational trust
When spare parts are not available, we decommission air crafts from the PTO to provide in the CRO demand	cannibalizing systems in NL	negative effect on continuity	Intra-organizational trust
When spare parts are not available, we decommission air crafts from the PTO to provide in the CRO demand	cannibalizing systems in NL	negative effect on continuity	Intra-organizational trust
I do not think we as a company are aware of this strategic deficit. Things are done everywhere, but whether these choices are made consciously is doubtful	loyalty/adaptiveness of personnel keeps the organization going	negative effect on the organization's strategy	Intra-organizational trust
When purchasing new equipment's, we often face the trade-off of more equipment's vs spare parts and usually choose for more equipment's instead of spare parts	lack of long-term strategy	negative impact on trust	Intra-organizational trust

One of our main concerns are the long lead times we're facing	Lead times poses a problem	negative impact on trust	Intra-organizational trust
Uncertainty ultimately means a higher risk and within logistics you think the higher the risk the more stock you will need in terms of sustainment	CRO demand uncertainty poses a risk for logistics	negatively affects supply chain strategy	Intra-organizational trust
The aviation industry is characterized by monopolists and long lead times.	influence of monopolists	supplier power	Intra-organizational trust
The provision of spare parts for aircrafts revolves around the air craft manufacturer	type of system and regulations determine the supplier	supplier power	Intra-organizational trust
Logistics operations during PTO should be the same as during PTO.	standardize processes	improves the ability to continuate	Intra-organizational trust
For many years we have been forced to focused on efficiency and do more with less even though our operations require responsiveness and so now is difficult to change that way of thinking because there's shortage on all levels and you can't just loot a BU of its assets	efficiency still trives over effectiveness	change is difficult	Intra-organizational trust
What we notice is, certainly the last period, that we leave for a CRO with systems where for some articles / spare parts the lead times are tremendous but still	efficiency still trives over effectiveness	change is difficult	Intra-organizational trust

we have chosen for a Just in time sustainment construction and so we have no spares or supplies			
The sustainment for PTO does not align with the sustainment requirements of a CRO	PTO sustainment does not match CRO requirements	uncertainty	Intra-organizational trust
In the supply chain we are not learning from past CRO. We are making the same mistakes over and over again	learning ability is lacking in the organization	negative impact on trust	Intra-organizational trust
The air force is responsible for the PTO part, so we try to do that as efficient as possible. The responsibility for CRO, however, lies with the defence staff and thus all extra costs of operating in a CRO are for them	distinction between financing PTO and CRO	consequence of organization silo's	silos
The sustainment for PTO does not align with the sustainment requirements of a CRO	PTO sustainment does not match CRO requirements	lack of integrality because of organizational silo's	silos
we created a KPI tree and projected it on the entire SC to show what data we generate and steer on	be transparent about the goals	building trust in the supply chain	silos
the staff of the business unit and the logistic unit need to work together but that's not always the case	improve collaboration	lack of integrality	silos
strictly speaking we should coordinate our SCM activities	improve collaboration	lack of integrality	silos

but sadly, we are not there yet	improve collaboration	lack of integrality	silos
And act as a team to restore control over the SC	coordinate approach of units to prevent	lack of integrality because of organizational silo's	silos
Within the defence organization nobody is worrying about the big picture and responsibility for bad results are hard to pin on a single unit's manager.	integrality is missing	consequence of organization silo's	silos
We as an organization do not succeed in standardizing procedures through the whole of the organization	standardization is difficult	consequence of organization silo's	silos
Every defence unit is hanging on to its own way of working	holding on to own identity	exercising power	silos
a very important observation is that there's no single chain of command over the supply chain because of the silos	command over the supply chain is fragmented	negative effect on the organization’s strategy	silos
The defence supply chain consists out of silos. Decisions in the silos are taken without looking at the consequences they impose on the chain.	command over the supply chain is fragmented	negative effect on the organization’s strategy	silos
The responsibility for arranging the sustainment of equipment or to have sufficient supplies lies with the BU.	strict separation of responsibilities	lack of integrality	silos

A supply chain implies that there's some kind of integral single chain of command. But I doubt if that's the case.	strict separation of responsibilities	lack of integrality	silos
The chief of defence is also responsible for PTO, however, there are other departments calling the shots when it concerns acquiring new material and deciding on how the sustainment should be arranged	strict separation of responsibilities	lack of integrality	silos
the DOPS only focusses on the CRO and not with PTO because of its limited capacity	strict separation of responsibilities	lack of integrality	silos
When purchasing new equipment's, we often face the trade-off of more equipment's [tangible assets] vs spare parts [non-tangible] and usually choose for more equipment's [tangible assets] instead of spare parts	lack of long-term strategy	negative impact on trust	strategic intent
A supply chain strategy also makes clear what your ambitions as an organization are	lack of long-term ambition within the board of the orginization	negative effect on the organization's strategy	strategic intent
To develop a vision, you need powerful leaders who are willing to put aside their own personal ambition and carriers	lack of ownership	negative effect on the organization's strategy	strategic intent

Another thing that hinders the development of a long-term strategy is the swift change of board members, even that of politicians, and so does the political and organizations ambition	personal goals before organization goals	negative effect on the organization's strategy	strategic intent
Not having a supply chain strategy is a shame because, it's like a dot on the horizon from there we want to stand 15 years from now	sense of urgency is missing	negative effect on the organization's strategy	strategic intent
We lack a supply chain strategy because there's no updated strategic vision. The last one dates back to 2011 but since then global politics has changed tremendously	strategic vision no longer connects with external environment	negatively affects supply chain strategy	strategic intent
I suppose that not having a strategic vision has to do with the time we live in where managers on the holding level, even politicians, are rather reactive instead of proactive	managing the organization is reactive and not proactive	negatively affects supply chain strategy	strategic intent
Examples of reactive instead of proactive behavior are the current safety issues. These could have been prevented if there was a long- term strategic vision.	managing the organization is reactive and not proactive	negatively affects supply chain strategy	strategic intent
Two years ago, material readiness was on top of the agenda. Now it's safety. As a consequence, the sense of urgency to improve material readiness has faded	managing the organization is reactive and not proactive	negatively affects supply chain strategy	strategic intent