



Master's degree thesis

LOG950 Logistics

**The management of cost savings in the Royal
Norwegian defense sector**

Kevin Brendesæter-Janzen

Number of pages including this page: 113

Molde, 30.08.2021



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Preface

The Master Thesis is a general requirement in the final stage of the Master of science program in logistics at Molde University college. The study for this master thesis started in early December 2020 and was finished in august 2021. The study was a clinical management research conducted in collaboration with the Royal Norwegian Army and Norwegian defense logistics organization (NDLO). Due to COVID-19 physical meetings with the Army and NDLO had to be cancelled and affected the study by complicating the gathering of information.

I want to show special gratitude to my supervisor Sergei Teryokhin from Molde University College. Sergei has provided helpful academic guidance for this study. I feel fortunate to have had Sergei involved in this study with his expertise. Sergei has given great feedback and has been encouraging throughout the entire process.

I would also like to thank the research company, the defense sector for allowing me to research the subject with great support in the organization. Further I want to send a special thanks to my colleagues Dag Bjerke in the Norwegian defense logistics organization and Torstein Takvam in the economics department of the Army. Through the study they have been my main facilitators through continuous information exchange between December 2020 and until august 2021. From the first encounter until the last I was met with informant that were engaged to contribute to the study. This reflects the defense sectors wish to improve own processes and facilitate for academic studies within their organization.

At the end I want to thank my family for making it possible for me to combine working on my master's degree at the same time as being in full time work in the Army. Special thanks to my girlfriend for taking care of the children, all the time I had to spend on my masters and was off to Molde University. Another special thank you goes to my mother, who taught me to always believe in myself.

Bardufoss, 30.08.2021

Kevin Brendesæter-Janzen

Summary

This thesis wishes to contribute to explain the complexity regarding the failure in management systems in the defense sector. The aim of the study was to investigate the performance of the management in cost savings and possibly propose how the use of modes in coordination can improve the outcome. The Norwegian defense logistics organization (NDLO) is the defense sector's centralized procurement function. NDLO negotiates framework agreements on behalf of the different branches and proposes cuts in the budgets of the branches based on their expected cost savings. This study is conducted in the defense sector using a clinical management research method, limited to the coordination between the Royal Norwegian Army as branch and NDLO.

The thesis found multiple obstacles in the coordination between NDLO and the Army when managing cost savings that ultimately lead to a failure in the management of these expected cost savings. A high degree of dependence has left the army vulnerable, as the exchange of relevant information has been low. With the high degree of dependence in the relationship the degree of information exchange has not been sufficient to compensate for the low data quality provided to the Army through the ERP management support system SAP. The findings in this research indicate that the purchasing power of the army has been decreased the last four years. Due to low data quality, qualitative and quantitative research was combined to show the impact these obstacles have on the purchasing power of the army.

The Thesis concludes that by using three of the four modes of coordination by Simatupang et al. (2002) most of the uncertainty in decision making can be countered. The relevant modes identified are collective learning, incentive alignment and information sharing to improve the outcome in the management of cost savings.

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1.0 Introduction

This chapter will start with the background for researching the management of cost savings in the defense sector. Thereafter, the relevance of the study, the choice for the research problem and the research problem itself, with outlined research questions, is presented. Finally, this chapter concludes with a presentation of the thesis structure.

1.1 Background

In 1953, Dwight D. Eisenhower, the president of the United States of America, had the following to say about the costs of armed forces:

“The cost of one modern heavy bomber is this: a modern brick school in more than 30 cities ... We pay for a single fighter with a half million bushels of wheat. We pay for a single destroyer with new homes that could have housed more than 8,000 people.”

(Dwight D. Eisenhower 1953)

This sentiment can also be said for the Norwegian defense sector. Based on the high alternative cost of investing in the defense sector efficient use of resources is important for the public opinion on the defense sector. The Norwegian defense sector is in the process of heavy modernization where recently, the tanks belonging to the Army have been modernized, with new trucks on the brink of being implemented and projects regarding the procurement of new tank for the Army is in the works. Additionally, new planes and helicopters for the air force, and new submarines for the Navy, have been ordered. The defense sector continues to increase its spending and historically, it has been difficult planning with all the increased costs of implementing new material. To increase the flexibility in their budgets, the defense sector has focused on increasing efficiency to free economical resources for reallocation. According to The Oxford Dictionary, “an increase in efficiency is reducing waste used, for the same output.” (Oxford Dictionary)

For the defense sector to release economical resources they first need to reduce their spending in some areas. Within the supply chain management, procurement has increased in importance. Achieving cost savings through more efficient and cheaper procurement has improved the chance of achieving cost savings. According to Albano and Sparro (2010), the introduction of centralized purchasing bodies, besides scale economies, would ensure a reduction of acquiring costs through the increase in the buyer’s market power. This again

can lead to the access of better resources (Baldi and Vannoni 2017) and can again, lead to more competitive prices (Duggan and Scott Morton 2010).

For the defense sector, this means that centralized procurement can achieve cost savings through economies of scale. The idea is that, the larger the customer, the more attractive it is for firms to offer lower prices, as increased demand from the customer means higher profits. So, the defense sector centralized its procurement functions at the Norwegian defense logistics organization further referred to as “NDLO,” to increase scale economy, among other things. Good performances in the centralized procurement are measured through the reporting of “expected cost savings” and the evaluation of the “actual cost savings” compared to the “expected cost savings.” To be able to increase economical flexibility and actual cost savings, it is important to understand how the cost savings are measured. In the private sector, cost savings can be measured by the money spent on products compared to prior years. These cost savings will be visible in the end of a fiscal year when the bottom line of the firm has increased. In theory, this evaluation seems accomplishable within a firm. However, in the defense sector, this measuring and managing of cost savings becomes more complex due to the nature of centralized procurement and the structured management of cost savings. In the defense sector, branches cannot wait until the end of the year to see their actual savings as this would result in unused resources.

This thesis will focus on issues in the management of cost savings in centralized procurement. There is currently a failure in the management of cost savings, identified through various reports, which leads to the impression that purchasing power of the branches has decreased. This study will repeatedly use the term “failure” to refer to the “failure” in the management of cost savings. The aim of this study is to show the mechanisms of failure impact that decrease the purchasing power of the Army. Furthermore, this study intends to show how certain modes of coordination can improve the outcome of managing cost savings in public procurement. The management of cost savings studied in this paper is specialized in public procurement with yearly budget allocations. Johan Gedde-Dahl (2021) responsible for the researched process at NDLO says that there is room for improvement in several areas, amongst them communication between different branches and departments. According to Gedde-Dahl (2021) it is important that all agree on a common set of rules, that everyone has the same basic

information, and a common understanding of roles and responsibilities (what when and who). That is lacking in the current setup according to Gedde-Dahl (2021). In the new long-term plan for achieving cost savings written by Kvalvik et al. (2019), the defense sector sees 8790 million norwegian kroner (NOK) as a changeable potential within the defense sector. These are expected savings from operational procurement in the defense sector from streamlining purchasing and renegotiating framework agreements. Figure 1 shows what the FFI-report from Kvalvik et al.(2019) reveals in realizable cost savings in the period between 2021- 2024. From the total of 8790 million NOK in identified realizable cost savings, the report expects only 2410 million NOK to be achievable between 2021-2024. Due to the current status of the new framework agreements, Kvalvik et al. (2019) believe 370 – 890 millions of these savings to be realizable in the period 2021-2024. Framework agreements are negotiated for 4 years at a time (Kvalvik et al. 2019) limiting the achievable cost savings to the framework agreements renegotiable in the period. These expected savings are based on the performance of Norwegian defense logistics organization strategic procurement further referred to as “NDLO SP”.

Considering the size of the expected cost savings for the next 4 years, a failure to effectively manage these cost savings could have a severe impact on the budgets of the various branches.

Support	Definition of category	Influenceable consumption 2018 (million NOK)
Property or management	Rent and management of property, besides Forsvarsbygg area of responsibility, primarily connected to air bases.	Defense sector: 290 Other agencies and defense department: 40
Consumables	Mainly tools and workshop equipment, office supplies, furniture, and commercial kitchen equipment.	Defense sector: 480 (190) Other agencies and defense department: 40
ICT Products and services	Mainly services and products, user equipment and software.	Defense sector: 730 Other agencies and defense department: 330
Professional services	Mainly services related to cleaning of the armed forces bases and facilities, courses and conference activities, consulting services and staffing.	Defense sector: 500 Other agencies and defense department: 420
Provisions	Mainly groceries and field rations.	Defense sector: 500 (100) Other agencies and defense department: 0
Travel, accomodation and catering	Mainly costs related to passenger transport by plane or train as well as travel agency services.	Defense sector: 460 (320) Other agencies and defense department: 60
Transport, forwarding and storage services.	Mainly leasing of vehicles and transport services.	Defense sector: 280 Other agencies and defense department: 0
SUM		Defense sector: 3240 (2410) Other agencies and defense department: 890

Figure 1: (Kvalvik et al., 2019) Changeable consumption goods based on categories. Corrected estimate on influenceable consumption in 2021-2024 in the parentes.

1.2 Determining the problem and research questions

Since I started in the military in 2017 there has been much frustration over the yearly budget cuts based on expected cost savings. This frustration is based on a general uncertainty within the Army of the impact budget cuts due to expected cost savings have on their purchasing power. This frustration peaked my interest, as evaluating cost savings and their effect on budgets generally should not be such a difficulty. After all, these cost savings are based on the negotiation of new framework agreements and the amount of savings the defense sector expects to achieve through the new agreements. After having been appointed financial officer, I could clearly see that the mechanisms in the management of cost savings in the defense sector were far more complex than they first appeared. My budget analysis revealed difficulties in extracting relevant data in evaluating cost savings through centralized procurement. This left me and the battalion with uncertainty regarding the reality of the expected cost savings and their impact on our purchasing power. At the same time, after speaking to NDLO CP and evaluating the cost savings, I learned that these were realized savings, meaning expenditure had decreased regarding certain agreements. Neither my colleagues in the other Battalions, nor the economics section in the Brigade or Army could give me a definite answer on how these expected cost savings should or could be evaluated. Instead, they categorized them as “unspecified budget cuts.” Since unspecified budget cuts results in Battalions treating them as regular budget cuts rather than evaluating them as savings, this does not coincide with the intention of managing cost savings. Instead, the budgets get cut on different accounts than where the budget cuts can be expected and make it more difficult to control the effect of the cost savings.

As such, this study will focus especially on one part of NDLO called strategic procurement further referred to as NDLO SP. NDLO SP is responsible for the negotiation of new framework agreements on behalf of the entire defense sector and calculate the expected cost savings on behalf of the defense sector. One of the goals of NDLO SP is to save money on behalf of the defense sector and their branches. There is evidence that the budget cuts based on expected cost savings result in the reduction of purchasing power as there is less money to spend in different accounts, while the overall cost stays unchanged or even increases. This sparked an interest in conducting a closer examination of the subject and the development of my research problem.

1.3 Problem description and research questions

With increased focus on government spending, a need for an increase in efficiency is required on all government spending. With regards to this, the centralization of procurement in the defense sector was introduced to achieve synergies and economies of scale. Even though cost savings have been achieved and can be documented since centralizing procurement the purchasing power of the branches is believed to have decreased. The impression is that the management of cost savings in the centralized procurement has a negative effect on the armed forces purchasing power, as other agreements might have increased in price more than the expected cost savings. In addition, there is evidence that cost savings are overreported and is not adjusted when the actual cost savings are identified. After trying to find out how to measure these cost savings and realizing that there was no obvious procedure within the system, I was sent to NDLO. At NDLO there was no easy way of receiving the raw data needed to evaluate these cost savings. Based on this lack of data, I concluded that this study needed to focus on researching the coordination between NDLO and the Army and how to remove the uncertainty in the management of cost savings. Within the centralized procurement, the coordination is of great importance to achieve good performance in managing cost savings. Throughout the interviews there are several issues within the coordination that are illuminated. The one issue at the core, is the argument regarding how cost savings should be evaluated. In today's practice, NDLO only reports cost savings on the framework agreements that have achieved better conditions and reports the expected cost savings based on these. The Army argues that the cost savings need to be evaluated based on the net savings of all framework agreements. In this thesis "cost savings" will refer to the calculation of the expected cost savings on new framework agreements that have been negotiated that reduce the overall cost for the branches. In turn, "net savings" will refer to the evaluation of all framework agreements, and the difference between the expected cost savings in comparison to the increase in price on the remaining framework agreements.

NDLO agrees with the reasoning in reporting net savings, rather than reporting cost savings. At the same time the defense sector still has not changed the procedure of reporting cost savings and therefore NDLO is still measured on their reported cost savings. This means that, as long as the defense staff does not change NDLO's incentive, NDLO will report cost savings rather than net savings. This is based on the mandate from the

defense staff for NDLO to achieve a certain amount in cost savings each year which is to be cut from the branches' budgets dependent on their reports. The Army has no choice but to accept this fact. They therefore tried to retrieve relevant data to do the same evaluations and further try to complete an evaluation of the net savings. As necessary data is not available for the Army on a regular basis, information availability for relevant personnel is an issue that needs to be addressed. If the management of cost savings leads to a reduction in purchasing power, today's centralization of procurement in the military should be considered failing in their goal to achieve cost savings.

As the defense sectors budget is assigned each year, the expected cost savings due to new framework agreements are calculated and their budgets are cut in early stages, each year. Budget cuts are completed before the scope of the actual cost savings are documented. This leaves the risk that the process will have an impact on the overall purchasing power of the branches in the armed forces. Therefore, the Army is interested in knowing how these cuts impact their change in purchasing power. The change in purchasing power of today's Army is difficult to measure as outlined in this study. In this study the purchasing power as defined by Hayes (2021) is used. He defines purchasing power as the value of a currency expressed in terms of the number of goods or services that one unit of money can buy. He also mentions that purchasing power is important because, all else being equal, inflation decreases the number of goods or services one can purchase. In other words, for the Army the change in purchasing power in this case defines the amount of a product that can be bought the current year in comparison to previous years, within the same budget.

Necessary control measurements are not always considered in the entire supply chain to evaluate a change in purchasing power. Whereas the private sector can measure their cost savings on the bottom line, the armed forces cannot wait until the end of the year to see the impact of their new framework agreements on their accounting. This could potentially result in yearly unused resources for the armed forces. Even if the defense sector could wait until the end of the year, they may not be able to see the impact on their accounting due to low data quality. Since the intention of achieving cost savings is to reallocate saved resources to other activities, unused resources would go against the intention of the defense sector. Therefore, the expected savings due to new framework agreements are cut from the branches budgets at the start of each year leading to the risk of a negative impact on the purchasing power of the Army to reallocate the "cost savings" to other parts in the

defense sector. Meaning that even though cost savings may not be real the resources may already be reallocated.

Åmot (2015) evaluated the defense sector's cost savings from 2009 till 2014. It was completed by the defense research institution further referred to as FFI and noted that, only 20 percent of the reported cost savings could be characterized as controllable. The report explained that if the reporting requirement should function there needs to be an improvement in control mechanisms. Ideally these cost savings need to be identifiable in the accounting. This study will use qualitative and quantitative analysis to analyze the challenges in controlling the reported cost savings. Åmot (2015) also says that an evaluation requires not only better documentation but also better accounting systems. Based on the findings in Åmot's report from 2015 and the uncertainty in the Army regarding their change in purchasing power, this problem must be further researched.

To solve the above-described problem, the following research questions were formulated to foster discussion. The biggest department of the Army is the Brigade North. Here, the chief financial officer Gøran Halvorsen from Brigade North categorizes the cost savings as "unspecified budget cuts." This indicates a failure in the management system of cost savings as these are not being categorized as such by the Army. Based on this, before looking at the mechanisms that lead to the failure in the management system, the main reasons for failure need to be identified. Therefore, the first research question is:

RQ1: "What are the main reasons of failure in the management system of cost savings in the Royal Norwegian defense sector?"

Based on the findings in research question one, research question two will use the reasons described to explain the mechanisms leading to a failure impact in the management of cost savings. Åmot (2015) states that only 20 percent of the defense sector's cost savings are controllable. To control the cost savings, the report concludes that better documentation and accounting systems are needed. This study will look at potential ways to measure such cost savings with the use of the accounting system. This is important as today's model for following up the cost savings expects the branches to evaluate their net savings instead of NDLO. Research question two intends to shed light on the grey areas within the supply chain in the way that cost savings are managed and to highlight their impact on the

purchasing power of their members if not corrected. Based on this, the second research question is:

RQ2: How does the failure in the management system of cost savings have an impact on the Army 's purchasing power?

In other words, research question two aims at disclosing the set of cause-effect relationships in the management of cost savings which result in the reduction of purchasing power. Based on the findings different modes of coordination can help improve today's system of managing cost savings to reflect a more appropriate cut in the budgets. In other words, a budget cut that does not have a negative impact on the purchasing power of the Army.

Therefore the investigation of different modes of coordination presented in supply chain literature is done to choose the appropriate mode for the purpose of this research resulting in the formulation of the following third research question:

RQ3: What is the most appropriate form of coordination between NDLO SA and the Army to improve the outcome in managing cost savings from centralized procurement?

1.4 Thesis structure

In the following the structure of the thesis is shown in figure 2 and explained to help showing the thread through this study. After the introduction to understand the complexity of the mechanisms within the management of the cost savings, this study begins by focusing on the case description before delving into the theory used. Within the theory, the thesis presents the theoretical framework used in this paper. The theoretical framework outlines the theory used to answer the research questions. After the theoretical framework, the research methodology is both explained and validated. These are all presented vertically in figure 2 as their order is indifferent. The analysis is then divided into three research questions, with each being answered separately before combining their results in the conclusion. As the different research questions build on the findings from the earlier research they are presented horizontally in figure 2. Here the order is not indifferent. Based on the outcomes of both research question one and two, research question three focuses on how the modes of coordination should be improved upon to achieve a more accurate

balance between cost savings and a change in purchasing power for the Army. Then based on the findings in research question one, two and three the study is concluded.

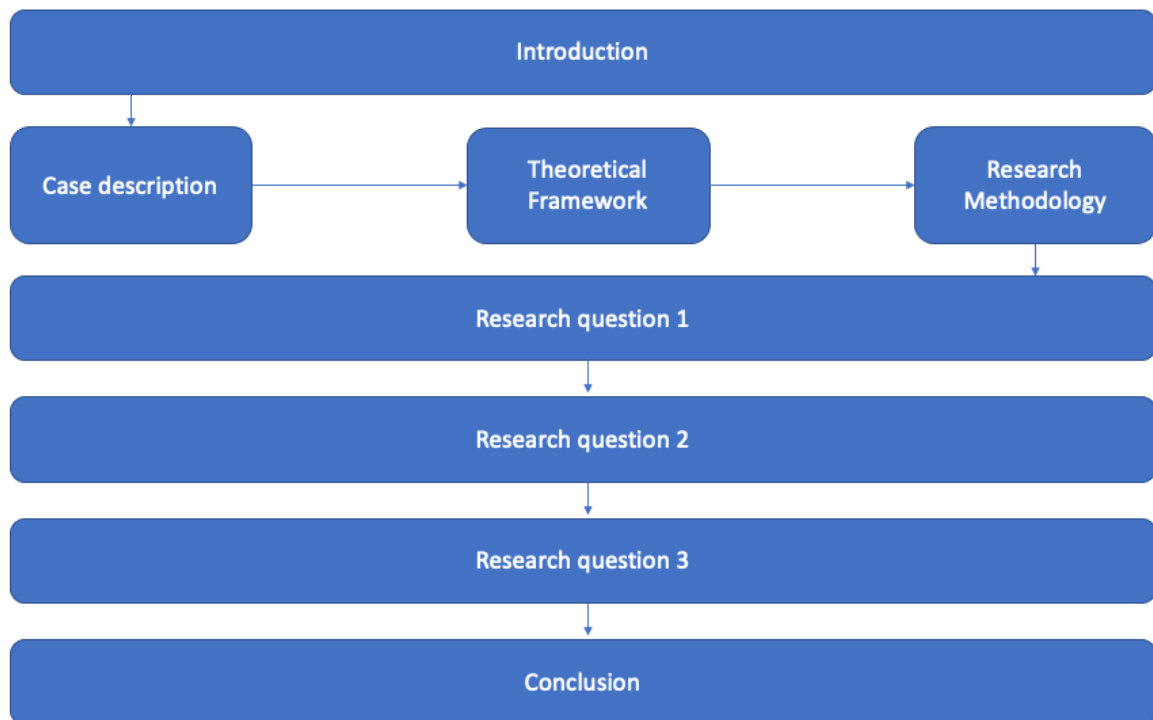


Figure 2: Thesis structure

2.0 Case description

The centralization of procurement in the public sector is based on the same theories as the private sector. Therefore, the defense sector has some characteristics that need to be addressed and explained to understand the complexity in the mechanisms of managing cost savings in the armed forces. The background information for the case is first presented before the main coordination mechanisms are explained. These are explained based on the literature review below. The case description is based on interviews, reports, and electronic database.

2.1 Background information

In October 2019, Brage Lien from the Defense Research Institution published an article about increasing efficiency in the armed forces with the title “realized or only reported savings?” In the summary Lien (2019) writes that the armed forces have difficulties in

reporting savings. The reason is inappropriate organization and deficient overview over their work of increasing efficiency in the armed forces. Responsibility, roles and authority with focus on increasing efficiency are not clearly defined and bad communication leads to great disagreements and little reporting of cost savings. Further Lien (2019) states that the if winnings reported are higher then realized, a consequence can be lower Defense ability. With lower defense ability Lien (2019) refers to a decrease in purchasing power.

The idea of establishing NDLO SA was to increase the defense's ability to save money through centralized procurement. If instead the result of establishing NDLO SP would show a decreased defense ability because of NDLO, the intention of NDLO SP freeing resources for other investments would have failed. Even though Lien stated these findings in 2019. As of 2021 there has still been little change in the way budgets are cut and cost savings are reported. Therefore, budget cuts, that are supposed to be handled as cost savings, are treated in Brigade North's and the Army's budget, as "unspecified budget cuts". Gøran Halvorsen (2021), the chief financial officer in the Brigade North writes in his order to the Battalions that Brigade North has no authority to arrange framework agreements that ensure cheaper goods and services. Therefore Brigade North manages the budget cut as "unspecified budget cuts

Halvorsen (2021) specifies that the budget cuts are being implemented in the general ledger accounts according to the expected cost savings. The reason they are categorized as "unspecified budget cuts" is based on their lack of controllability and verifiability. The budget cuts are presented to the Army as expected cost savings. The Army and NDLO SP are not certain on the impact the cost savings have on the Army's budget. Therefore, the budget cuts based on the reported cost savings are considered a failure by the Army and they are convinced the budget cuts decrease the Army's purchasing power.

Based on the findings of Lien (2019), and the citation of Halvorsen (2021), the proposed research aims to both explore why the centralization of procurement has led to what the Army is convinced is a decrease of defense ability, and understand how this problem can be solved.

2.2 Mechanisms in managing Cost savings

There are several main coordination mechanisms identified that must firstly be explained. These include yearly budget allocations, management of economical profits, roles, responsibilities within the defense sector in managing cost savings, and profit center, cost center and general ledger accounts.

2.2.1 Managing economical profits in the Royal Norwegian defense sector

The process in the management of economical profits from the yearly cost savings is described by Gedde-Dahl (2021) as follows: In January the Army gets deducted the expected cost savings, for example 15 million kroner and then throughout the year we identify that not all of the gains can be realized within the same year, and consequently adjust the expected cost savings to 12,5. When NDLO reports this to the defense staff, the Army may get 2,5 million back or only 1,5 million due to uncertainty. Tertiary three is reported in January. Then NDLO says expected savings were 15 million, these were adjusted to 12,5 or 13,5. And then ended up at 11,8. Then in the revised national budget (RNB) the branches are supposed to get back the difference between what they have been deducted and what the actual savings turned out to be.

Based on this description from Gedde-Dahl and the interviews with the remaining interviewees, the following three processes in the management system of cost savings have been identified for closer analysis in this research:

- The reporting of cost savings by NDLO.
- The purchasing according to framework agreements.
- The evaluation of cost savings.

In the conducted interviews, these three processes have been identified as important due to their impact on the purchasing power of the branches if handled incorrectly. For the model to work successfully without impacting the purchasing power of the Army, there are several prerequisites. Some of the main prerequisites include: continuous monitoring of the actual cost savings, adjustment of budgets if cost savings are not as expected, ensuring budget cuts meet the right branch and ensuring the budget cuts are based on the net savings of the branches. The defense sector has a formal document that describes the method of

increasing efficiency in the defense sector. After initial discussions with the defense staff, I as the researcher was introduced to the new version of the document that will be released in 2021 called “Temporary Methodology in the Defense Staff for Economical Profit Calculation from Streamlining” (Defense Staff 2021). This method focuses solely on the economical profits achieved through the work of NDLO and their processes. Economical profits are defined by the defense staff as, freeing economical resources by making something cheaper without reducing its quality (Defense Staff 2021). In the above-described method, there are different categorize of gains presented: cost reduction (cost savings), cost avoidance and one-time cost reduction. Lasting effects are contracts that are negotiated that are cheaper and replace the already existing more expensive contracts and therefore present lasting savings. Further they mention that the lasting effect is not guaranteed to last after the new contract expires and that the different branches must compensate for the increase in cost. Since this temporary methodology is not officially implemented, this study will not refer to it further. However, it is still important to mention as the lasting effect of new framework agreements is also mentioned later in this research by Åmot (2015).

2.2.2 Roles and responsibility

The defense sector is divided into separate branches (Army, Navy, Air force, Cyber,). This study uses the Army as an example for the rest of the defense’s branches. Due to the size of the defense sector, viewing the defense sector as one customer can have an impact on the management of potential cost savings that need to be addressed. Today’s framework agreements treat the defense sector as one customer in the collection of supplier statistics, instead of many different customers within the defense sector. This is supported by Bjerke (2021) who says that Data can only be presented down to the branches by NDLO SP analysis. This is due to low quality in data. Our analysis will never be better than the data quality and we have holes in our data quality.

Even though the accounting reflects the spending of each profit center, the service support system does not give detailed information within the different framework agreements and a change in spending based on this.

To understand some of the issues referred to later, Figure 3 shows the chain of command in the processes evaluated complicating some of the coordination. The chain of command is defined by Cambridge dictionary as, the way that people with authority in

an organization, esp. in the military, are ranked, from the person with the most authority to the next one below, and so on.

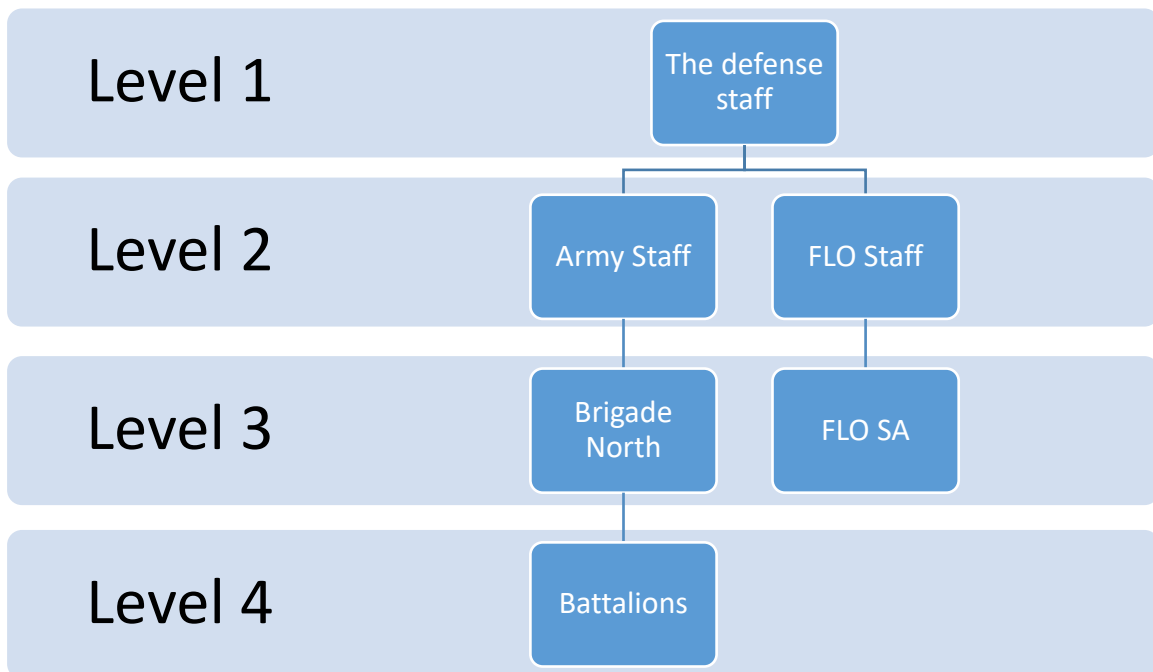


Figure 3: Hierarchy of centralized procurement in the Norwegian defense

This means that each soldier, reports within his own chain and should not directly report horizontally. Level 1 is made up of the defense staff which is the common leadership for the Army and NDLO. NDLO is the support branch that facilitates logistical functions for all branches in the entire defense sector. NDLO SP, as a department of NDLO, is responsible for negotiating new framework agreements and reporting potential cost savings based on new framework agreements. NDLO SP is also responsible for the supplier follow-up. Dag Bjerke as responsible for the analysis team in NDLO SP says about the work of NDLO SP analysis that they produce a foundation for potential cost savings, but how that foundation is used in collaboration with the different branches, we do not have any impact on.

NDLO staff stands for the coordination between NDLO and the Army and are responsible for sending the expected cost savings to the defense staff. The defense staff then cut the armies budget based on the expected cost savings and the recommendations from NDLO Staff, as described in the above processes. Torodd Lindland (2021) in the finance section in the Army (level 2) says that the expected cost savings are sent by NDLO to the defense staff that acknowledges them before they are sent to them. Thereafter, the Army (level 2) initiates budget cuts down their own hierarchy. The Army (level 2) cuts into the budget of the Brigade (level 3) and the Brigade (level 3) cuts into the budget of the Battalions (level

4), based on the expected cost savings. Gøran Halvorsen (2021) as the chief financial officer in the Brigade (level 4) says their responsibility is executing budget cuts and evaluating cost savings achieved in the Brigade. Meaning cutting the budget from the Battalions (level 4). At the Battalions (level 4), there are local purchasers that order products based on the new framework agreements and the budget made available by the chief financial officers on level 4 in the battalion staff.

2.2.3 Profit center, cost center and general ledger account

To understand the case reviewed in this paper, a general understanding of the use of profit center, cost center and general ledger accounts is necessary. The defense sector is divided into different profit centers which separate the Army and other branches down into each battalion (level 4) and even company (level 5) which use their own profit center when acquiring products. Within the different profit centers that are linked to the different branches, there are different cost centers to split the cost within each profit center.

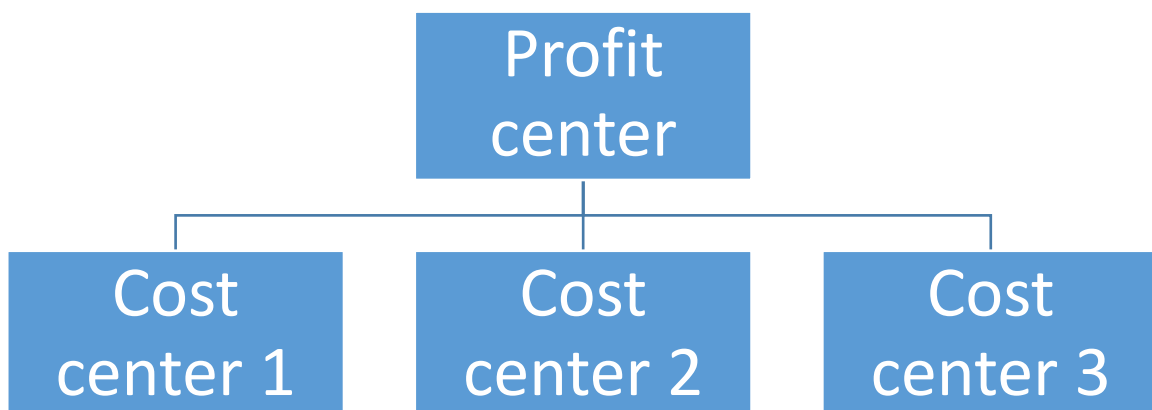


Figure 4: Profit center and cost center based on Bjerk (2018)

These centers are used when purchasing to reveal where the costs should be charged. They also reflect the spending of each profit center in the accounting divided into different cost centers.

The general ledger accounts define how the spending is categorized. The general ledger account is divided into 9 main categories (Kontoplan 2019) in accounting with many sub-categories:

1. Assets
2. Debt
3. Sales Revenue
4. Purchase of goods to be resold

5. Salary
6. Other operating expenses
7. Other operating expenses
8. Financial expenses and income
9. Internal guides

The two categories of accounting relevant for this case are 6 & 7. Categories 6 and 7 are called the same, but differ based on their subcategories. These define the other operating expenses as most purchases within framework agreements are registered within these general ledger accounts. When purchasing, the purchaser defines manually what profit center/cost center and general ledger account should be used with each purchase. The difference between profit center, cost center and general ledger account will become relevant primarily in research question two and three.

2.2.4 Yearly budgeting

The defense sector gets a yearly budget from the government in accordance to long term goals and daily operations. According to Bjerck (2018), who is the retired chief financial officer for the defense the implementation letter also referred to as IVB in figure 5 (Iverksettingsbrev), from the defense department defines, superior goals, control parameters, allocated budget and reporting requirements.

“The budget is acknowledged for each calender year” (Stortinget 2005).

This budget is only valid within each budgetary year (January till December) and any money left at the end of the year, in theory, is returned to the government to balance other government departments expenses. With a yearly budget allocation, the budget of the defense sector needs to be optimized to get the most out of the yearly budget that the military is given from the department of defense and not end with an excess in resources. Therefore, expected cost savings are reallocated at the start of a budgetary year. If the defense sector chooses to wait until the end of the year to see their overall cost savings due to centralized procurement, they would have money left from their yearly budget allocation. There would be limited with time to reallocate the resources properly. This would be considered lost money as the money is not moved to the next year and is retracted by the defense department and reallocated in the state budget to balance other departments' spending. Based on this figure 5 shows how resources are reallocated in the start of the year. This means that the calculations done by NDLO SA on their expected

cost savings has a direct impact on the reallocation on the different branches' budgets. In the following section, the management of expected cost savings will be presented as it is regulated by the defense department in 2020. The example in figure 5 is based on maintenance cost and is transferable to the model of centralized procurement. In figure 5 (on the left) we see the budget for 2019 and (on the right) is the budget for 2020 based on the expected cost savings.

Pengestrømmer (forenklet)

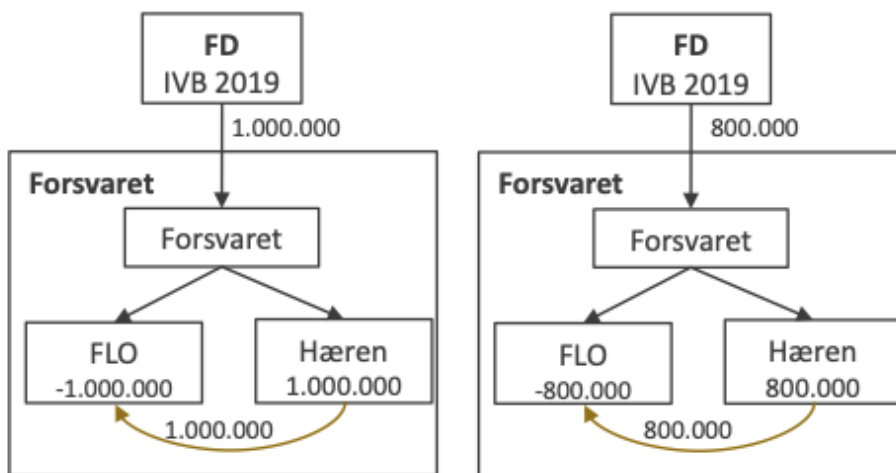


Figure 5: cash flows in the armed forces regarding centralized procurement (Forsvarsdepartementet 2020).

When NDLO presents their new framework agreements, they present a potential for cost savings for 2019, in the same way as figure 5 presents the maintenance costs. In the example the budget is reduced with 200,000 from the original budget for 2019 based on the expected cost savings. The purchasing power of the Army is expected to have increased and therefore, the Army only receives 800,000 in 2019 instead of 1,000,000. Lindland (2021) says that the budget is not cut based on the entire expected cost savings at the start of the year. The budget is adjusted based on a percentage. If expected savings show 20 MNOK within the year, the Army may be cut for 12 MNOK and the remaining 8 MNOK get retracted when actual savings show greater savings than 12MNOK.

3.0 Literature Review

In the following section, the theoretical framework used throughout the study is presented. The theoretical framework will be applied according to the problem statement above. As most of the theoretical framework used is written for the private sector and the research is

done in the public sector, the theoretical framework written for the private sector is adjusted based on their relevance for this research. This means that this paper focuses on parts of the theory that are applicable for the public sector. The relevant theory used in the paper is theory specialized within coordination. The theories used in the research are: Sunil Chopra's "Five Distinctive Obstacles for Coordination," "The Modes of Coordination in a Supply Chain," "The Resource Dependency Theory," and "Oslo Economics Measuring Units of Cost Savings in Public Procurement."

3.1 Literature review

Few researchers have appeared to develop and test the concept of coordination in the supply chain, given its critical importance. Peter Senge (1990) was the first to start popularizing the concept of coordinating the chain members to create collective knowledge. As there is still little research done on how coordination can be measured, this research has tried to understand different forms and modes of coordination by showing the complexity within the theory of coordination. The four main literature sources used in the theoretical literature review are carefully selected based on the chosen research questions and transferability to the public sector. Multiple research articles (see references) have been used to supplement the arguments for coordination and visibility in the supply chain.

The Obstacles in Coordination is a theory by Sunil Chopra (2019) published in his book "Strategy, Planning and Operations." For the theory of coordination, two articles were chosen, one describing the forms of coordination and the other the modes of coordination. The modes of coordination were found in the article "The Knowledge of Coordination for Supply Chain Integration" by Simatupang et. al (2002) and was published in Emerald Insight. The article for the forms of coordination by Håkansson & Lind (2004) called "Accounting and Network Coordination" were published in Elsevier. For the measuring of the cost savings in research question two, the main theory is based on the suggestions of Oslo Economics (2013) that is published by Oslo Economics. The final source discussing the visibility in coordination is based on an article from the "International Journal of Manufacturing Technology Management" published in Science Direct written by Lee et al. (2013).

Initially research began by focusing on centralized procurement at NDLO SP. To find relevant theory for the study, I started at Molde Universities' online library looking at past

master's theses within centralized procurement, looking for words like: "measuring of cost savings," "procurement in public sector," "cost savings in the public sector," "centralized procurement in public sector," and "measuring cost savings in public procurement." When narrowing the research topic, the theory of visibility was identified, as the coordination between NDLO and the Army showed issues not only limited to the visibility. The search then shifted towards the broader term "coordination" as there was a need to identify obstacles in the coordination, such as incentives. This led to an extensive search for theories within coordination by searching for "lack in coordination", "failure in coordination", "obstacles in coordination," and "failure in coordination," to mention a few. Remembering from my studies at school I looked at the chapter about Sunil Chopra's "Obstacles in Coordination" to compare it to some other articles I had found. The theory of Sunil Chopra showed great promise to use in researching the obstacles in the coordination between NDLO and the Army having found the theory for the first research question. Now that the obstacles in coordination could be identified, it showed that the overall issue leading to the different obstacles could be traced back to a lack of informational exchange in several processes when revisiting the importance of visibility in the supply chain. However, there was also the need for a theory to explain the failure impact due to a lack of information exchange in coordination. This led to the choice of the "Resource Dependency Theory." After this, key words like "coordination," "visibility," "coordination obstacles," and "supply chain integration" were used in different combinations with "supply chain," "centralized procurement" and "public procurement" to find articles relevant for this study. The search engines Google Scholar, Science Direct, Elsevier and Emerald were primarily used, as well as other search engines supported by the Molde university. Further, some articles were referred to me by my supervisor when discussing my master thesis with him that were compared to the remaining articles found. Marko Balaban (2016), Master's thesis revealed measuring units from Oslo Economics that were applicable to the challenges studied in this thesis for the quantitative analysis and were used to help answer research question two. The master degree was found by searching for "measuring units in public procurement".

3.2 Coordination within supply chain integration

Malone and Crowston (1994) generally define coordination as the act of managing interdependencies between activities to achieve a goal. In a supply chain coordination, this can be viewed as an act of properly combining (relating, harmonizing, adjusting, aligning)

several objects (actions, objectives, decisions, information, knowledge, funds) for the achievement of the chain goal according to Simatupang et al. (2002). Where perceptions of mutuality for other members and commitments to the system (holism) are absent, coordination will fail according to Lee et al. (1997) and Checkland (1999). To maximize the potential for converting competitive advantage into profitability, firms need to develop effective coordination within and beyond its boundaries, according to Dyer & Singh (1998). One of the main reasons for dysfunctional operational processes can often be explained through poor coordination between members in the supply chain. With that in mind focusing on studying the coordination between the members in the defense sector with the background of the case seemed to fit.

There is different literature about forms and modes of coordination. Therefore in the following the forms of coordination by Håkansson & Lind (2004) and modes of coordination by Simatupang et al. (2002) are described and compared. These two theories were central in answering research question three. In 3.2.1. both of the theories are presented and compared.

3.2.1 Form and modes of coordination

There was little attention paid to exposing different coordination modes and their interactions. The different modes of Lee (2000) consist of: information sharing, logistics coordination, and organizational relationship linkage. Simatupang et al. (2002) formulated a framework on the knowledge of coordination to achieve chain profitability. This was done by unifying different modes of coordination to integrate the supply chain processes of different partners in the supply chain.

Simatupang et al. (2002) identified two main dimensions in coordination as the mutuality of coordination and the focus of coordination. MacNeil (1980) argues that mutuality in some degree is important to strengthen closeness between the members resulting in better-coordinated activities. Simatupang et al. (2002) adds that collective responsibility is meaningful, if partners share mutual accountability in attaining a better performance. The mutuality of coordination can further be divided into two dimensions according to Simatupang et al.(2002). The complementarity of processes and coherency of understanding. Simatupang et al. (2002) says that complementarities are chain members striving to collectively manage interdependencies between logistic activities.

Interdependence based on Simatupang et al. (2002) is the degree to which one process is

dependent on the other to achieve the overall value creation. The goal of complementarity in processes is to create value and manage logistical processes to remove economic barriers, such as incentive misalignment. The second dimension within the mutuality of coordination is the coherency. Coherency is the degree of consistency in the reasoning across organizational borders according to Simatupang et al. (2002). Chain members need for coherency to share information and knowledge that can make sense of processes and manage uncertainties along the supply chain. According to Simatupang et al. (2002) coherency can be considered the process of aligning context, viewpoint, purpose, and actions to achieve the shared goal through information sharing and collective learning. The second dimension is the focus of coordination on operational or organizational linkages according to Simatupang et al. (2002). Linkages exist when the one chain members activities affect activities or outputs of another member. This makes linkages to an interface between firms decisions need to be coordinated between chain members. Operational linkages according to Simatupang et al. (2002) focus on integrating interdependent processes and information flow. Organizational linkages on the other hand consists of interconnected actors perceiving and arguing about their own interests in the collective action.

Håkansson & Lind (2004) in their article based their theory on the forms of coordination by Richardson (1972). Richardson (1972) identified three forms of coordination in his paper. These are categorized as “hierarchy,” “market,” and “co-operation.” These forms have received recognition and have been discussed in many studies. Hierarchy, according to Richardson (1972), is useful when two activities are closely complementary and similar. Håkansson & Lind (2004) define closely complementary as a situation where different phases of a production require coordination. In a hierarchy, two activities are directly coordinated within a company according to Håkansson & Lind (2004). In principle, this means that they become one activity. The learning process in such a environment requires that information is generated over time (Håkansson & Lind 2004). Further, a company needs a continuous supply of very detailed information regarding technical and economic aspects of the activities according to Håkansson & Lind (2004). Håkansson & Lind (2004) further state that the more comprehensive the information and use of resources regarding the activities, the better a company can coordinate advantageously. The other form of coordination is market. Market according to Håkansson & Lind (2004) is defined as standardizing the interface between the two coordinated activities. According

to Richardson (1972), this form of coordination is suitable when activities are complimentary and dissimilar. According to Håkansson & Lind (2004), the information needed is not as detailed as in the hierarchical situation. The last form of coordination, according to Richardson (1972) is co-operation, also called business relationship. Co-operation is considered much more complicated than the market and hierarchy form for coordination. As the activities are of such dissimilar nature, they cannot be left entirely to the internal coordination of the firm or market forces, according to Håkansson & Lind (2004). Therefore these activities, even though considered closely complementary, need to be performed by two different companies. In this case, the two units interactively seeking a suitable solution to match their activities and resources with each other.

After looking closer at the modes of coordination and form of coordination, both choices were considered. The decision ended with choosing the modes of coordination in answering research question three as they fit better with the problem statement and the research method. The collective learning, incentive alignment and information sharing gave a generality and possibility for combining that were more applicable to the studied case. Given the choice for using the modes of coordination by Simatupang et al. (2002), the following section will briefly present modes of coordination in more detail.

3.2.2 The knowledge of coordination

According to Simatupang et al. (2002), the definition of knowledge in coordination is gaining an explicit understanding about which key drivers of coordination modes that affect the performance of the supply chain. To achieve improvement in coordination, the creation of shared context is essential. Therefore, the question of how the best fit among the supply chain partners can be achieved. Through mutual goals, the different members in the supply chain have to perform consistently to achieve the mutual goals. Afterall, the supply chain performance depends on the collaborative performance of all members working together and not how well each member performs separately. Simatupang et al. (2002) identified four modes of coordination in the taxonomy as: logistics synchronization, information sharing, incentive alignment, and collective learning. Three of these four become essential to conclude this research. A taxonomy in coordination is how different coordination modes can be classified to act together. In a supply chain, Simatupang et al. (2002) mention two related concepts to identify the knowledge of coordination. The first is

the individual contribution of coordination mode to achieve supply chain integration. The other is the use of drivers of coordination modes to attain operational excellence.

Figure 6 below shows the conceptual framework of coordination knowledge based on Simatupang et al. (2021), and how each coordination mode contributes to achieving an integrated supply chain by generating four loops of coordination within the different modes. These loops are important in the answering of research question three.

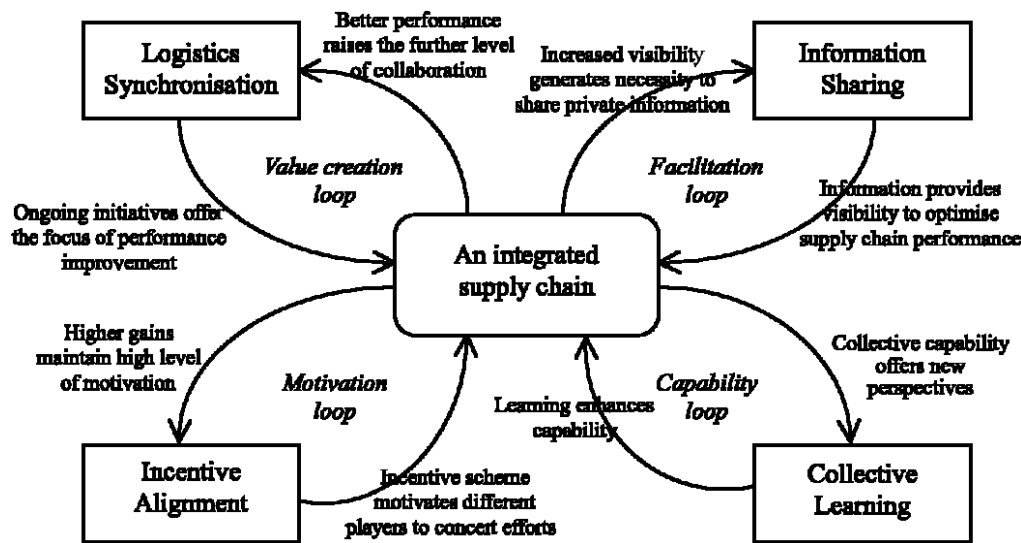


Figure 6: The recursive interplay between an integrated supply chain and the four coordination modes (Simatupang et al. 2002)

The loop going between the integrated supply chain and logistics synchronization is the first loop. The first loop focuses to increase and improve the individual and overall supply chain performance in value creation processes through the implementation of improvement initiatives.

The second loop is connected between the integrated supply chain and information sharing. The second loop is focusing on the increase of visibility and how to facilitate through information sharing. Shared information provides a platform of visibility that enables consideration of the global scope to make better decisions that optimize supply chain performance (Simatupang et al. 2002).

As the importance of mutuality in coordination has been presented earlier, incentive alignment can facilitate for increased mutuality. Therefore, mutual benefits are often realized after incentives are aligned. The incentive scheme is designed to motivate the

different members of a supply chain to align decisions and actions with supply chain profitability.

The last loop in figure 6 is the loop between collective learning and the integrated supply chain. This one is the capability loop intended to combine fragmented skills and enable chain members to acquire new skills from one another. The result of collective learning can be a growth of trust between parties. This, again, would lead to an increase in confidence for further innovation of performance improvement according to Simatupang et al. (2002). Figure 7 shows the characteristics of the different modes according to Simatupang et al. (2002), to achieve profit maximization in the supply chain.

Coordination mode	Agreeing on joint efforts	Attributes of future research	
		Practical concerns	Research questions
Logistics synchronisation	Jointly implementing the most effective initiatives for value creation	Maintaining focus, subordinating other supporting activities, and ensuring successful initiatives	How does one tailor the initiatives to match with different segments of customer values? How does one focus on value creation and subordinate other supporting activities? What are the common metrics that one can use to evaluate mutual success?
Information sharing	Effectively creating information visibility for logistics planning and execution Ensuring relevant, accurate and timely data	Substituting information for physical processes. Mitigating demand uncertainty Using technology to monitor supply chain status and provide intelligent response	How does one define and measure the value of information sharing in substituting information for physical processes? What types of information will be captured and how is it going to be used to make better decisions? How does one capitalise on a decision support system and the Internet to mitigate demand and supply uncertainties?
Incentive alignment	Focus on motivating individual members	Negotiating successfully for mutual gains and risks	Can logistics synchronisation be used as a basis to offer incentives for chain members? How does one design a commercial incentive that allows independent members to create customer value? How does one predict and measure the impact of incentive alignment on the actual behaviour?
Collective learning	Effectively co-discovering and developing new capabilities	Applying new capabilities to accelerate improvement and overcoming resistance to change	How does one use collective learning to accelerate performance improvement? How does one define and measure the progress of collective learning? How does one resolve resistance to change?

Figure 7: Coordination modes (Simatupang et al. 2002)

3.2.3 Logistics synchronization

The synchronization of logistics in Simatupang et al. (2002) is the recognizing and improving of initiatives that significantly contribute to value creation in the acquisition, consumption, and disposition of products and services. As the main issues identified are not within the synchronization of the logistics processes, this theory is not further explained or prioritized in this study.

3.2.4 Information sharing

Coordinating information sharing is attempting to make available relevant, accurate and timely information for decision-makers (Lee 2000). Often, chain members have access to different private information, which is usually not shared with others. Asymmetric information is inherent in supply chains (Simatupang and Sridharan 2002). Information technology can be applied to facilitate information sharing with customers and partners to optimize the performance of the supply chain. According to Simatupang et al. (2002), information sharing and processing among supply chain members must be accompanied by a readiness to use the information in the execution of logistical tasks that contribute to financial performance. Logistics synchronization that consists of formal processes to improve profitability in response to shared information is a key to success. According to Simatupang et al. (2002), there are several examples of how information sharing provides necessary visibility to enable better decisions to be made to maximize the total supply chain profit.

3.2.5 Incentive alignment

Incentives define how decision-makers are rewarded or penalized for the outcome of the decisions they make, according to Simatupang et al. (2002). This means that the decision-makers will make their decisions based on maximizing their own profit. This will have a direct impact on the collaboration with other members in the supply chain. A conflict of interest occurs when the incentives of the members in the supply chain lead to actions that maximize personal gain but often reduce the total profitability (Clemons and Row 1993). In a supply chain where two companies work together, such thinking will impact the long-term relationship between partners as it goes against the theory of supply chain integration. This can be resolved by offering incentive schemes linked to global performance that reflects both value creation for the customers and profitability (Simatupang and Sridharan 2002). Using this coordination mode is called “incentive alignment” and motivates partner behavior to be consistent with customer focus and total profit (Lee 2000). Therefore, the alignment of incentives will establish a mutual goal for achieving profit maximization of the supply chain. According to Simatupang et al. (2002) firms sharing complementarity of business processes will, based on a relational contract to manage risks, attempt to resolve incentive misalignment.

3.2.6 Collective learning

Collective learning within coordination, deals with how to tackle the coherency problem of knowledge initiation and diffusion across the organizational borders (Sawhney and Prandelli 2000). Collective learning has as goal to create new capabilities in coordination. The goal is to emphasis on learning from one another. Through learning from each other, the members can understand and create the capability to implement initiatives that can improve the performance. To achieve this capability, the process involves intensive dialogue, experimentation, and discussion of data, information, and knowledge to attain collective sense making (Senge 1990). When trying to implement new solutions, usually there is quite some resistance that needs to be broken down. Therefore, the key collaborators must embrace the necessary changes. This will help the initiator of the solution to overcome any layers of resistance. Typical layers of resistance, according to Smith (2000), may consist of: disagreement with the solution, disagreements of possible side-effects and whether the solution is viable in the current environment.

3.3 Coordination obstacles in a supply chain

Coordination in a supply chain is improved if all stages of the chain take actions that are aligned and increase the overall supply chain surplus (Chopra 2019). Supply chain coordination requires a sharing of information and considering how this action impacts the other stages in the supply chain. According to Chopra (2019), a lack of coordination occurs either because different stages of the supply chain have local objectives that conflict or because information moving between stages is delayed and distorted. Conflicting objectives on different stages of a supply chain often occur if each stage tries to maximize its own profits, resulting in a diminishing of total supply chain profits. Sunil Chopra (2019) has identified five distinctive obstacles to coordination in a supply chain. These five obstacles are:

- incentive obstacles,
- information-processing obstacles,
- operational obstacles,
- pricing obstacles
- behavioral obstacles.

Any factor that leads to either local optimization by different stages of the supply chain or an increase in information delay, distortion, and variability within the supply chain is an obstacle to coordination according to Chopra (2019). Based on the nature of the case study, the chosen obstacles for this thesis are incentive obstacles, information-processing obstacles, and behavioral obstacles. The pricing obstacle is not relevant as there are no pricing of goods in this case. The operational obstacles are not considered relevant as this thesis only scratches the surface of the ordering process. Therefore, the pricing obstacle and operational obstacle are not further explained in this section.

3.3.1 Incentive obstacles

An incentive obstacle is when a situation occurs in which different incentives are offered to different stages or participants in a supply chain and can lead to actions that increase variability and reduce total supply chain profits. These are also incentives that focus on the local impact of the action result rather than the impact of the entire supply chain, which can end in decisions that do not maximize the total supply chain surplus. Chopra (2019) says it is natural for any participant in the supply chain to take actions that optimized performance measures along which they are evaluated.

3.3.2 Information-Processing obstacles

An information-processing obstacle occurs when demand information is distorted while moving between different stages of the supply chain. Eventually, this leads to increased variability in orders within the supply chain. A lack of information sharing within stages of the supply chain magnifies information distortion. As a part of the information-processing obstacle Chopra (2019) identifies the lack of information shared between stages of the supply chain expanding information distortion.

3.3.3 Behavioral obstacles

Behavioral obstacles, according to Chopra (2019) are challenges in learning and contributing to information distortion. Behavioral obstacles are often related to the structure of the supply chain and the communication among different stages.

1. Each stage of the supply chain only views its actions locally and is unable to see how it will impact other stages of the supply chain.
2. Stages of the supply chain react to the current local situations rather than looking at the root of the problem.

3. Based on local analysis, different stages of the supply chain blame each other for fluctuations, with successive stages in the supply chain becoming enemies rather than partners.
4. No stage of the supply chain learns from their actions over time because the most significant actions occur elsewhere, which results in a vicious cycle. Stages create the very problems that they blame on others.
5. The result of behavioral obstacles is a lack of trust among supply chain partners, causing them to be opportunistic at the expense of overall supply chain performance. This leads to the duplication of efforts as information is not shared and must be gathered individually at different stages.

3.4 Measuring of cost savings in public procurement

Oslo Economics has suggested the following method of measuring the effective use of resources in public procurement. This is relevant for this study when trying to evaluate the effectiveness in public procurement. The theory of Oslo Economics (2013) is based on seven specific units of data that are designed for the efficient use of resources by government institutions. These are:

1. Cost compared to last year's budget.
2. Costs per employee per account.
3. Cost related to purchasing activities.
4. Delivery and competition register.
5. General overview of vendors with agreement coverage.
6. Agreement shares per account.
7. Price per item number.

(Oslo Economics 2013)

In the following section, only “cost compared to last year's budget” and “costs per employee per account” are explained more closely as the other five measuring units are not applicable in the thesis.

3.4.1. Cost compared to last year's budget

If a company's cost when looking at the accounting has increased significantly on an account from the same period the year before, this may be an indication of an inefficient use of resources. If the cost, despite the increase from last year, is still within budget, it

will likely be that changes in the company's working method or delivery volume are the reason for the cost increase. A cost increase, that is also a budget gap, may also be due to underlying purposes that are beyond the purchasing department's control. All such cost increases will in any case be a good starting point for requesting a more detailed account of those responsible in the area.

3.4.2. Costs per employee per account.

Some cost types will largely covariate with the number of employees in the companies. For example, there would be reason to assume that the cost of office space depending on its size. The companies that have a high cost per employee may have a reason to consider whether resource utilization could be more efficient. This can also apply to cost types such as supplies, canteens, furniture/fixtures, or courses/conferences.

3.5 Interdependence theory

Barrat and Oke (2007) define visibility in the supply chain (SC) as the extent to which actors within a supply chain have access to or share information which they consider as key or useful to their operations and which they consider will be of mutual benefit. In the following section, the resource dependency theory and some antecedents for successful coordination in a supply chain are presented.

3.5.1 Resource dependency theory (RDT)

When considering how external resources influence the behavior of the organization, this is known as “Resource Dependence Theory.” In strategic management and organizational theory the resource dependency theory (RDT) has become one of the influential theories according to Hillman et al. (2009). RDT recognizes external factors influence on the organizational behavior. To function effectively, an organization may not be entirely self-reliant (Reid, Bussiere & Greenway 2001). The organization is dependent on procuring critical resources from an external environment to function optimally, which introduces uncertainty into the decision-making processes of the firm. To reduce uncertainty regarding the flow of required resources, organizations try to restructure their dependencies through different tactics. The most prominent tactic is “constraint absorption” (Casciaro & Piskorski 2005). The goal is to enable SC partners to move towards more collaborative long-term economic relationships (Klein & Rai 2009). Within interorganizational relationships RDT is also a primary theoretical perspective to

understand these relationships. The RDT perspective on interorganizational relationships explores how an organization can get resources to reduce uncertainty and interdependence. Yan and Gray (1994) have found that alliances occur when organizations are mutually dependent but the partner controlling more important resources retains strategic control. Based on Gulati and Sytch (2007) identifying two dimensions of interdependence- dependence asymmetry and joint dependence. Hilman et al. (2009) find that joint dependence can help reduce uncertainty and enhance the firms performance.

3.5.2 Asset specificity

Inter-firm asset specificity is the degree to which the assets are specialized in conjunction to the assets of an alliance partner (Dyer & Singh 1998). The expectations are that if asset specificity is high, participating firms are more cooperative by making internal information visible to their partners. After all Inter- firm specific assets say that the value of one's asset is significantly decreased without the other (Clemons& Row 1991). Inter-firm relationships are the strategic core of an alliance and justify the existence of the relationship (Reve 1990). By Increasing the access to required information between partners, productivity gain can be realized for the relationship. This will lead to increased benefits for the entire value chain. The inter-firm asset specificity concept refers to the significance of a firm's alliance partner for the strategic development of the firm (Lunnan & Haugland 2008), because of the nature of co-specialization. The higher the inter-firm asset specificity between two organizations, the higher the incentives to exchange or share their important informational resources.

3.5.3 Interorganizational trust

Networks of relationships constitute important assets for the conduct of boundary spanning activities. Interorganizational trust is a key for relationship capital in social capital theories (Nahapiet & Ghoshal 1998). There are three sources of interorganizational trust according to Adler (2001). They include: familiarity through continuous interaction, calculation based on interests and norms that create predictability and trustworthiness.

Interorganizational trust is relation specific. Interorganizational trust according to Zaheer et al. (1998) is the extent of trust placed in the partner organization by the members of a focal organization. Interorganizational trust is a relationship asset. Interorganizational trust stimulates perceived fairness in a relationship (Levin & Cross 2004). The more a firm believes in the integrity and benevolence of a supply chain partner, the higher the increase

in their willingness to make efforts at collaborative behavior in the form of information exchange with supply chain partners.

3.5.4 Complementary resources

Strategic alliances give firms the possibility to achieve access to the complementary resource endowments of the partner. When individual strengths of partners complement each other, mutual gains can be achieved. For instance, manufacturers have expert knowledge of their product manufacturing, while suppliers are experts in the characteristics of raw material. When SC participants consider their partners to be complimentary to their own production, their common interests may motivate better exchange of important information to enable mutual gains. Supply chain partners can realize mutual gains through enhanced cost-effectiveness and adaptability. The greater the gains from combining complementary resources, the higher their incentives to exchange or share their important resources.

3.5.5 Interdependence

Interdependence is the extent to which firms are dependent on each other to achieve their respective goals. Interdependence is described in the theory of RDT as one of the antecedents for successful interorganizational coordination. According to Thompson (1967), there are three levels to increase interdependence: pooled, sequential, and reciprocal. If the interdependence between the firms increases among supply chain partners, the partners are more likely to commit to their partnership and less likely to behave opportunistically (Gulati & Sytch 2007; Kumar et al. 1995). High levels of interdependence signifies that each party requires a lot of information from other party to fulfill their own tasks and prevent any disruptions in upstream and downstream activities. The more interdependent supply chain partners are, the more likely it is that they will maintain a close relationship to reinforce larger interests at play (Lusch & Brown 1996).

3.5.6 Supply chain integration and supply chain performance

There is extensive research done on the impact of supply chain integration on performance (Devaraj, Krajewski & Wei 2007; Flynn, Huo & Zhao 2010; Germain & Iyer 2006). supply chain integration refers to how “a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes” (Flynn et al. 2010, p. 59). There are many ways of collaborating with supply chain

partners and thus there can be various dimensions of supply chain integration. The different dimensions include: internal versus external integration, customer versus supplier integration, process versus relationship integration, etc. The withholding of information by a supply chain partner may have a disadvantage for the entire supply chain. The “bullwhip effect” is a core problem in supply chain management because it distorts information about demand. This information is transmitted upstream in a supply chain (Lee, Padmanabhan & Whang 1997). If a supplier’s demand forecast is made based on the order history of its immediate downstream partner the bullwhip effect can happen, without knowing sales information from the ultimate customer (Kim et al. 2012). By sharing sales information with upstream supply chain partners, the bullwhip effect can be mitigated. Is the visibility high, relevant information flows to upstream partners and all members in the supply chain synchronize operations.

4.0 Research methodology, research design, data collection

This chapter describes the research process and the scientific reasoning for the chosen activities. Further on, the research method and research design are explained before discussing the defining of data points, research design quality, data collection and analysis.

4.1 Choice of research method and research design

The methods of analysis considered included case research, clinical research, or action research, due to their similarities in addressing issues and practical problems. Karlsson (2016) describes the difference between these methods as so similar that they often are categorized in one group. Since I had insight on the data needed and the firm was invested in facilitating for the researched topic, in addition to the nature of the research, the chosen method is the clinical management research. The clinical management research method is based on the clinical research by Edgar Schein. Schein (1991) characterizes the clinical research as the observation, elicitation, and reporting of data that is available when actively engaging in helping organizations. Karlsson (2016) also engaged in the clinical research states that for clinical research the researcher has a strong position for making inquiries in the organization and obtaining rich but confidential insights, since clinical research is a response to a problem encountered by a client who wants help in dealing with it. Therefore

Karlsson (2016) further says that the results are deep in causal understanding of issues and strategic choices, but difficult to report. Since I as the researcher in this study have a background in managing budgets within the Army, which gave a deeper insight into the issue studied, access to relevant data, and knowledge about the system. This led to me being the client representing the Army and approaching myself with the issue. Before choosing to research the topic of coordination between the Army and NDLO, the Army was informed about the intention of the study. After telling the financial section in the Army that there was an interest in studying the chosen research subject, the Army became invested in supporting the research and became the client. Clinical management research gives an opportunity to organizations and their management to achieve deeper and richer insights into issues and challenges than other approaches (Karlsson 2016). The studied topic has been a continuous obstacle in the management of cost savings in the defense sector with several studies such as Brage Lien (2019) and Elisabeth lindseth Åmot (2015) from FFI stating the issue in their reports. Even though there have been previously mentioned obstacles, there has yet to be a closer study on the obstacles in coordination, as earlier studies have focused more on the procedures of managing cost savings. Special for the clinical research is that in no other approach can the researcher be so certain of finding the actual issues that organizations are confronted by, have to deal with and have to work with according to Karlsson (2016). He further explains that the reason is that it is both concurrent research and a response to a problem encountered by a client who wants help in dealing with it. The goal of this study is to show a detailed presentation of the issues different branches encounter in the management of cost savings and how these lead to uncertainty in decision making processes. Karlsson (2016) defines the role of the researcher as similar to a consultant as he is in continuous dialogue and exchange of information with the client, where the researcher gives information to the client and receives information from the client. This was especially done in the qualitative analysis to ensure a common understanding between the different members of the supply chain and getting responses from the informants on continuous findings. The clinical research usually begins with the question, “what are the issues?” to define the problem rather than trying to explore “how something is done” according to Karlsson (2016). Due to earlier knowledge of the issue when contacting the organization in interview and other arenas, the chosen approach was to focus on: “what are the issues leading to this failure” and to define the problem rather than find out how something is completed. Again, this supports the choice of the clinical management research.

The research design according to Yin (1994) links the data collected and the conclusions outlined to the initial research questions in the study. Research methodologies can be classified into qualitative data and quantitative data. As the data gathered within the clinical management research method is based on intervention and diagnosis, according to Karlsson (2016), all interventions count, from the very first contact to recommendations and implementation. This means, that both the qualitative and quantitative method for gathering information is relevant for this study. Qualitative data primarily focuses on written theory and not as much on statistical and mathematical model. On the other hand, quantitative data focuses primarily on a method using statistical and mathematical ways to research. Ellram (1996) says that if explanation of a phenomenon is a goal, qualitative methods are preferred because they provide depth and richness. Further they allow the researcher to really probe the how and why questions and construct idiographic knowledge.

The research design of this thesis should be primarily defined as a qualitative analysis in combination with an empirical data type. The paper focuses on studying the information exchange between members in the value chain and tries to generate a holistic and realistic description and explanation of the studied phenomenon.

According to Ellram (1996), using real world data tends to be less predictable and less controllable, and significant effort may lead to no meaningful results. But empirical methods receive more attention in improving the relevance of business research, as coordination also includes relations that are more difficult to analyze through quantitative data. For this study to show a larger specter of the reasons for failure, minor use of quantitative data is done in answering research question two. However, quantitative analysis will not be heavily emphasized and with more support placed on the qualitative findings and analysis.

4.2 Defining data points

In clinical management research, there is great importance in defining data points including selection of informants and documents (Karlsson 2016). In the following section, the process of defining data points for this study is explained.

4.2.1 Identifying relevant data points

In an economical meeting from 2020, Gøran Halvorsen, the chief financial officer for the Brigade, explained to all the financial officers the impact that the new framework

agreements would have on the budget. When the budget for 2021 was presented, the business order for the Brigade's cost savings were presented as "unspecified cost savings." This notation led to the process of starting to gather relevant data points. Initial informal talks were done with Dag Bjerke, responsible for NDLO SP analysis team on understanding why the cost savings are treated as "unspecified budget cuts" by the branches rather than cost savings. Bjerke suggested to contact Torstein Takvam, the officer in the Army's finance staff, as he had been in regular contact with Bjerke regarding the presentation of achieved cost savings. From talking to Takvam, many of the main issues were brought to light and for the first time, the name of Johan Gedde-Dahl, responsible for cost savings at NDLO staff, was included as a counterpart to the Army's finance section. The information from Takvam clearly showed a gap between available information and needed information to treat the expected cost savings appropriately. From this point on, I contacted an anonymous informant in the defense staff. As the increase in efficiency is a topic given quite some focus today, he referred me to Brage Lien who had written several publications about increasing efficiency in the public sector. But the report by Lien (2019) does not specialize much on the coordination between NDLO and the Army. Further investigation also led me to the publications from Elizabeth Lindseth Åmot (2015). In this process, I was given access to the work document of the defense staff that is to be published in 2021, to try to solve some of the issues addressed in this study.

In the analysis, there was little evidence of reports looking at the impact that obstacles in coordination have on the management of cost savings. Based on this fact, I decided to research the topic and went back to Bjerke to get an interview with him about the obstacles in coordination between NDLO and the Army. From there I was sent to the manager responsible for collecting analyses and framework agreements. After the interview with Bjerke, I conducted the interview with Takvam and Lindland in the Army. In this interview the lack of information and data was identified and defined the need for interfering with the Brigade and Battalions. In the questionnaire sent to the Battalions, I found that no evaluations were done on this failure impact on lower levels, showing a disruption in the lines of communication. In addition to the fact that the Army had stated that they do not have the necessary information to do relevant evaluations, I saw good reason for completing evaluations of the accounting which led to the quantitative analysis in research question two.

4.2.2 Informants

There were several informants identified and narrowed down to the few that were needed for an in-depth interview. The interviews were limited to being conducted within the Army and NDLO to get a full understanding of today's line of communication and their obstacles. The interview informants were chosen based on their line of work regarding their role in the management of the cost savings. This included several informants from both NDLO and the Army. The need for informants for interviewing was narrowed down based on the line of communication as shown in figure 3. Within each interview the interviewees were asked who they report to and if they had suggestions on who else I should talk to, according to the snowball method. Who they recommended that could have another view on this process or who could have answers to the questions they could not answer. At the same time, there was no reason to widen the specter of personnel included as the main study focused on the different levels in the two chain members.

Table 1: Overview of interviews

Job title	Name	Month of interview
Section of finance Army staff (Army)	Torodd Lindland and Torstein Takvam	February 2021
Responsible for internal efficiency at NDLO. (NDLO Staff)	Johan Gedde-Dahl	May 2021
Chief of finance (Brigade North - Army)	Gøran Halvorsen	March 2021
NDLO SP Analysis team (NDLO)	Dag Bjerke	February 2021
NDLO SP profit management and reporting (NDLO)	Srija Nagandrarasa	April 2021
Agreement manager Professional services (NDLO)	Guro Slettvold	April 2021

The result was four in-depth interviews with personnel from NDLO and two from the Army. The chief financial officers at the battalion received a questionnaire asking them to explain how they evaluate the cost savings and what they are missing to treat the cost savings according to the expected cost savings. Based on their role in the process, it was more important to get feedback from several financial officers rather than solely an in-depth interview with one of them. Doing so, allowed for the representation of the entire population.

4.3 Research design quality

According to Ellram (1996), regardless of quantitative or qualitative data, good research design requires external validity, reliability, construct validity, and internal validity. The extent to which a concept or conclusion is reflected accurately according to the real world is described as validity. Reliability is the extent to which a study and its methods for collecting data give the same results if repeated (Gripsrud, Olsson, and Silkoset 2016). In the following sections, the validity will be discussed, before looking at the reliability of the study.

4.3.1 Validity

There are three types of validity evidence in research according to Yin (2014, p. 46-48): “construct validity,” “external validity,” and “internal validity”.

4.3.1.1 External validity

External validity reflects how relevant the studied topic is for other supply chains and how generalized the results are. The research is done in the public sector and is relevant for companies in the public sector that focus on the centralization of procurement and managing cost savings. The research topic researches the coordination between the centralized procurement branch and the purchasing branch, to maximize cost savings. Therefore, this is the same for the entire defense sector, not only the Army. According to Karlsson (2016) the results from clinical management research often stem from one organization. Further Karlsson (2016) says that this organization might be a large global company that is active in multiple business areas, with many employees and driven by initiatives to implement various types of changes. Even though other government sectors might not experience the same consequences from obstacles in coordination, the challenges identified can be relevant for other sectors in the public sector. Looking at the study of coordination within the public sector in a hierarchical institution can transfer to other cases in the public sector who have failure impacts due to obstacles in coordination. To conclude, the findings on how the failures impact purchasing power is not necessarily generalizable due to the characteristics of managing economy in the defense sector. For the validity process, Karlsson (2016) states that clinical research is a matter of validity and cites Schein (1991) who says that, hanging around organizations in a clinical consultant role reveals a lot, but can also be considered shaky knowledge. The question then, is how

one can be sure if one knows something? The answer is that if one observes dynamic processes, one can confirm or deny one's hypotheses continuously. Schein (1991) further states one should operate with self-insight and healthy skepticism so that one does not misperceive what is occurring, to make it fit our preconceptions. If one is trained, he or she should be able to generate valid knowledge of organizational and cultural dynamics throughout a period of interaction with an organization according to Schein (1991). As the study is based on the main reasons for the failure between NDLO and the Army, it was important for the validity of findings that both NDLO and the Army report the same, when confronted with the different issues. As the failure impact on the Army's purchasing power is studied, only having the Army report back on their change in purchasing power could not be considered as valid with no definite proof. If it can be crosschecked with NDLO, that then draws an identical picture of the impact of today's practice on the performance of the supply chain and it is valid. When receiving new reasons or critical incidents, the different members of both NDLO and the Army had to confirm or deny the hypothesis of the impact for it to gain validity. This was ensured by changing the interview guide or sending mail to confirm it. The interviews were semi-structured, which can secure construct validity as the questions are answered by all informants.

4.3.2 Reliability

The second issue in research design quality based on Ellram (1996) is reliability. Reliability addresses the repeatability of the experiment, and whether replication is possible and will achieve the same results. Since the research model used is clinical management research, and focuses on an issue known by the client, a repeatability of the experiment resulting in the same outcome, given the same conditions, is very likely. In clinical management research, informants are approached with knowledge about the issue and to see the mechanisms that lead to the issue. As long as the issue is the same, the findings should be the same given that the study focuses on the coordination between the Army and NDLO. The parts relevant in the coordination of managing cost savings have been included and would have to be included in another study. What could change the outcome of the study would be if central personnel in this study changed positions, as the interviewed personnel had great experience with the studied issue and seniority in their respective positions. Due to the complexity of the studied case, if personnel would be employed with less experience it could impact the findings.

4.4 Data collection

This research collected qualitative and quantitative data to solve the research issue. According to Karlsson (2016), the researcher doing clinical research is inquiring. Inquiry is the process of creating or refining knowledge driven by the search for insight. Karlsson (2016) claims that in clinical research, all interventions count, from the very first contact to recommendations and implementation. Every time clinical research intervenes it is data gathering and should therefore be recorded.

4.4.1 Formal approval

For this study, several approvals had to be gathered to start to research. Firstly, the formal approval was gathered from the chief of staff in the Army and the main individual responsible for NDLO SP. Secondly, the staff of the defense college granted the permission to do research in the defense sector and approved my plan to conduct the study. Due to the new general data protection regulations (GDPR), the Norwegian center for research data (NSD), also had to approve that the method of research was in accordance with the Norwegian regulations set by the NSD. This was approved by the NSD before interviews were conducted.

4.4.2 Primary and Secondary Data

In this study, both primary and secondary data were required. First, the collection of secondary data from relevant sources was completed, to obtain further knowledge within the field (exploratory design) to understand which factors should be included in the research (descriptive design) (Gripsrud, Olsson and Silkoset 2004). Secondary data was gathered in every encounter with NDLO SP and the Army, resulting in a better understanding of the processes. Meetings between NDLO SP and the Army were held, and I was invited as researcher. Furthermore, Bjerke and Takvam provided a lot of information for achieving a greater understanding of the situational awareness in the different chain members via informal phone calls between Bjerke and I, and Takvam and I. Reports done by FFI, especially from Brage Lien, Brage Lien et al. and Åmot, were given intensive study to analyze relevant factors to include in the study. The primary data collection included the qualitative data from interviewing the financial officers at different levels that are heavily involved in the process of budget cuts and personnel in NDLO SP. The questionnaires from the financial officers in the Battalions also provided primary data.

Lastly, the quantitative analysis primary data was taken from the accounting available for financial officers on the battalion level.

4.4.3 Clinical Inquiry

In clinical management research, there are different ways to intervene, which are divided into four levels of inquiry. These inquiries, according to Karlsson (2016), are pure inquiry, diagnostic inquiry, action-oriented inquiry and confrontive inquiry. The idea of pure inquiry is to interfere minimally with the client's own efforts to get their story across in their own way. Diagnostics inquiry is to interfere with the client's thought process and make the client think about the reasons and causal linkages. Action-oriented inquiry focuses on interfering with the client's thought processes by forcing the client to think about prior, present, and future actions and incidents. Lastly, confrontive inquiry, forces the client to think about what may not have been thought about before.

In the study, the interference model that was used most to answer research questions was the diagnostical inquiry. This is due to the search for a diagnostic answer to the question of "why the failures happen?" and focusing on the root issue. Typical with the diagnostical approach is that diagnosis is done simultaneously with the data gathering (Karlsson 2016). This was done as the thesis changed direction throughout the research, as with the diagnosis.

4.4.4 Interviews

Interviews are the primary data as the study seeks to explore the relationship in the supply chain. Clinical management research is based on searching for data rather than only data gathering (Karlsson 2016). The researcher's knowledge on the studied topic, and the need for certain data to find the main reasons for failure, lead to the interview guide being more direct in the approach to find the reason for an event. As Karlsson (2016) says these are typically based on a "why, why, why approach", "why something is happening?", or "what are the alternatives?". Typical questions could also include asking "why things are not completed in a certain way?". The interviews were semi-structured including both open-ended questions and closed-ended questions. The semi-structure of the interviews was chosen to gain answers to the already identified issues through earlier interviews, and any issues that the interviewees may identify that were not already part of initial questions or thesis. A semi-structured interview guide also allows the possibility of the interviewer identifying what is important for the different parties in the researched topic. The interview

guide was more a topic overview showing what kind of questions the interviewer needed answers to and sporadically used when the answer to some topics did not come up. The communication was fluent, with the interviewees sharing their views on the topic and the reasons for failure, while the interviewer asked necessary questions to get relevant data. This method of interviewing safeguarded a better empirical result and information that exceeded my understanding of the complexity of the process. This was done in accordance with Karlsson (2016) stating that, in clinical management research the client has taken the initiative while the researcher probes the client to understand what the cause of the problem is. This was important as understanding the entire complexity of the process was a key to understanding the main failures. Karlsson (2016) says that causal relations are the focus and the strength of clinical research. In total, there were 6 in-depth interviews with 7 different people involved. Two of the interviewees were interviewed together as they work in the same section. The interviews were done between February and May 2021. Due to COVID-19, the interviews were done over 3 months instead of 1 month as initially planned. Each interview varied in length between 1 hour and 2.5 hours depending on their involvement in the process. I conducted the interviews myself. The interviews were done in Norwegian. This was to ensure that no information was lost in translation as the interviewees work primarily in the Norwegian language. The interview subjects would be more limited in their English language and might choose to omit relevant information if asked in a foreign language. As the study needed a broad understanding of today's practice, it was important that no information was lost through language barriers. The subjects were informed that the study would be completed in English and that citations had to be translated to be relevant for the research. The translated statements were sent to the interviewees for approval before being included in the paper. The interviews were recorded, and relevant information was transcribed from the interviews without the entire interview being transcribed as each interview was between two and two and a half hours. Each interview was evaluated directly after the interview to identify information that should be included in a new interview guide for the next interviewee. Further data collection from that point on was done through mail correspondents and there were no new interviews set up with the same informants. The informants were notified ahead of each interview that the study would not focus on the performance of individual employees, but rather the study of the mechanisms and issues that lead to a failure in managing cost savings. This could be the reason behind why many of the informants shared a lot of their opinions on the topic and spoke as freely as they did. Some of the interviewees choose to

share information they did not want used in the study, but still helped to gain a better understanding of where the main issues could be found. A couple days prior to each interview the informants received an overview of the topics that were going to be discussed and an information letter was sent to them via mail. The recordings were kept in a safe and confidential location that only the researcher had access to and were deleted after the end of the research period. A weakness with the recordings was that not all the information about the interview situation was captured. Due to COVID-19 there was no possibility to have interviews done in-person as this would require traveling different places in Norway. It was initially planned to complete the interviews in-person before the second lockdown in Norway. Based on this, an evaluation of the body language and change of tone in voice was not considered when interviewing the different informants. As the informants were informed that this study was not about an evaluation of their performance but rather the system itself, they did not seem to withhold information or answer in a way they felt was expected from them. However, there is always a risk that some of the informants thought differently.

4.4.5 Questionnaire

The research used a questionnaire, as shown in the appendix, which was distributed to all financial officers on the battalion level for collection of secondary data. The goal was to receive feedback on the lowest level of the supply chain. This questionnaire was based on free text answers to get reflected answers. As there was evidence of a lack in informational exchange, the individual reflection of each financial officer was important to obtain to achieve a good situational awareness of the information available for each financial officer. As the lowest level in the supply chain is broad and included in a smaller degree in the entire process, quantity was more important than the quality of the answers. Choosing one of the financial officers, for example the most informed, would give a false understanding of the situational awareness of the average financial officer. Furthermore, there is rapid replacement of personnel in the military sector and therefore quantity will ensure better data quality. The reason for this is that new employees do not necessarily have a good enough understanding of the complex problem discussed in this thesis. Therefore, it was important for this thesis to get feedback from the most experienced financial officers up unto the least experienced to see if their answers support each other. After all, it is the financial officer in the battalion that needs to report back actual cost savings based on the expected cost savings. By sending a questionnaire, the research can

evaluate all the financial officers' impressions of the cost savings in the Brigade instead of handpicking some. The research can get the opinion of a bigger population, rather than the opinion of one individual battalion that does not necessarily reflect the impression of the Brigade.

4.5 Analysis

In the following section, the use of method, research design and theory in the analysis of data is explained based on the different research questions.

4.5.1 Coding and interpretation

Data was coded differently based on its relevance or if it was critical incidents (CIT). In this clinical management research, the goal was to study the main reasons leading to the failure impact. Data was analyzed after each interview and new reasons, or critical incidents were identified and coded. When a reason or incident was included in the next interview guide, the answers were coded according to the earlier data to be able to discuss these. The interview guides were structured in the same way, with questions that gave answers to the different obstacles to help the coding process. Interpreting these findings meant that the critical incidents were taken apart, organized, and classified into recurrent topics and categories (Karlsson 2016). As the analysis was done continuously after each interview, the new findings, main reasons and critical incidents were presented to the new informants and based on this, received feedback on validity of the findings. Due to the COVID-19 situation, it was difficult to organize steering meetings as proposed in the theory, to achieve enough validity but there was one originally planned. Validity based on the coding was achieved through the continuous analysis of data and exchanging the new critical incidents and information with the relevant informants.

4.5.2 Critical incidents

Within clinical management research, Karlsson (2016) states it is especially relevant for the research method to focus on activities that have had an impact on the performance of the organization and therefore will help identify what the research is looking for, or "causal relations." In this research, the critical incidents are of great performance and the parts that are CIT's are marked in the analysis as CIT's or main reasons.

4.5.3 Research question one

The main objective of research question one is to identify the reasons for failure or critical incidents in the management of cost savings. To describe the current state of today's coordination, a qualitative analysis was done with the use of Sunil Chopra's, *Five Obstacles for Supply Chain Coordination*." Within these obstacles the performance of the supply chain was measured through interviews and document research, focusing on areas that impact the supply chain coordination. The qualitative data analysis was done by the use of recordings from the interviews and article analysis. The interviews were analyzed based on coding, making it possible to compare data from different interviews and documents and put the data in context. The citations were sent to the participants for control and for any necessary corrections before publishing.

4.5.4 Research question two

Based on the critical incidents and main reasons for failure, the data was analyzed using the resource-dependency theory and its antecedents in coordination. This was done to show how the mechanism of failure impact influenced the purchasing power of the Army. To support the findings, a quantitative analysis of the combat service support Battalions accounting was done based on the proposed measuring units by Oslo Economics to see the impact on purchasing power. The data for the quantitative analysis was extracted from the accounting system SAP ERP (FIF). The goal was to evaluate the battalion's ability to control the budget cuts as proposed by NDLO SP.

4.5.5 Research question three

Research question three is answered by analyzing different modes of coordination. As research question two explains the mechanism of failure, research question three discusses ways to improve information sharing, incentive alignment and collective learning to achieve an improved outcome in the management of cost savings.

5.0 Discussion and analysis

In the following chapter the three research questions are discussed. The first part of the analysis discusses research question one and evaluates the qualitative data collected to identify the main reasons or critical incidents for failure in managing cost savings. The

second part is research question two and has two separate objectives. The first objective is understanding the mechanisms leading to the failure impact in centralized purchasing and how this failure impact affects purchasing power. The second objective is showing the failure impact from evaluating cost savings at the battalion through quantitative analysis. Research question three summons the chapter by looking at what modes of coordination are most appropriate between NDLO SP and the Army, to improve the outcome of managing cost savings.

5.1 Main reasons for failure in managing cost savings

This chapter of the study evaluates the data collected through interviews and the questionnaires to identify the main reasons for failure and critical incidents in the coordination of cost savings and in that way, answers research question one. The evaluation is done using three of Chopra's five obstacles in supply chain coordination. These are: incentive obstacles, information processing obstacles, and behavioral obstacles. The pricing obstacles and operational obstacles are not included in this study as they are not applicable to this study.

5.1.1 Incentive obstacles

According to Chopra (2019), an incentive obstacle is when a situation occurs in which different incentives are offered to different stages or participants in a supply chain. Incentive, according to Cambridge dictionary (2021), is something that encourages someone to do something. In an integrated supply chain if the incentives differ, it means that the incentives encouraging the Army to do something, do not encourage NDLO and vice versa. This suggests an incentive obstacle. As Halvorsen (2021) states when looking at the way NDLO SP operates they start wondering what their prioritize are, whether it is to maximize the reporting of cost savings or achieving beneficial agreements for the armed forces. One of the challenges regarding the incentives that was addressed several times in the interviews was the focus on cost savings compared to net savings. As NDLO primarily focuses on reporting the cost savings of some of the new framework agreements rather than the net savings of all the framework agreements, there is a need for the Army to use time and resources to evaluate net savings. There is a different view on cost savings in the sector with NDLO and the Army, which have different incentives for looking at cost savings. The result of NDLO 's activity is measured by the defense staff on their reported cost savings. Therefore, the reporting of cost savings is the incentive of NDLO

encouraging them to achieve maximized cost savings on new framework agreements rather than net savings. For the Army, the net savings of all framework agreements are the incentive requiring them to do their own evaluations on the impact of the new framework agreements. According to Lindland (2021) if the price of all framework agreements has increased and the Army 's budget gets cut based on the cost savings and not the price change of all framework agreements, then it needs to be treated and called budget cuts and not cost savings. Meaning that reporting of cost savings on the framework agreements that have become cheaper do not reflect a change in their expenditure.

Bjerke (2021) confirms that they only report cost savings as he mentions that they do not report net savings but only cost savings. This is because they are required to do so to meet their goals. This leads to an incentive obstacle as supported by Chopra (2019), who says that it is natural for any participant in the supply chain to take actions that optimize performance measures along which they are evaluated. As NDLO is measured based on their reported cost savings they report as such. Based on the statements of Bjerke (2021) and Lindland (2021), the Army needs to do their own evaluations on the overall net savings to understand the impact this has on their purchasing power. It could be argued that focusing on the cost savings will be beneficial for NDLO as they can report higher savings than if they would report net savings. At the same time, only focusing on the cost savings can have a negative impact on the other members (branches) of the supply chain. In figure 8 the incentive obstacle is exemplified. For the Army, the incentive is the net effect of agreement 1-4. In this example the cost savings from 1-4 are, 500 in savings from agreement one, 250 in price increase from agreement two, 300 in price increase from agreement three and 125 in price increase on agreement four. The net savings of this would be 175 in price increase on the 4 agreements. Whereas NDLO has an incentive to report on the agreements that have achieved cost savings, which is agreement one, with 500.

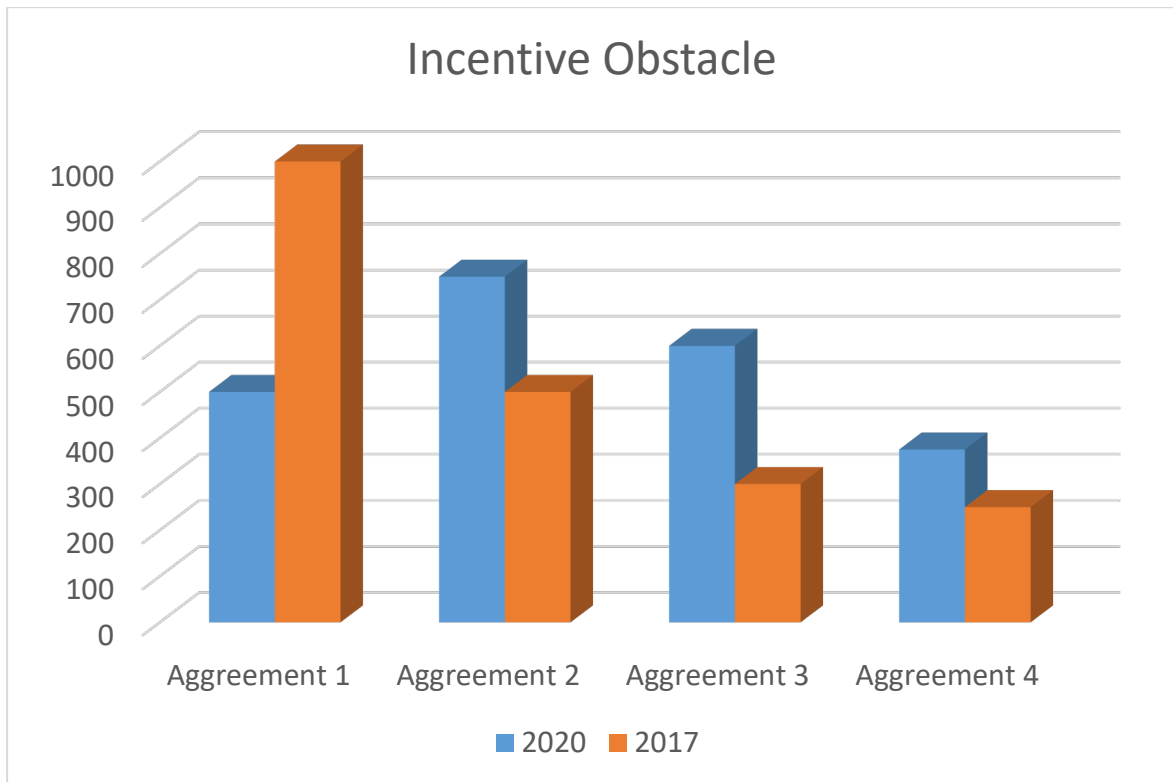


Figure 8: Example of Incentive obstacle

According to Chopra (2019), incentives that focus only on local impact of an action result in decisions that do not maximize the total supply chain surplus. When confronted with the difference in net savings and cost savings Bjerke (2021) said the increased prices due to new framework agreements need to be identified and presented by the Army in order to reduce budget cuts based on expected cost savings. Meaning that it is the Army 's responsibility to report the change in price on agreement two, three and four to adjust the budget cuts that are based on agreement one. Considering that NDLO SP is established to increase the quality of purchasing for the defense sector, measuring NDLO on incentives other than the change in purchasing power for the branches, can be considered an incentive obstacle.

To conclude the incentive obstacle, Halvorsen (2021), Lindland and Takvam (2021), Bjerke (2021) and Gedde-Dahl (2021) all agree on the possible negative impact that the difference between evaluating net savings and cost savings can have on the purchasing power of the branches. Based on the difference in incentives, presenting yearly cost savings based on changes in new framework agreements, contributes to misleading parts of the supply chain. This gives a wrong impression of the financial situation and increases uncertainty in the branches and their decision-making processes.

5.1.2 Information- processing obstacles

The information-processing obstacle occurs when demand information is distorted as it moves between different stages of the supply chain, according to Chopra (2019). In the public sector and the defense sector it is not the sharing of demand information, but rather information that can impact the performance of the supply chain that is discussed.

Information that can maximize cost savings or improve the management of cost savings. A lack of information sharing between the stages of the supply chain magnifies the information distortion according to Chopra (2019). The following section looks at the data availability in the supply chain, framework agreement loyalty, and the prerequisites for achieving expected cost savings which are all requirements for profit maximization and require extensive information exchange by the members.

5.1.2.1 Data availability

According to Reid, Bussiere & Greenway (2001) for the resource dependency theory to function effectively an organization may not be self-reliant. This is the case for the Army as NDLO is responsible for the process of achieving cost savings on behalf of the Army. Therefore, an evaluation of the information made available for the Army needs to be done in this study. When asking the Chief Financial Officers in the Battalions on how they plan for budget cuts based on the expected cost savings an anonymous financial officer in the Brigade (2021) answered that he does not see specific areas in his budget where he achieves the cost savings that the budget cuts are based on. The same informant answered, that she/he had little to no insight on the new agreements when asked and what impact these will have on her/his budget. When asked what kind of information is needed to be able to treat these budget cuts as cost savings, he/she answered that he/she would need concrete information that shows where the potential for cost savings is and which general ledger account or supplier. The financial officer (2021) explained that this would increase the possibility to evaluate the cost savings. The feedback from the Battalions in the Brigade is almost uniform when asked about the “unspecified budget cuts,” regarding information sharing as shown in the Appendix. The main answers from the question asking how much insight they have and what information they would need to treat the budget cuts as cost savings, included the following most common answers:

- The result is that they have little to no insight on the new agreements and their contents.

- They lack information on how the new agreements affect them and their budgets.

This indicates an obstacle in the information-processing as the lower departments responsible for evaluating the cost savings do not have enough information provided or do not know how to process the information received.

5.1.2.2 Use of outdated system support

Another reason that might lead to a failure in managing cost savings is the gap in time from updating the supply catalogue on the ERP SAP. The outdated ERP system is not the main problem according to Bjerke (2021), as working on the intranet presents far more obstacles. The intranet is based on cable that secures confidential military information. But this also makes it difficult to get the necessary information from and to the open internet in communication with suppliers. Therefore, this is an obstacle in information processing between all parties as there is a lag in time needed to update relevant information which has an impact on the data quality available. Further the branches primarily work on the intranet, while the suppliers primarily work on the open net. According to Bjerke (2021), the boundaries of updating the catalogues in the intranet needs to be done manually and due to strict regulations, this process takes time and effort. When products are exchanged in the framework agreements for substitutes, the catalogue might not be updated and therefore the more expensive products that are not included in the framework agreement might be bought.

Gedde-Dahl (2021) says NDLO SP needs 30 new employees and has so far only received financing for 15. However, the financing is dependent on NDLO SP delivering economic gains in line with their original estimates. In his opinion with the implementation of better support and logistics systems over the next few years NDLO could potentially achieve the same goals as today, but with fewer people. If you employ 30 people now, in 5 years if we get better system support, we do not need these 30 employees anymore and could potentially even reduce the number of employees. But it is not easy to get rid of people in the public sector. Meaning that according to Gedde-Dahl (2021) the need for more staff is a direct reflection of the outdated support service and back-office programs in use, both regarding accounting and supply management. The type of control needed in these processes requires a lot of staff to compensate for the lack of system support.

5.1.2.3 Framework agreement loyalty

To achieve the expected cost savings calculated by NDLO, NDLO SP shares certain prerequisites explaining how the framework agreements are supposed to be used by the different branches. Some of the prerequisites explain, for example, how the purchase is supposed to be executed and what type of products should be purchased to achieve greater savings. This requires the entire supply chain to be loyal to the prerequisites and purchase according to the new framework agreements. As of today, there are no reports stating how many products each department buys that are not included in the framework agreements or any evaluations that show if framework agreements are used as intended. Looking at the seven measuring units by Oslo Economics (2013), one of their suggestions is to follow a target figure that tells how much of the purchases are made through agreements. There are reports showing how much was bought through agreements, but not reflecting purchases done outside of agreements. According to the analysis team of NDLO SP it is difficult to measure the loyalty of the different branches due to poor data quality on products that are not bought as a part of the framework agreement. Bjerke (2021) believes this is a reflection of the amount of ordering channels as The more ordering channels, the more discrepancies there will be. For example, airline tickets. Better structure on order channels could increase data quality. Further he says that as of today there are a lot of different ordering channels via the internet, the phone, app and so on. These do not necessarily become a part of our data. Torodd Lindland working with economics in the Army states that reports measuring agreement loyalty can be done and has been done before to measure the framework agreement loyalty. However, there is no routine or incentive as of today to do this. This is not optimal as NDLO SP according to Bjerke (2021) are dependent on framework agreement loyalty to be positioned to get greater deals with future suppliers. The more demand NDLO can show suppliers, the more suppliers are interested, and better prices can be achieved. Based on this, the need to increase focus on loyalty towards framework agreement has great importance not only to achieve greater cost savings short-term, but also to be better positioned when negotiating future agreements for long-term savings. Focusing on measuring agreement loyalty would also reflect an incentive for the branches to follow-up their own loyalty. Reports that show a lack of loyalty from the departments to framework agreements could also justify the cutting of the budgets even though cost savings are not achieved to force a change in purchasing behavior.

5.1.2.4 Sharing of information regarding cost savings and their prerequisites

Since the military still operates within their own chain of command and NDLO has become their own branch, communication still goes through the chain of command in the different branches. The communication link is long between the purchaser and negotiator of the framework agreements as shown in figure 3. This is supported by Bjerke (2021) who says that there is a long communication line from us until the user. As we do not have direct link to the user, and everything is communicated through the chain of command. As of today, all information shared regarding the budget cuts is done through the chain of command and primarily using excel sheets. This means that the two parties that need to exchange information to achieve these savings are NDLO SP (negotiator) and the battalion (Purchaser). However, these rarely communicate together. Instead, communication regarding the use of and evaluation of new framework agreements is linked through the Brigade staff, Army staff, NDLO staff and NDLO SP. According to Bjerke (2021), NDLO SP primarily reports to NDLO staff as it is their line of communication. Bjerke presents their expected cost savings to NDLO staff with the prerequisites but does not know or have any impact on what is communicated with the Army. In the questionnaire, the different financial officers did not know who in NDLO they could contact to get the information needed and one financial officer (2021) wrote that it is obvious that some people do not ask the right questions regarding the budget cuts as nobody knows what to cut each year. When negotiating new framework agreements, the NDLO SP analysis team calculates the cost saving potential based on certain prerequisites that follow the new agreements. This states clearly what type of material is included in the agreements that have become cheaper and which products should not be acquired. It also includes how much of each article was bought earlier in the year and based on this historical data, an expected cost savings is then calculated. Bjerke (2021) says that there is a detailed description on what the prognosis is based on, and what prerequisites, need to be followed to achieve the cost savings. For Lindland (2021) the main issue with regards to information exchange, is that we do not get the necessary information on the prerequisites that follow with the presented cuts. With that in mind, Takvam (2021) who works closely together with Lindland, requires an increase in the informational exchange due to the Army demanding more detailed information. Takvam (2021) has an impression that it has gotten a little better, because they have started to demand a lot more information. There is still no good procedure but some more information has been made available after several requests. There is evidence

of a mismatch between the information that NDLO SP identifies as relevant and the Army which can be a result of a mismatch in incentive alignment.

This is information the financial officers on all levels need to evaluate and control the cost savings and therefore, there is a clear information-processing obstacle. This is unavailable information due to: outdated support systems, information getting lost or not included in the information exchange between the Army and NDLO, and a mismatch regarding what information the Army requires, and NDLO SP provides. This is not only based on NDLO withholding relevant information, but also includes uncertainty regarding what information is relevant and needed.

5.1.3 Behavioral obstacles

In the following section, the behavioral obstacle is divided into 5 different subsections reflecting the 5 challenges within the behavioral obstacle: viewing actions locally, reacting to current situation, blaming each other in the supply chain, not learning from past actions, and lack of trust in the supply chain.

5.1.3.1 Viewing of actions locally

To maximize the outcome of centralized procurement, it is important that NDLO SP and the Army operate in a way that increases the benefit for the entire supply chain. According to Chopra (2019), one reason for behavioral obstacle is when each stage of the supply chain only views its actions locally and is unable to see the impact it has on the other stages of the supply chain. One of the impacts of viewing actions locally is the calculation of expected cost savings as addressed in the incentive obstacle and will not be further addressed here. In this case, a behavioral obstacle identified by the viewing of actions locally, is the inability to consider the information needed by the Army. Bjerke (2021) says that their analysis will never be better than their data quality and that their data quality has holes. Bjerke (2021) refers to the data quality in SAP that is generated or not generated using different ordering channels. Further in the interview, Bjerke (2021) stated that they can only present data down to the different branches and not further down to the Battalions, leaving the branches with uncertainty regarding where these cost savings should be expected in their branch. To compensate for low data quality, NDLO SP uses both data from SAP and from suppliers to calculate and evaluate expected cost savings resulting from new framework agreements. To counter the low data quality according to Bjerke (2021) NDLO collect data from suppliers and SAP. The primary data is from SAP,

but secondary data from suppliers is used to supplement SAP data. These expected cost savings rarely are broken down to reflect the expected cost savings for each branch based on profit center or cost center, rather, they are presented as savings for the defense sector. Calculating these expected cost savings with data provided directly by the supplier requires that the Army receives relevant information to do their own evaluations. Knowing this, there is potential that the low data quality will have an impact on the performance of the supply chain in the management of cost savings. As the data is not broken down further at NDLO SP, this needs to be done somewhere else in the supply chain so the budgets can be cut where savings can be expected. The insufficient accounting system increases the need for coordination and analysis that should be done by an accounting system. Within the defense sector it is instead, done by Johan Gedde-Dahl in NDLO staff in excel and based on individual distribution keys. Distribution keys in this study are methods to define how the expected cost savings are distributed through the branches based on parameters relevant for the cost savings.

When Bjerke (2021) was asked if the branches could find the necessary data themselves to calculate the expected cost savings, he responded that this could be difficult for them to find. Data from suppliers is necessary and even if they got the data from suppliers, there could be divergence between the members calculations. The Army does not necessarily have the knowledge to analyze the data reasonably. Based on this knowledge, failing to present the expected cost savings down to different branches or share relevant information will leave the branches in difficult situations by having to control these budget cuts themselves. When the Lindland (2021) was asked about their evaluations he answered that they need help from the analysis team in NDLO to see what the savings due to the new framework agreements are. Lindland (2021) says that they need help from the analysis team to see how much the actual cost savings has been within a year, as they are missing data to do these evaluations themselves. This shows how dependent the Army is on NDLO SP to manage and maximize their cost savings. According to Lindland (2021), the cost savings are called “budget cuts” by the Army, and from working with the other branches, it seems to him like it is the same for all branches. Therefore, they have started to cut the budgets of the lower departments (level 3) at the beginning of the year to reduce the uncertainty in decision making from the lower departments. Since the Army relies on NDLO to calculate the expected cost savings, and NDLO does not break these expected savings down to profit and cost centers, this task is impossible to do for the Army without

the right data. The result is that the Army refers to cost savings as “unspecified budget cuts” and treats them like budget cuts.

5.1.3.2 Reacting to current situation

Throughout the interviews, several informants mentioned the impact that the lack of resources had on the quality and effectiveness of the supply chain, in the management of cost savings. With a lack of resources available and outdated support systems, both NDLO and the Army are not able to do more detailed reports and therefore, are impacted in their ability to share relevant information and do necessary evaluations. Bjerke (2021) said they do not do any assessment on how the cost savings are supposed to be distributed between the different branches. We could do it with the right resources, but we do not do it today. This shows that with the number of their employees they do not have capacity to make better evaluations on how these cost savings should be deducted from each branch and rather, leave it up to custom distribution keys as further explained in Chapter 5.2 and briefly mentioned earlier in this chapter. Takvam (2021) is not satisfied with today’s practice as he states in his interview. The way the cost savings are split on the different branches at times seems arbitrary.

This is a critical incident in this research as it results in the inability of the Army to evaluate their expected cost savings. The challenge when calculations are not shown and understandable for the branches is that it results in budgetary uncertainty in the decision-making processes and therefore, forces the Army to treat these as “unspecified budget cuts”. Åmot (2015) wrote in her FFI-report that if the calculations are not shown, it is impossible for an outsider to know what is included and what is not included in the initiative gains. As resources are short in NDLO, they are neither able to share detailed enough information with the Army, nor to do a detailed analysis on the armies cost savings which leaves them in a situation that makes it difficult for the Army to manage and evaluate their own cost savings. While there is a lack of detailed information exchange, Gedde-Dahl (2021) says the defense department wants to implement a new method that is less detailed in their way of calculating the achieved cost savings. In his opinion they need detailed calculations and adequate documentation on the achieved gains to be able to have control on the achieved cost savings in dialogue with especially the Army, air force, navy and so on. Which also agrees with the opinion of Åmot in detailed explanation of their calculations. With regards to the detailed questions, they get from the different branches,

there is a need to be able to present details of the cost savings and this is not taken into consideration in the new method presented by the defense department.

The model today leaves the branches in the same position every year, facing “unspecified budget cuts” that seem arbitrary. Ultimately, this leads to the uncertainty in the branches on whether it has a negative impact on their purchasing power. Instead of addressing the roots of the problem, current situations are dealt with to try to minimize the impact the “unspecified budget cuts” have on their budget each year.

5.1.3.3 Blaming each other in the supply chain for not achieving supply chain profitability

For a centralized procurement system to function optimally, the ownership of the processes needs to be shared between the participants. Chopra (2019) states that all facility, transportation, and inventory decisions should be evaluated based on their effect on profitability or total costs, not functional costs. Even though this is not relevant in this case, the intention is to focus the evaluation of decisions on their effect on total profitability, rather than functional costs. Chopra(2019) states that there is a tendency to assign blame to other stages of the supply chain because each stage thinks it is doing the best it can. Further he says that a lack of coordination has a significant negative impact on the supply chain’s performance. One behavioral obstacle is to blame each other for not achieving expected cost savings. According to Chopra (2019), local analysis will lead to different stages of the supply chain blaming one another, with different stages in the supply chain becoming enemies rather than partners. Lindland (2021) said in their criticism of NDLO, they have to say that the Army has not been strong at increasing cost savings themselves, which is the reason that NDLO has been tasked to save money on behalf of the defense sector. And the cost savings each year show that a reduction in cost is achieved on some agreements. Keeping in mind, the inability of the Army to increase sufficient cost savings themselves, blaming NDLO SP for a change in purchasing power might not reflect the bigger picture of the challenge within the supply chain regarding managing cost savings. In fact, all parties feel that the other party does not do their utmost to improve the outcome of the process studied. However, none of them identified it as the main reason for failure. Gedde-Dahl (2021) believes that their expected cost savings yearly are not met because of the way the branches use the framework agreements while the Army claims the reason for not achieving cost savings is based on the missing information that needs to be shared by NDLO. Even though there is blame put on each other in the

supply chain, the main obstacle identified is not reflected in the parties blaming each other. On the contrary, both the army and NDLO admit that there is room for improvement by both parties, with neither being entirely sure what information would be necessary for today's system to work effectively. Therefore, blaming each other in the supply chain is not taken into further consideration and is not recognized as an obstacle for coordination in the supply chain, although it is important to mention for this study. This increases the reliability of the other findings as there is a wish by the client to find a solution to the main issues rather than placing blame on each other.

5.1.3.4 Not learning from own actions

The discussed topic has been an issue since the centralization of procurement, there is evidence that the defense sector has not managed to learn from their actions. A lot of the same challenges written by Åmot (2015), and Lien (2019) are still evident today. There is a work group established by the new Chief of the Defense, placing the entire process of increasing internal efficiency under evaluation and improvement. In this workgroup there is a larger focus on change in the theoretical approach and less of a focus on the practical implementation. What this means is that this change would not necessarily solve the issue of coordination between NDLO and the Army. As Gedde-Dahl (2021) mentioned, there is less focus on the details in the information exchange. At the same time, it is important that the new theoretical approach reflects the findings in this study to secure sustainability in the way information is exchanged in the process. In a FFI report from Åmot (2015), most of the challenges in this study were brought to light and Åmot (2015) concluded that new framework agreements cannot be considered as "lasting cost savings" as they usually do not last longer than 4 years and only savings exceeding the timeframe of 4 years should be considered "longer lasting savings" (Åmot, 2015). Still the defense sector cuts budgets based on expected cost savings from new framework agreements. Åmot (2015) wrote in her report that there is large uncertainty on how long the cost savings due to new framework agreements will last, as prices change with the renewing of agreements and there is no guarantee that the terms of the agreements will change in the favor of the military (Åmot, 2015). At that point, the branches need to be compensated again for the increase in this framework as their budget has been cut based on the savings. As of today, budgets are reduced based on new framework agreements lasting 4 years. Lindland (2021), who has worked in the economics department of the Army for several years says, that there has not been regular compensation for the Army for framework agreements that have

become more expensive which leaves the Army primarily cut in budgets and only compensated for the consumer price index yearly and cost increase that they present themselves. This means, as Lindland (2021) clarified, there are no routines for compensating increase in price of new framework agreements, but there is a routine for reducing budgets based on savings. In the long-term this can have an unfortunate outcome, as explained in section 5.2. Since the same issues today, exist as the ones in 2015, more than six years later, this shows the system's inability to be flexible in changing their way of operation and increasing coordination to effectively overcome the obstacles. To conclude, the defense sector's slow ability to learn from their own mistakes must be considered as an obstacle in coordination.

5.1.3.5 Lack of trust

Furthermore, the FFI report from Åmot (2015) focuses on the verifiability of cost savings. To define how verifiable these cost savings are, they have created two requirements.

Initiative gains are verifiable if:

1. Initiative gain calculations are shown.
2. The raw data used is explained.

Since the cost savings are based on the calculations of NDLO, a lack of transparency in their calculations will have a direct impact on the trust experienced by the branches. . Especially given that low transparency in processes often leads to a lack of trust. That is the reason why Gedde-Dahl (2021) arguments for more detailed calculations and why he reacts on the defense sector wanting to implement a model that is less detailed in calculations. Even though the transparency has increased in their way of calculating, the Army still has an impression that the way the cost savings are split on the branches seems arbitrary (Takvam 2021). The cost savings are split in a way that is not explained sufficiently for understanding, according to Takvam (2021). This indicates that the transparency in the way cost savings is calculated needs to be improved to increase the trust between the parties. The second requirement from FFI to make the cost savings verifiable, requires the documentation on where the information used in calculations is gathered. For example, if the data is collected from the accounting system in SAP, then what report is used to collect the data, what costs are included and how are the other costs regarding the procurement included. Åmot (2015) concludes that it is clear that initiative gains can change significantly depending on the raw data used. This also supports the need

for more transparency in the processes. Further the report from 2015 stated that from the 990 million kroner savings that were expected saved only 178 could be considered verifiable which further supports why there is a lack of trust in the supply chain. Åmot (2015) that the accounting in nearly every case is too basic to see initiative gains. The same accounting that the Army needs to use to evaluate their net savings. According to Levin & Cross (2004) interorganizational trust stimulates perceived fairness in a relationship. When the Army can not control the cost savings based on NDLO's calculations and Åmot (2015) that most of the budget cuts are not controllable this does not facilitate to the feeling of fairness between NDLO and the Army. Åmot (2015) also mentions that the poor connection between initiative gains and accounting are unfortunate. Based on this reporting initiative that have no real content is too easy and outsiders have difficulties to follow-up these possible gains. To add the gains from each year and saying that the sum equals the amount of increased efficiency in the military in the period measured can give a very wrong impression. This issue is complained about by the Army, but Lindland (2021) says that even though the branches complain, there is rarely anything happening with the complaints. Our impression is that the money is reallocated and therefore the new budget needs to be accepted. This lack of trust in what happens with the money is also an impression NDLO has, as Gedde-Dahl (2021) states that they have a lag of 42 million from last year that is based on a mistake done in the defense staff for example. This was admitted by the defense staff, but the money has not been reallocated because it is planned otherwise. So, the right principles are there but it is not always as easy to get them completed.

To conclude this does not only reflect a lack of trust in each other within the supply chain, but also a lack of trust in the system and shows the uncertainty in decision making processes resulting from years of using this model. An optimal solution would be, if possible, to track the cost savings in the accounting. However, this would require better documentation and better accounting systems. Lack of trust in a supply chain, according to Chopra (2019), results in the duplication of efforts as information is not shared and needs to be gathered individually at different stages. With an increase in trust in a supply chain, information exchange is increased and therefore greater results can be achieved.

There are indications of a lack of trust from the Army towards NDLO and their way of operating. This has resulted in the Army focusing increasingly on resources in studying the

way NDLO operates to see how they can evaluate the expected cost savings. Therefore, a lack of trust needs to be recognized as another obstacle in the coordination between NDLO and the Army. There is also evidence in a lack of trust from both NDLO and the Army on the system practiced today and the role of the defenses staff in reallocating expected cost savings.

5.1.3.6 Concluding research question one

According to Chopra, there are five different obstacles in coordination. This research has focused on three and identified each of these as evident in the coordination between NDLO SP and the Army. For the incentive obstacle, the main argument considering Chopra's theory, was that incentives that focus only on local impact of an action result in decisions that do not maximize total supply chain surplus. Both the Army staff and Brigade staff (Lindland 2021 and Halvorsen 2021), mention that focusing on the cost savings rather than the net savings does not give the Army a relevant reflection of change in purchasing power. As NDLO is measured based on their reporting of cost savings, there is an incentive obstacle. The information-processing obstacle shows several issues such as the data availability. There is a significant difference in data available for the Army in comparison to NDLO. There is a lack of information exchanged to make the same data available for each member. The information that is provided through the support systems is not sufficient to facilitate for effective management of cost savings. This signifies an uneven dependence between NDLO and the Army, making the Army more dependent on input from NDLO. According to Lusch and Brown (1996), high levels of interdependence signify each party needs a lot of information from the other party to fulfill its own tasks and not to cause any disruptions in upstream and downstream activities.

The last obstacle is the behavioral obstacle. The behavioral obstacle was divided into several undersections such as viewing actions locally, reacting to the current situation, not learning from one's own actions, a lack of trust and blaming each other. Showing there are behavioral obstacles. A more detailed summary of the different reasons for failure within each obstacle are listed below in table 2.

Table 2: Collection of the main reasons of failure

Obstacle	Main reason for failure
Incentive obstacle	Different incentives
Information processing obstacle	Low data quality ERP
Information processing obstacle	Different data availability for the army and NDLO
Information processing obstacle	Measuring of framework agreement loyalty
Information processing obstacle	Long communication line in the sharing of information
Information processing obstacle	Uncertainty regarding the exchange of information and what information is needed
Behavioral obstacle	Lack of knowledge how own behavior effects others.
Behavioral obstacle	Division of cost savings based on custom distribution keys.
Behavioral obstacle	Not being able to control each other's performance
Behavioral obstacle	Not being able to change practice even though obstacles are evident.
Behavioral obstacle	Lack of trust through a lack of transparency in the different processes.

5.2 The failure in the management system

In research question two qualitative analysis of the mechanisms that lead to a failure impact in the supply chain are done, in addition to quantitative research on the economical evaluation of the cost savings on one of the Brigades Battalions'. The qualitative research discusses the main reasons and critical incidents in coordination that lead to the failure impact in managing cost savings. This is done using the resource dependency theory and the antecedents for coordination as tool for discussion. Furthermore, the analysis of the quantitative data will use the data available to control the yearly cost savings by using two of the measuring units suggested by Oslo Economics (2013). The goal is to try showing the Army's ability to analyze the impact the cost savings have on the purchasing power of the Army with the data available in the accounting. For this section, three main processes of managing cost savings have been identified from research and the following section is structured according to these processes. Doing so, makes it possible to put the mechanisms in context and makes it easier to understand the complexity of the case. The processes are the reporting of expected cost savings, purchasing according to the prerequisites, and evaluation of the expected cost savings as presented in chapter 2.

5.2.1 Reporting expected cost savings

The first of the three processes analyzed is the reporting of the expected cost savings. The expected cost savings are reported by NDLO and require the sharing of information from NDLO with the Army to integrate the chain. Due to the incentive obstacle identified, extensive information needs to be shared between NDLO and the Army to compensate for NDLO not evaluating the net savings. This is based on the aspect that the data availability is different for both parties and there is a lack of relevant information shared. Lee et al. (1997) say that withholding of information by SC partners may have a disadvantage for the entire supply chain. Even though it is not the case that NDLO withholds information intentionally, there are no routine in place that allows the Army to automatically receive the information that they need. As NDLO clarifies, it is due to lack of data quality and resources that prohibits the necessary information to reach the branches. This is the main reason why the supply chain cannot be classified as integrated. The fact of the obstacles and that there are no routines for sharing relevant information in the chain this is a critical incident leading to a failure in the management system.

The difference in incentives examined in chapter 5.1 is another one of the main reasons for failure in managing cost savings. That NDLO SP does not report on all their accounts managed, but only on the accounts that have expected cost savings within a budgetary year, results in uncertainty in the management system of the budgetary year. This uncertainty impacts the Army in their decision-making as the financial impact these cost savings have on the purchasing power are uncertain. In the following section, the mechanism of the Army 's uncertainty will be further explained.

Gedde-Dahl (2021) says that if you compare the defense sectors budget development you see that spending only increases from decade to decade. And therefore in my opinion everything we do can only be categorized as a reduced cost increase rather than cost reductions. The costs do go up and therefore the defense sector should be careful with cutting the budgets of the branches as we can only delay the cost increase. Meaning in Gedde-Dahl's opinion nothing can be categorized as cost savings to the point where budgets should be cut. The expected consequences of focusing on cost savings of new framework agreements rather than net savings can be illustrated through the development in figure 9 below. Based on the reported expected cost saving as shown in figure 9, the Army should be able to purchase the same amount in 2020 with the use of less resources.

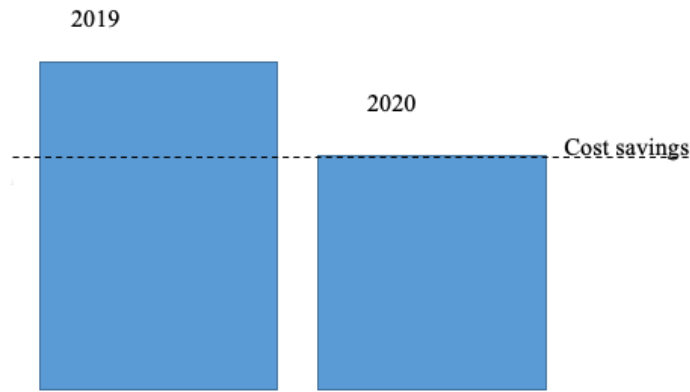


Figure 9: Budget cuts based on exp. cost savings (Halvorsen 2021)

According to Halvorsen (2021), Lindland/ Takvam (2021), Gedde-Dahl (2021) and Bjerke (2021), cost savings are not calculated based on net savings. This supports figure 9, when considering the one framework agreement and the expected cost savings regarding the new agreement. If three other framework agreements have increased more than the savings of the one as shown in figure 8 in chapter two, the Army needs to be compensated for this increase rather than cut in their budget. This would lead to a reallocation of the savings to cover increased prices on other agreements.

Since this is not the case, this leaves the Brigade with a budget that looks like the one in figure 10, according to the chief financial officer in the Brigade Gøran Halvorsen (2021). Figure 10 shows the holes in the budget. The reason for these holes in the budget is years of cutting budgets without quality assurance of the expected cost savings. This means, until the uncertainty in the environment is clarified through evaluations of net savings, these cost savings need to be categorized and treated as “unspecified budget cuts”.

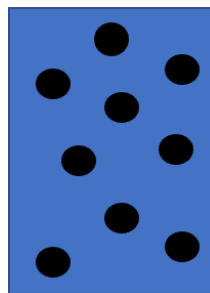


Figure 10: Result from cutting budgets without realized savings (Hypothetical)

After the expected cost savings are presented and budgets adjusted, the Army needs to manage this change in budget. According to Gedde-Dahl (2021), Bjerke (2021) and Lindland (2021) these cost savings are not broken down to profit centers and cost centers. Rather these are divided based on distribution keys that according to Takvam (2021) often

seem arbitrary from the Army 's point of view. Gedde-Dahl (2021) explains what the distribution keys are based on and shows the challenges he is met with when deciding the distribution keys. Most distribution keys are based on historical extracts from accounting and vendor statistics to show annual consumption per branch. Others are, for instance, based on the number of full-time equivalents per branch, or the number of cellular phones per branch and so on. Gedde-Dahl (2021) further adds to the distribution keys that it is not a perfect methodology, but it is the one they have, and it is the one they have to try and live with. He explains that they are trying to do their best with the model they have, and he tries to update the distribution keys at least yearly if not even more frequent. To show an example of failure in the use of custom distribution keys. Halvorsen (2021) and Gedde-Dahl (2021) mentioned the new Scandinavian Airlines (SAS) agreement. According to Halvorsen (2021) the branches were cut in their budgets based on the expected cost savings on distribution keys that took the number of employees and soldiers into consideration when calculating which branch should be deducted. After closer analysis, the Army found out that their main route between Bardufoss and Oslo had become more expensive. The major cost savings were expected on routes that were not travelled as frequently by the Army. In this case, the Army was right and budgets were readjusted. This clearly shows a weakness in the use of custom distribution keys to allocate budget cuts. This incident was also confirmed by Gedde-Dahl (2021) as a weakness to their distribution keys if the branches do not involve themselves enough in the process.

Gedde-Dahl (2021) also mentions having tried to change the way expected cost savings are reported but has not gotten backing from the defense staff in changing the approach and therefore the system remains unchanged. However, there are changes under way for this Long-Term Period (LTP 2021 – 24). We just don't know what it will look like yet.

Åmot (2015) stated in her report, the two requirements for identifying the verifiability in the cost savings are that initiative gain calculations are shown and that the raw data used is explained. As the Army neither agrees with the calculation nor receive the raw data used, they treat these cost savings as "unspecified budget cuts". According to the department of defense (2020), all financial gains should appear in the accounts and budgets. They also mention in the report that it can be difficult to breakdown these gains into sizes that may appear in accounting transactions, but efforts should nevertheless be made. In the same paragraph, the defense sector writes that in many cases a detailed review of the practical

and accounting implications of a measure, to succeed, is required. This shows the defense department's challenges in managing these financial gains and suggests the use of custom distribution keys where gains cannot be broken down to reflect in the accounting.

Therefore, the budgets are cut based on personal distribution keys by NDLO. The Army staff has their own distribution keys for the Brigade and again, the Brigade has their own distribution keys for their Battalions. Every level in the chain has different data available for determining appropriate distribution keys, meaning that the distribution keys used by NDLO may be different than the ones used by the Army and the Brigade. Halvorsen (2021) says the following about their distribution keys. The budget cuts in the Brigade are divided based on the size of the battalion and their ability to cut their budgets without too much damage, some budgets are more robust and can absorb bigger budget cuts with fewer consequences.

When reading this statement from the Brigade, and as the last level in the Army to distribute the budget cuts, we can conclude that the management of cost savings with certainty, has failed to reach the lower departments as intended. An approach based on custom distribution keys requires good evaluations of the actual cost savings to correct and reallocate possible misallocations based on the distribution keys at the start of the year.

5.2.2 Purchasing according to prerequisites

Interdependence in RDT is described as one of the antecedents for successful interorganizational coordination. The relationship between NDLO and the Army are interdependent to achieve their overall goals of maximizing cost savings. To achieve this goal, NDLO is dependent on the Army's purchasing according to the way the framework agreements are designed. The Army is highly dependent on the information and data that NDLO SP possesses to do their evaluations of their net savings. This is also the case for their purchasing, according to the design of framework agreements explained further throughout this chapter. According to Gedde-Dahl (2021) NDLO calculate a potential for gains, and is responsible for the calculations, but they observe that the actual savings are not according to their expectations. The potential is still there to achieve the cost savings, but we do not always fulfill the potential and one reason is the way we purchase. Gedde-Dahl believes that the branches do not purchase according to the design of the framework agreements. That the branches do not achieve the expected cost savings could potentially reflect the use of chain of command. Halvorsen (2021) says that the Brigade needs to see

that all the aspects like geography differences, transportation costs, purchase costs and so on, are included in their deals, along with why that deal is cheaper for the Brigade. Also Lindland (2021) mentions that if they use the framework agreements wrong they need to get the information needed to understand how the agreements are designed. Lindland and Halvorsen (2021) state that they cannot see the savings in their accounting. When that is said the information exchange has increased according to Takvam (2021) as they require more information from NDLO. Throughout the study there is different information needed at the different levels, showing that not only how much information is shared but also what type of information is shared is important. In the end, what is important for the evaluation of these savings is that the Battalions have the information they need for using the framework agreements as designed and to evaluate the cost savings. Therefore, their satisfaction with the shared information needs to be considered. There are multiple reasons to purchase according to the framework agreements. As mentioned by Bjerke (2021), when the purchaser uses the framework agreements accordingly, this will increase the data quality and facilitate better framework agreements in the future as this data is used in new negotiations. Today's model seems to be more based on "interorganizational trust," where the branches should expect cost savings to be achieved as reported. But "interorganizational trust" is a relationship asset, according to Zaheer et al. (1998). Its purpose is to reduce the cost of negotiation and interorganizational conflict, leading to effective performance of an exchange relationship. If the Army cannot use the information shared by NDLO to purchase according to the design of the framework agreements, information needs to either be altered or information needs to be explained and vice versa. The mechanism for failure impact regarding this can be presented through the circle in figure 11.

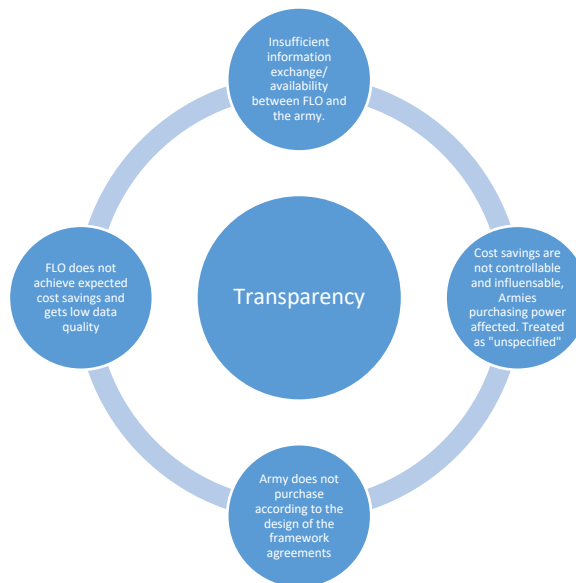


Figure 11: Mechanism leading to failure in purchasing power

NDLO and the Army see their own assets decrease significantly by not synchronizing processes. For the Army, this decrease is in form of their ability to evaluate cost savings. For NDLO, it is how much of the expected cost savings that can be realized. There is asset specificity between NDLO and the Army in the way that NDLO achieves cost savings on behalf of the Army, making the Army dependent on NDLO 's assets. The other way around, NDLO is not as dependent on the Army to maximize their profit. But NDLO 's performance also increases based on the Army 's loyalty to the framework agreements. To maximize the profit of both the Army and NDLO's, they are dependent on the work of each other making them interdependent. In this process, the insufficient transparency in the reported savings, leaves the Army treating the expected cost savings as "unspecified cost savings." This results in the Army not purchasing according to the design of the framework agreement, which again leads to NDLO not achieving the expected cost savings and therefore, lower data quality.

5.2.3 Evaluation/ Control of the expected cost savings

A lack of trust was identified and can be the result of the Army 's inability to control the work of NDLO. This could be a reflection of the supply chain not being as integrated. In a highly integrated supply chain, all the information between NDLO and the Army would be available for each other and give each other the possibility to evaluate their processes. As shown in the information-processing obstacle and behavioral obstacle, the two parties do not have the possibility to evaluate respectively, the purchasing behavior and calculation of cost savings. A more integrated supply chain could safeguard the supply chains uncertainty

through increased availability of information. Since the data quality is low, how cost savings are split down to the different lower levels, can have an impact on the purchasing power of the branches, which is confirmed by Gedde-Dahl (2021), Halvorsen (2021), Bjerke (2021) and Takvam & Lindland (2021). The fact that NDLO SP only has the option to present data down to the branches and not down to the profit center and cost center of the end user. This leaves the responsibility to decide how these budget cuts are split down to the end user based on factors other than accurate data and therefore distribution keys are used. This in times lead to misallocation of cost savings impacting the purchasing power of some branches. The solution to this requires detailed analysis of actual cost savings to reallocate misallocations in the start of the year. However, these evaluations are not done sufficiently, so considering the cost savings as “unspecified budget cuts” is the only solution. As mentioned by Gedde-Dahl (2021) the defense staff wants a new and less detailed way of calculating achieved cost savings which basically goes further away from FFIs recommendation of sharing increased details. And this would increase the potential misallocations of budget cuts. The Army believes that the budget cuts based on the expected cost savings presented by NDLO reduces their purchasing power. However, they are unable to exactly show this, due to the high budgetary uncertainty regarding the “unspecified cost savings.” According to Lindland and Takvam (2021), there is no evaluation of the entire yearly budget cuts to conclude whether purchasing power has been affected negatively at the end of each year. Instead, analyses have been done in some cases, like the analysis of the ammunition budget and other agreements, where the change in price was obvious. In the case of the ammunition, the result was obvious, and money was reallocated. For Lindland (2021) it is clear that for the Army the total of all framework agreement is relevant and how these change. Do they get cheaper, follow the CPI or do they get more expensive. There is no point in focusing on the 4-12 framework agreements that have become cheaper. The reality is that the few framework agreements that have become cheaper are highlighted and used in the calculation of the expected cost savings. Nobody ever talks about the framework agreements that have become more expensive! Lindland who has worked with economics within the system in several years, offers the above statement. In theory, this leaves the Army in a position where their budget is cut at the start of the year, and they cannot see that their costs have decreased accordingly. These budget cuts are removed from other areas that have not been included in new framework agreements as shown in chapter two leaving holes in the budget. According to the Army, this puts the Army in a position that ultimately reduces defense ability, due to budget cuts

that were never realized net savings. As politicians grant the military more money due to the goal of spending 2% of BNP on the military, it comes with specific goals to increase output. Therefore, the Army experiences growth in budget with serious holes in the foundation of their budget due to regular “unspecified budget cuts”. Since an increase in budget comes with expectations, the increase does not give the branches flexibility to refill the holes from earlier budget cuts as shown in figure 12.

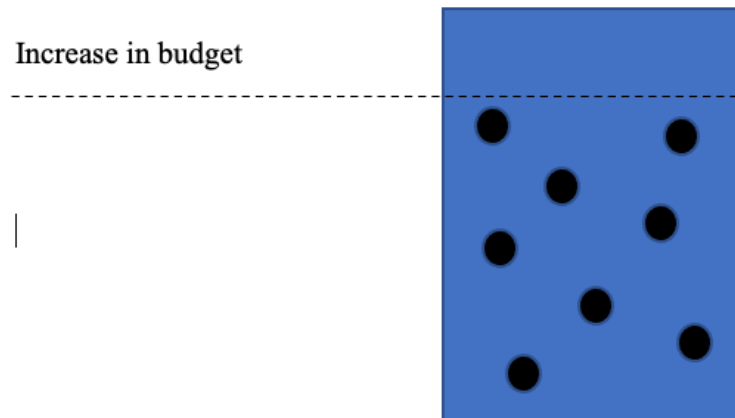


Figure 12: Increase budgets with increase in activity

As seen in figure 12 above, the budget is increased. The accounting support system cannot facilitate for data needed for evaluation of net savings and therefore the uncertainty in the budgeting processes remain. The management of the cost savings is highly uncertain for their supply chain members. To overcome this uncertainty there is an increased need in informational exchange to reduce the uncertainty in the management system by increasing supply chain integration. As the need of data to evaluate all the framework agreements is so extensive and complex it often ends with no evaluations being done. Now there is increased focus in the Army finance section to extract information from NDLO as the budget cuts increase and the impact on their purchasing power increases. The obstacles and mechanisms show evidence that the purchasing power of the Army is impacted negatively. To put the obstacle of evaluating the cost savings into perspective, the following change in budget of one of the Brigades’ Battalions was evaluated from the period of 2017 – 2020.

Quantitative analysis of the controllability of cost savings

The reality is, that according to Lindland (2021) and Halvorsen (2021), the Army does not know the scope of impact the budget cuts have had on their purchasing power as they are dependent on the help of NDLO to do their analysis. With regards to the evaluation of cost savings, Bjerke (2021) stated that today’s system expects the different branches to present

why the expected cost savings or budget cuts are not an accurate reflection of change in their purchasing power. Based on the statement above from Bjerke, a possible evaluation of the end customer (Battalions) ability to show their change in purchasing power will give an indication on the effect that cost savings have on the overall budget. The following section looks at Oslo Economics' "Measuring unit of data suggestions for effective use of resources", to evaluate the impact on purchasing power. Åmot (2015) said that, trying to evaluate how much the military has gained from the initiatives appears to be a question that can never truly be answered as the verifiability from these initiatives are low. This also counts for this evaluation as it will not provide an optimal solution. Nevertheless, this study analyzes the possibility of using some of the seven specific units of data designed for the efficient use of resources by government institutions, to give an indication on the change. The analysis presented in the following sections, uses the budget allocations of the combat service support battalion between 2017 to 2020 as example and to compare the difference in spending within the same period. The budget allocations included are: changes in the budget based on price compensations, yearly budget increases, and budget cuts that directly impact the budget of the fixed assets general ledger accounts 6 and 7. The analysis of spending is done using two of Oslo Economics seven different measuring units. Since there is no description on how such an evaluation can and should be completed, this study has based its evaluation on the data available in the accounting for the financial officers at the battalion level and analyzes the budget according to the two relevant units. The reason for choosing the battalion for evaluation is based on two aspects. The first is the model that requires the Army to do their own evaluations of change in purchasing power and the second, is the fact that Battalions suffer the most from "unspecified budget cuts". The evaluations are done by me as the researcher. At the point of study, I also was the most experienced financial officer at the battalion level in the Brigade and therefore most qualified. These are, "cost compared to last year's budget" and "cost per employee per account". As earlier mentioned by Lindland they do not evaluate their net savings as they lack data and need help from NDLO. Both the Army's economics section and the Brigades, give indications of not knowing exactly how the budget cuts from cost savings, have affected their purchasing power. This is also reflected by the description from Halvorsen (2021) on how the budget cuts are divided on the Battalions. His description shows that the budget cuts are based on their own distribution keys and not based on quantitative data from NDLO SP and therefore, are not handled as expected cost savings but rather as "unspecified budget cuts."

5.2.3.1 Cost compared to last year's budget

According to Oslo Economics (2013), an evaluation of the cost per account compared to last year's cost per account can give a firm indication on how costs have changed after achieving new agreements. Such evaluations are done by NDLO SP on behalf of the defense sector to evaluate their own effectiveness based on primary data collected from suppliers. As the Battalions do not have a defined communication channel to the suppliers, the analysis is done based on the data from the accounting. This study saw the possibility to split cost per account to be analyzed in two different approaches. One way to look at an account is to view the supplier as one account and evaluate the change in cost of using the supplier. Another way to look at it is to evaluate the change of cost in each general ledger account for each year. By evaluating each supplier by itself, the defense sector will receive feedback on their change in purchasing power according to the analyzed supplier. After evaluating all the framework agreements within a general ledger account, the defense sector may be able to have a better indication on how the change in all framework agreements impact the purchasing power within each general ledger account. With regards to the question of how the cost per account evaluations are distributed between the different branches, Bjerke (2021) who is responsible for the analysis team, responded that they do not complete assessments on how these should be distributed through the different branches.

3.4.2.1.1. Supplier account

An evaluation based on the supplier account should be done based on the supplier account and down to the profit center to give a real indication on where the cost savings are expected to impact the defense sector. Unfortunately, this is not completed by any part, not the Army, the Brigade or NDLO. Therefore, the budget cuts can be expected to be divided in a way that makes the management of cost savings rather impossible through the use of distribution keys. Based on that calling the cost savings as "unspecified budget cuts" is reasonable. The analysis of the supplier data extracted from accounting basically revealed the same result as the evaluation of the general ledger account, since there are no more detailed parameters received. The only information received is the purchasing order number which can be manually checked and compared from year to year. In total, there are 285 suppliers' with each supplier having between 4 and 100 purchasing orders each year. This work was too complex and not worth the time due to the focus of this study. As such, the supplier account was not further analyzed in the accounting of the battalion's budget.

3.4.2.1.2. General ledger account

NDLO reports on their cost savings rather than the net savings of the new agreements. The cost savings presented are done based on the analysis from the supplier rather than the analysis from accounting. Therefore, a change in the framework agreement would not necessarily be able to detect a change in the price of other general ledger accounts that may be increased due to the characteristics of the new framework agreement. A new framework agreement with a supplier located further away from the customer will have increased transportation costs. If transportation is not included in the new framework agreement, a change in the transportation costs will not necessarily be picked up as the transportation costs might be registered on a different general ledger account.

Evaluating the general ledger account can be completed down to the amount spent on each supplier in each general ledger account, but it fails to compare the change in the purchased amount each year. This will be able to give an indication in change with regular suppliers given that we assume the spending of a battalion is comparable from year to year. But there will still be uncertainty regarding the volume ordered.

3.4.2.1.3. Change in cost per general ledger account

The change in cost per general ledger account is measured by comparing the overall change each year in the different ledger accounts to see if an evaluation based on this model is possible. This paper will now look at the general ledger account 6 & 7 together, before looking at each account within these main accounts. General ledger accounts 6 & 7 are what can be considered the operational budget. Most of the purchases are registered within general ledger account 6 & 7 and therefore, it is relevant to delimit the focus of this analysis to these accounts. Table 2 shows the change in spending from 2017 until 2020 for the battalion and the consumer price index regulation. This is the budget increase based on the increase in consumer price index (CPI).

Table 3: Spend analysis 2017-2020

Name	General ledger account numbers for undercategories	Spending 2017 (In 1000 NOK)	Spending 2020 (In 1000 NOK)	Difference in spending 2017-2020 (In 1000 NOK)	Consumer price index compensation per account (2017-2020) (In 1000 NOK)	Status after budgets adjusted to CPI. (In 1000 NOK)
Gifts	5900	7,9	11,6	3,7	-1,25	-2,46
Cleaning	6360	12,9	0,44	-12,4	-5,46	17,86
Car Rental	6450	287	864,6	577,23	-149	-427,8
Other rental costs	6490	28,8	9,7	-19	-5,4	24,5
Tools	6510	587	2971,8	2384,8	-307	-2077,7
Inventory	6540	88,8	103,66	14,9	-26	11,6
Computers	6550	527	500,8	-26,6	-73	99,8
Work clothes	6570	508	549,32	41	-92	51,1
Ammunition	6580	3434	3972	537,8	-654	117,1
Provision	6581	4,44	975	970,5	-101	-869
Sanitary consumables	6583	122	313	190	-28	-163
Consumables	6584	2261	2091,5	-169,8	-378,3	548
Office supplies	6800	3434	3972	537	-654,9	117,1
Course	6870	9040,6	9616	575,6	-1680,5	1104,9
Transport costs	7130	2546,7	6407,6	3860,9	668,7	-3192
Total change	All accounts	22892,3	32359,6		4827	-4640,2

Looking at the budget change in table 3 from 2017-2020, the budget shows an increase of spending equal to 9,467 million NOK. The accounting support system does not provide easy access to detailed information that could help the Army evaluate a change in purchasing behavior from 2017 to 2020. To make an evaluation possible this study assumes no significant change in purchasing power, accepting that it weakens the evaluation. In the same period, the budget had been increased with 4,640 million NOK as seen in table 4. This increase was due to the battalion starting to pay plane tickets for soldiers and employees and new framework agreements that increased in price. After the increase in spending, the CPI increase and the budget increase show that the Battalions spending would equal the new increased budget. To sum up the above, if there had been no budget cuts, the consumer price index (CPI) compensation seems to equal the general price increase in the period from 2017-2020 based on these calculations. With that being said, in the same period the budget of the battalion had been cut based on “expected cost savings” by 8,780 million NOK. This left the budget in a deficit of 8,780 million NOK between 2017 and 2020, ultimately decreasing its purchasing power by 27 percent on the general ledger accounts 6&7.

Table 4: Status after CPI and budget cuts/ cost savings

Name	General ledger account	Status after budgets adjusted to CPI. (in 1000 NOK)	Extraordinary Budget increase (2017-2020) (in 1000 NOK)	Status after budget increase (in 1000 NOK)	Budget cuts / Cost savings 2017 - 2020 (in 1000)	Status after cost savings (in 1000)
Gifts	5900	-2,46		-2,46	-2,5	-4,99
Cleaning	6360	17,86		17,86	-3,7	14,2
Car Rental	6450	-427,8		-427,8	-195	-623
Other rental costs	6490	24,5		24,5	-5,55	19
Tools	6510	-2077,7	600	-1477,7	-568,9	-2046,6
Inventory	6540	11,6		11,6	-25	-13,5
Computers	6550	99,8		99,8	-119	-19
Work clothes	6570	51,1		51,1	-143	-92
Ammunition	6580	117,1		117,1	-944	-827
Provision	6581	-869		-869	-381	-1250,8
Sanitary consumables	6583	-163		-163	-55	-218
Consumables	6584	548		548	-505	42,7
Office supplies	6800	117,1		117,1	-944	-827
Course	6870	1104,9	895	1999,9	-3732	-1732,5
Transport costs	7130	-3192	3101	-91	-1153	-1244,5
Total change	All accounts	-4640,2	4596	-44	-8780	-8824

3.4.2.2. Cost per employee per account

An evaluation of the costs of operation can be presented down to each employee and soldier by using the total company spending in a fiscal year and dividing it by the number of employees and soldiers. As there is a significant difference between the amount spent on each employee and soldier depending on their specialty, this analysis must be broken down to each battalion. The defense sector operates with a general cost per employee and cost per soldier rate calculated for the entire defense sector. The battalion can look at each year and analyze the total spending on each account in comparison to the number of employees in the battalion. By doing this, the battalion will again, see that spending has decreased, but do not know whether this is due to cost savings or reduced purchasing power as there is no definition on how the change in purchasing power should be analyzed from year to year. To evaluate the change in cost per employee, the variable of value creation needs to be taken into consideration. As the budgets are cut in the beginning of the year based on expected cost savings, the purchasing behavior of the Battalions naturally adapt to the adjusted budget, failing to secure clear evidence on whether purchasing power has decreased or increased within each budgetary year.

3.4.2.2.1. Change in cost per employee per general ledger account 2018-2020

The following calculations are not shown as the total number of employees and soldiers in the battalion are classified to the public. Therefore, the results will be presented based on calculations done on the militaries intranet. The total spending in 2017 is divided by the number of active employees and soldiers within that year. The same is done for 2020 to see an increase in spending in comparison to a possible increase or decrease in employees. The evaluation shows that the cost per employee and soldier in 2020 compared to 2017, increased by 26.400 kroners per employee and soldier. There has been a change in the number of soldiers and employees in that period that is taken into consideration in the calculations.

Table 5: Cost per employee evaluation 2017 vs. 2020

Name	General ledger account	Cost per employee 2017 (In 1000 NOK)	Cost per employee 2020 (In 1000 NOK)	Change In cost per employee (In 1000 NOK)
Gifts	5900	16,4 kroner	26,6 kroner	10,2 kroner
Cleaning	6360	27 kroner	1 kroner	-26 kroner
Car Rental	6450	596 kroner	1974 kroner	1378 kroner
Other rental costs	6490	59,7 kroner	22 kroner	-27,7 kroner
Tools	6510	1220 kroner	6784 kroner	5564 kroner
Inventory	6540	184 kroner	236 kroner	52 kroner
Computers	6550	1094 kroner	1143 kroner	49 kroner
Work clothes	6570	1054 kroner	1254 kroner	200 kroner
Ammunition	6580	7125 kroner	9069 kroner	1944 kroner
Provision	6581	9,2 kroner	2225 kroner	2215,8 kroner
Sanitary consumables	6583	253 kroner	714 kroner	461 kroner
Consumables	6584	4692 kroner	4775 kroner	83 kroner
Office supplies	6800	7125 kroner	9069 kroner	1944 kroner
Course	6870	18756 kroner	21954 kroner	3198 kroner
Transport costs	7130	5284 kroner	14629 kroner	9345 kroner

Looking at the different general ledger accounts, there is an indication of an overall increase in spending, given the assumption that the purchasing behavior does not change significantly from year to year as the calculation of the expected cost savings does. This shows that cutting the budget of the Army based on their cost savings has a negative impact on the Army 's purchasing power as each employee becomes more expensive compared to earlier years in general ledger account 6&7. In reality, purchasing behavior from year to year has an impact on what is purchased and therefore, this evaluation cannot give an optimal answer. Rather, it shows how the Army is left with uncertainty in the

management system considering the lack of information available for the evaluating of the cost savings.

3.4.3. Concluding Research question two

To conclude research question two and how the failure in the management system of cost savings has an impact on the purchasing power it shows mechanisms of failure impact. Further it shows how the main reasons in today's practice lead to a decrease in purchasing power for the Army.

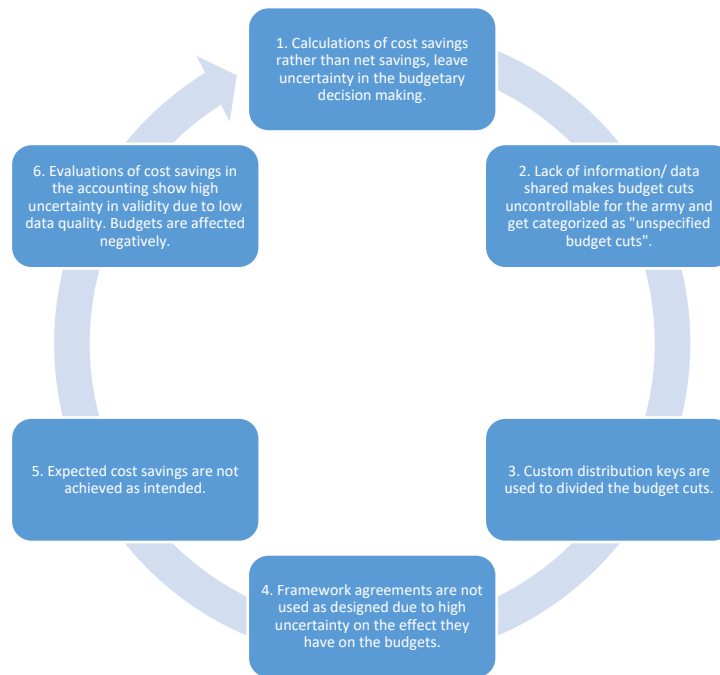


Figure 13: Cause effect relationship for failure in the management systems

The qualitative analysis of the mechanisms of failure resulted in the cause effect relationship described in figure 13. This is based on the findings in the interviews with the different interviewees indicating the same issues. Therefore, the representation in figure 13 needs to be accepted as the truth until proven otherwise through evaluations based on the net savings from 2017-2020. The idea of the quantitative analysis was to show how a lack of information lead to difficulties in evaluating a change in purchasing power based on the cost savings. Based on this evaluation, it shows an increase in overall spending while budgets have been decreased based on the expected cost savings. As Gedde-Dahl (2021) stated, in his opinion, their work can only be categorized as reducing the cost increase, which matched with the findings in the quantitative analysis. The quantitative analysis showed that the overall increase in spending was according to the increase in CPI and ultimately, lead to a difference of 44,000 NOK between 2017-2020. First and foremost,

when the budgets were cut the purchasing power of the Army decreased. There are several challenges in the quantitative analysis due to low data quality and therefore, the calculations can only be accepted as an indication. Optimally, the Battalions should be able to evaluate the number of products purchased compared to earlier years on all their accounts and see their change in spending down to profit center and cost center. This information is not available and therefore, concludes that the Army cannot evaluate the change in purchasing power sufficiently to give an exact answer but that the purchasing power of the Army is decreased.

3.5. Modes of coordination

Answering research question one has shown critical incidents and reasons for failure in managing cost savings. Research question two shows the failure in the management system and how the purchasing power of the Army is decreased. In the following section, research question three defines the appropriate modes of coordination suiting the problem of the thesis based on the conducted literature review.

According to Klein & Rai (2009), the goal of RDT is to enable SC partners moving towards more collaborative long-term economic relationships. Simatupang et al. (2002), state that there are two ways to identify the knowledge of coordination within a supply chain. These are either: the individual contribution of coordination mode in attaining supply chain coordination, or the use of the drivers of coordination modes to attain operational excellence. This study has so far highlighted the status of coordination within the supply chain and therefore, focuses on the latter form of identifying knowledge of coordination by using the drivers of the coordination modes to improve the operational coordination between NDLO and the Army. In Simatupang et al.'s (2002) theory, the question focuses on understanding how a company should achieve the best fit among supply chain members so that the tasks of the different players are performed consistently with mutual goals. This is the goal of the following chapter, to show how the modes of coordination should be used to achieve better performance. Research question three is answered by explaining the choice of relevant modes in coordination before showing how the modes of coordination can improve today's model.

3.5.1. Choice of modes in coordination

Looking at the characteristics of the different modes of coordination and focusing on three of them will increase the coordination in the supply chain. Based on today's situation, the

first task should be collectively learning to achieve better supply chain profitability. Through collective learning, NDLO and the Army can focus on aligning their incentives and thereafter, the information that needs to be shared. Today, the Army and NDLO are not sure what information they need from each other and what information the other part can provide to increase the performance of the process. This miscommunication is mainly due to the complexity of the failure in the management system. An example of this is the Army 's need for detailed information from NDLO. Gedde-Dahl at NDLO can provide relevant and detailed information if he is provided the right information from the defense staff, and the defense staff wants less detailed reports on the cost savings. Therefore, the incentive alignment is a main issue throughout this thesis, with the Army interested in their net savings and NDLO only reporting the cost savings. The information shared today does not give sufficient data and information for the Army to evaluate the effect cost savings have on their purchasing power. Their need for information increases based on, whether incentives are aligned or not.

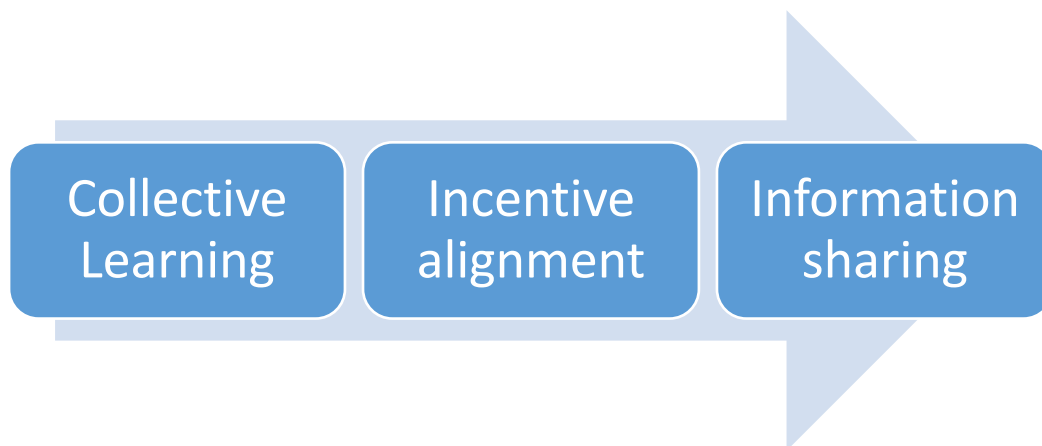


Figure 14: How the modes of coordination are used in research question 3.

Based on the complexity of the issue, only focusing on one of the three chosen modes will improve the outcome in short-term. To build a long-term and more sustainable solution, a combination of the three modes of coordination will give a better result.

3.5.2. Collective learning

The goal for the collective learning is through joint efforts effectively co-discovering and developing new capabilities. The relevant question going forward is asking how the use of collective learning can help accelerating performance improvement. There are several uncertainties in the supply chain identified that need to be addressed collectively, such as: how the cost savings impact the branches purchasing power and how to measure it, how to

evaluate the branches loyalty towards framework agreements, what information needs to be shared to achieve the same data availability, and how to synchronize processes to maximize the supply chain profitability. These different questions can be summed up as improving incentive alignment and information sharing.

Budgets are cut based on the expected cost savings. To secure that the purchasing power of the Battalions is not negatively affected, a process of collectively learning about how each other's actions affect the performance of the remaining members is necessary. Doing so, can ensure that profits are maximized independently of calculating cost savings or net savings. One example is the evaluation of the framework agreements and what impact these have on the Army's purchasing power. Since the net savings are not considered when the expected cost savings are presented, this indicates that there is room for the net savings being lower than the reported cost savings by NDLO. Furthermore, through collective learning, members could ensure that they have the same understanding and therefore, the same data as Gedde-Dahl requests. Gedde-Dahl (2021) says that it is difficult sometimes to get into the same meeting and talk about one subject and suddenly they have three different data sets on the same subject instead of having coordinated the data before the meeting. Gedde-Dahl (2021) mentions that the lack of synchronization leads to the different members doing different calculations with different data sets. In this example especially, a collective synchronization in identifying correct data sets is necessary. The importance is that for a change in process to succeed, the following incentive alignment and information sharing needs to be done through collective learning. This will ensure that all the branches agree and that the information shared is the needed information to increase the profitability of the entire supply chain. The Army does not have any incentive to reach the goals of NDLO, as they do not see the savings and what impact their behavior has on the profitability of the supply chain. Further the Army does not know how to increase the cost savings, as they do not know how to measure them and therefore have difficulties controlling the purchasing behavior of their branch. As such, the Army is forced to accept the budget cuts without the satisfactory information to be able to agree on the savings. The Army sees that the higher the uncontrollable budget cuts, the harder it is for the Army to meet their budget goals as they will become more underfinanced, which lately has resulted in the Army reducing their activity goals. Even though there are meetings to try to achieve mutual ground for the implementation and management of cost savings, the members still seem to be apart on agreeing how these cost savings should be structured, implemented, and controlled. One of the reasons can be the complexity of the failure in the

management system and the fact that the processes are not driven to implement common incentives but base their need for information exchange on their separate incentives. In this case, collective learning could facilitate by finding a way to agree on common incentives and ultimately the sharing of more relevant information. If their incentives do not align, it is difficult to see how the branches can come to an understanding of what information needs to be shared for a sustainable long-term solution to the present failure.

In evaluating cost savings collectively, NDLO and the Army need to become synchronized on how the Army can do the same exact budget evaluations. This can secure the Army the possibility to calculate their net savings and start to build trust to the process again.

Building interorganizational trust should be one of the main focuses as, interorganizational trust according to Levin & Cross (2004), stimulates perceived fairness in a relationship. This means the more a firm believes in the integrity and benevolence of a supply chain partner, the higher their willingness to make efforts at collaborative behavior in the form of information exchange with SC partners. The questionnaire done with the different FO's in the Battalions shows lack of data availability and maybe competence at the battalion and Brigade level to do budget analysis using the existing decision support systems. The feedback from the questionnaire reveals that the FO's do not focus on evaluating the expected cost savings and treat these as "unspecified budget cuts."

As the expected cost savings are distributed down the line, the prerequisites for following up on these cost savings need to be included in the budget cuts otherwise, these need to be treated as "unspecified budget cuts" rather than cost savings by the Battalions. Research question two shows what an evaluation based on today's decision support system can look like and shows an overall lack of data quality to draw certain conclusions. This reflects high uncertainty on the analysis that can be done with today's competence and data quality available. Through collective learning, NDLO SP could be involved in looking at ways that the Army can either evaluate their cost savings or identify what information needs to be distributed to be able to do these evaluations. As long as there is uncertainty surrounding the way other members operate, it will be difficult to know what information the other part possesses that needs to be shared. This conclusion is also backed by the qualitative analysis conducted based on the interviews. Especially Bjerke (2021), who explained much of the problem is: that a lot of data is in SAP, there is missing access to relevant reports for the Army, and some of the data that is used is provided by the supplier,

which all make it difficult for the Army to complete sufficient evaluations. As such, there will always be room for divergence between NDLO SP's calculation and the branches. In Bjerke's (2021) opinion the best solution would be that NDLO SP would share more data and give more insight on how the work is done and can be evaluated. There will always be room for divergence due to the quality of data, but it would be a lot more accurate. To improve coordination, NDLO SP and the Army need to find common ground on how their information exchange should be improved to give the Army the information needed and at the same time increase data quality. With the divergence between the availability in data, NDLO and the Army need to increase the overall competence on how the decision support service (SAP) can be used to do relevant analysis or how information sharing can be increased to give each branch the data needed to do relevant analysis.

3.5.3. Incentive alignment

The most pressing failure impact for the defense sector to overcome the reporting of uncontrollable cost savings is the alignment of incentives. Every interviewee supported the belief that cutting budgets on calculations of cost savings on grounds other than the evaluation of net savings had to be seen as negative for the purchasing power of the branches. This reaffirms the need for incentive alignment as a necessary step for moving toward a sustainable long-term solution. Therefore, this section will look at the alignment of incentives based on net savings and cost savings.

3.5.3.1. Net savings

If the incentives of the branches are aligned based on the achieved net savings, NDLO's goals would need to be adjusted for the impact their new agreements have on the net savings of all framework agreements. Focusing on the cost savings rather than the net savings indicates a negative impact on the armies purchasing power as shown in research question two. Bjerke (2021) also mentioned that he believes their analysis should reflect the overall net savings, but that it is not the case as of today. He agrees with the statement that the armies purchasing power will continue to be reduced if they continue to focus on reporting cost savings and cutting budgets based on this rather than net savings. Reporting on net savings based on cost center would require a lot more analysis by NDLO SP but the product would be the most optimal solution and remove most of the uncertainty and disagreements in the defense sector.

3.5.3.2. Cost savings

In the following section, the thesis analyzes the effect of a continuation of the current model of the defense sector reporting expected cost savings rather than net savings. According to Gedde-Dahl (2021), NDLO does the best they can with the prerequisites NDLO has to calculate cost savings today. Gedde-Dahl (2021) also emphasizes their need for better data availability and data quality. It is these prerequisites that all the members have to agree upon to find collective incentives. Through collective learning the incentives can be aligned in a way that allows the branches to agree on what information needs to be exchanged. Today's incentives for the Army and NDLO are not aligned as identified in research question one. According to Simatupang et al. (2002) and Clemons & Row (1993), incentives define how decision makers are being rewarded or penalized for the outcome of the decisions they make. Furthermore, they say that a conflict of interest occurs when the incentives of members in the supply chain lead to actions that maximize personal gain but often reduce the total profitability. In figure 15, today's model is visualized where NDLO SP exchanges information and data used for calculating expected cost savings. This results in the mechanism explained in figure 8, where NDLO reports on the cost savings of 500 in agreement one and maximizes their own reporting instead of reporting on the net savings of agreement one through four, that show an increase in price. The budgets of the Battalions are cut based on this information of the savings on agreement one. The expected cost savings are then evaluated by NDLO SP based on data received from the suppliers about the cost savings cut from the battalion's budget. This means that all the ownership of and decisions on the processes are done at NDLO together with the supplier about the budgets of the Battalions. These are done based on data the Battalions and Army do not have available. For NDLO SP, there is an incentive to achieve cost savings that can only be achieved through cutting the budget of the different branches as shown in figure 8. The incentive for NDLO does not require informational exchange from the Army with today's incentive to achieve their goals as they are measured based on a combination of data from the ERP system and supplier data. Ultimately leading to the NDLO reporting cost savings that lead to budget cuts for the Army that cannot be evaluated by the Army and without having to involve the Army in the process. Based on this it is not surprising that there is a lack of trust in the process. The Army, on the other hand, are heavily dependent on information from NDLO in achieving their incentive of evaluating the overall net savings to counter the budget cuts.

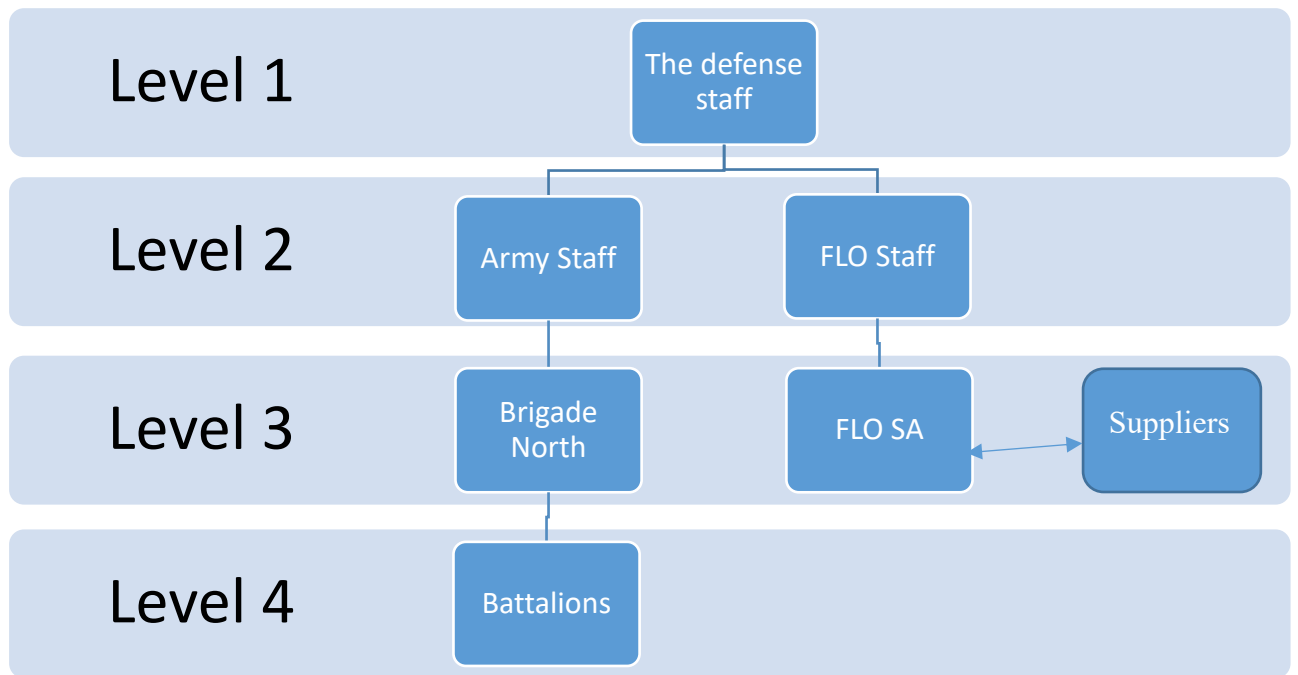


Figure 15: Visualization of today's model

Based on this, new incentives need to include an evaluation and calculation process of cost savings dependent on the budgets of the Battalions and their possibility to achieve cost savings. To avoid information distortion, communication between NDLO SP, the Battalions, and suppliers, should be increased to allow every member access to the same data. If evaluations are done based on the Battalions profit center and cost center, as suggested by Gedde-Dahl (2021), the Battalions could receive the same information as NDLO SP. This would then increase the transparency in processes and as such, increase the trust between members. This would also ensure that initiative gain calculations are shown and the raw data used, is explained, which according to Åmot (2015), is needed to make financial gains controllable. Instead of increasing the budgets of Battalions and at the same time retracting money from the Battalions for expected cost savings, the defense sector should focus on imposing claims on the Battalions to save money according to the new framework agreements. This means, that after analyzing the new framework agreements, the Army reports back on how much cost savings are realistic to achieve. This would have to be done through collective learning together with NDLO and would give the Army a larger incentive to try and purchase according to framework agreements and further, punish lower departments that do not follow the prerequisites when purchasing. Figure 16 could allow the Army to evaluate their net savings and report back to the defense staff if expected cost savings and net savings do not coincide.

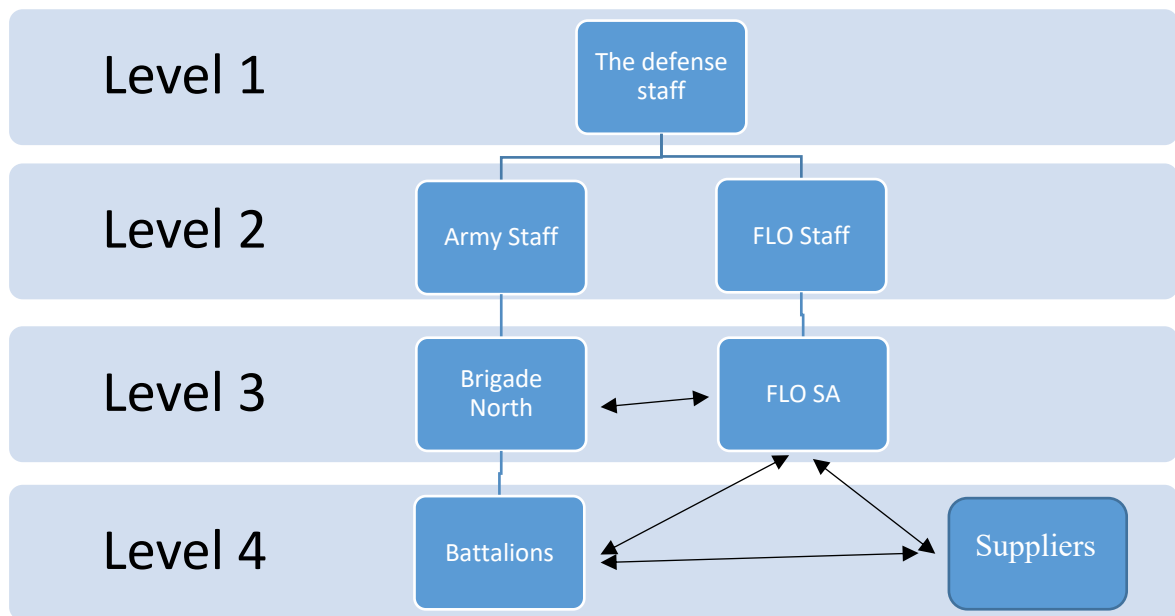


Figure 16: Incentive alignment through collective learning

In the theory of interdependence, there is a lack of commitment from NDLO with today's incentives to engage in an extensive information exchange as their incentive does not require increased informational exchange. Both Gulati & Sytch (2007) and Kumar et al. (1995) say that if the interdependence between the firms increase among SC partners, the partners are more likely to commit to their partnership and less likely to behave opportunistically. Based on this, incentives that increase the interdependence would have a positive effect on the commitment of NDLO in informational exchange with the Army.

3.5.4. Information sharing

In figure 13, joint efforts to increase information sharing requires creating effective information visibility, for logistics planning and execution, to ensure relevant, accurate, and timely data. Questions that need to be addressed collectively include: how the value of information sharing in substituting information for physical processes should be measured or defined, what type of information needs to be captured, how it is going to be used to make better decisions, and lastly, how one should capitalize on a decision support system and the internet to mitigate uncertainties in data analysis.

Detailed meetings need to be planned to exchange information showing a change in all new framework agreements. Here, the Army needs to see changes compared to the old agreement and what is included for the Army to evaluate a change in procurement cost. Optimally, this would include the information broken down to profit center and cost

center. This information does not necessarily need to be exchanged between NDLO staff and the Army staff but does need to be effectively distributed from NDLO SP to the battalions to maximize their cost savings. Takvam (2021) sees a need to be involved in early stages of the negotiation of new framework agreements to get a good situational awareness of the new framework agreements. You can basically strip an agreement of everything and save money, but if you strip the agreement for the actual demand, it will get costly. If the incentives of NDLO and the Army are not aligned, an increase in information exchange needs to be very detailed and extensive. The information that needs to be exchanged, must be identified together with the lower levels responsible for evaluating the net savings before continuous information sharing will be effective. Both NDLO and the Army have tried to change the way cost savings are measured to get a more accurate outcome from the expected cost savings, but nothing has materialized so far.

The quantitative analysis in research question two, shows an inability and lack of competence to analyze the cost savings based on profit center, indicating a lack of availability for relevant data in the Army. Bjerke (2021) also supports that the data quality does not give reports that can be split down enough to the different profit centers and sometimes not even down to the different branches. This indicates that consequences can include a wrong distribution of expected cost savings through the different branches, affecting the overall purchasing power of Battalions randomly. The cost savings are rarely distributed to the Battalions or branches based on data, but rather on distribution keys from NDLO. These distribution keys have been met with frustration within the Army according to Lindland & Takvam (2021). There is a need for synchronizing the distribution keys within the Army's understanding of potential cost savings. Gedde-Dahl (2021) mentioned how a more detailed report could be done by breaking down the cost savings to the profit and cost center, which ultimately would reduce a lot of the uncertainty. This shows, through the interviews with NDLO, that they have analyzed and tried to solve this issue regarding the low data quality but need backing from the defense staff to implement a new model. This would solve some of the Army's need for information as Takvam requested that the type of information on the prerequisites for the cost savings, in which general ledger accounts and how they can be measured, could be structured and presented. According to Gedde-Dahl (2021) the new model was supported by the defense staff, but with a recent change in personnel in critical positions, this process was paused. This solution could help solve some of the Army's need for information. According to Gedde-

Dahl (2021) they have the possibility to use profit centers and cost centers in setting up a viable distribution key, this would make it possible for NDLO to give a more detailed report that says the Army could save xxx.xx kroner, in this supply category based on these types of measures. This would also be helpful for the Army to monitor each of their departments and enables them to implement corrective measures if needed. If cost savings are not being broken down to the profit center and cost center as proposed by Gedde-Dahl, controlling the cost savings will stay uncertain as custom distribution keys will always leave room for error. If custom distribution keys are the future solution, these need to be decided through collective learning and based on the battalion's ability to control and evaluate these distribution keys in their accounting. The Army must be synchronized in the same way cost savings are calculated and receive data relevant for evaluating the change in cost on all framework agreements. Going forward, NDLO and the Army need to be more synchronized from the moment the framework agreements are negotiated to the moment the impact of these new framework agreements become visible in the accounting. Preferably, as proposed by Gedde-Dahl, they should be detailed down to the profit centers and cost centers. A lot of times, the Army does not know about the framework agreements that are negotiated before they are agreed upon, according to Halvorsen (2021) and Lindland & Takvam (2021). Therefore the Army should be more involved in the processes, instead of moving between the communication lines presented in figure 2, it is essential that information is shared directly between: the supplier and Battalions or between the account managers in NDLO and the Battalions as shown in figure 16. There needs to be an increase in communication that goes outside the hierarchical lines and connects relevant personnel to each other to overcome the lack in information available.

3.5.5. Concluding Research question three

To conclude, research question three to improve the supply chains performance, the most appropriate modes of coordination identified are the modes of: collective learning, incentive alignment, and information sharing as shown in figure 17.

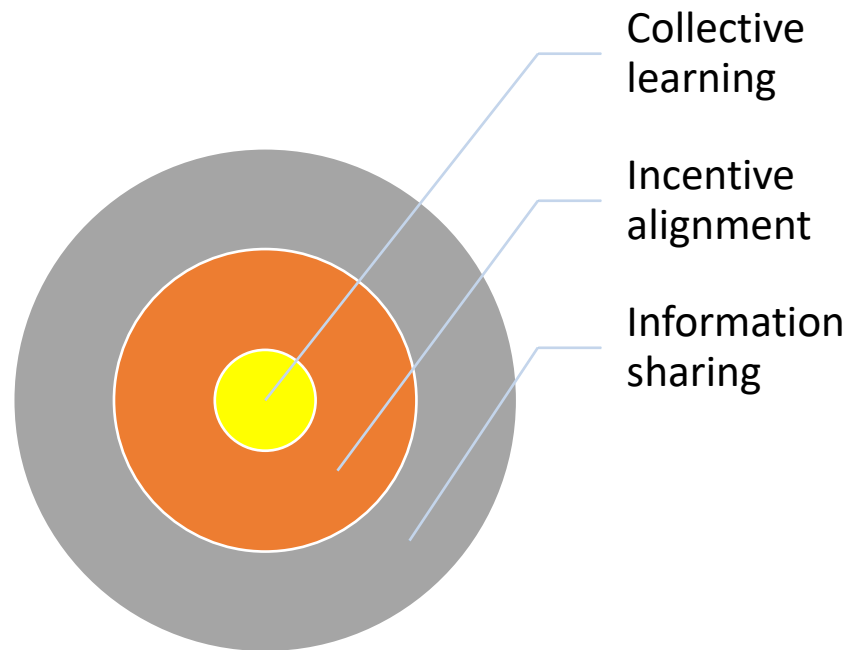


Figure 17: Building a sustainable solution

Due to the complexity of the situation, only improving one of the modes would still leave uncertainty in the process. The theory of the knowledge of coordination identifies four different loops as shown in figure 6 in chapter 3. The loop of the collective learning intends to combine fragmented skills and enable chain members to acquire new skills from one another. Therefore this is chosen as the core of the circle for building a sustainable solution. By choosing to focus on collective learning, members would achieve a better understanding of each other's way of operation. Collective learning has already started between NDLO SP and the Army to identify their need of information. But, the collective learning itself, does not secure a change in processes as collective learning is dependent on the personnel that are involved and is vulnerable if there is a change in personnel. The second layer of the circle is identified as the incentive alignment. As the incentive loop is designed to motivate different members of the supply chain to align decisions and actions with supply chain profitability building a foundation for long-term improvements. The last layer of the circle for building a sustainable long-term solution is information sharing. The loop of information sharing is concerned with the facilitation that enables the members in the supply chain to have visibility. Shared information can provide the platform needed to increase visibility and to enable the members making better decisions that optimize supply chain performance. The idea is that focusing solely on information sharing can increase the solution but is more vulnerable and requires more extensive information exchange. This is basically what the Army and NDLO SP are trying to do today, when increasing

information exchange without collective learning and incentive alignment. Such an increase in information exchange is vulnerable for change in personnel and a long-term improvement needs to be based on a combination of the three modes of coordination presented.

4. Conclusion

This chapter concludes the findings in the three research questions using a general overview. Furthermore, the conclusion reflects on practical implications, theoretical implications, limitations, difficulties faced with the researched topic, and lastly, presents a recommendation for further research in the field.

6.1. Conclusion of research question one, two and three.

In summation, this study used the analysis of quantitative and qualitative data to reveal clear indications of weaknesses in the management of cost savings. The data volume which is available for the entire supply chain today does not allow the different branches the possibility to control the effect of the reported cost savings, resulting in a lack of trust between the supply chain members. There is currently no regulation on how these cost savings can be measured and controlled by the different Battalions, making an evaluation of their impact on the purchasing power of branches almost impossible. The data that is shared, to compensate for the lack in data quality given through the ERP decision support system SAP, is not detailed enough to support the distribution keys used in determining the reported cost savings. The findings in research question two regarding the effect of today's model on the purchasing power of the Army, cannot be used as a definite answer. Nevertheless, the qualitative and quantitative findings in research question two, do strongly indicate that the purchasing power of the Army has decreased due to the failure in the management system of cost savings. Based on the findings in research question one and two, research question three concludes that the most appropriate modes of coordination to improve the outcome of the process is a combination of collective learning, incentive alignment, and information sharing. The overall goal is to overcome the failure in the management system of cost savings and to decrease the negative impact today's model has on the purchasing power of the Army. This study reveals short-term and long-term sustainable solutions on how coordination can be increased to solve the issues short-

term and long-term. To solve the issues in the long-term it requires extensive involvement of the defense staff.

6.2. Practical implications

Findings in this thesis indicate that the collective learning between the Army and NDLO is not sufficient to counter the lack of information exchanged. The reason for this could have to do with the defense staff not taking enough charge of the processes as mentioned by Gedde-Dahl (2021). This is unfortunate as the defense staff needs to be involved in potentially changing incentives. The way cost savings are managed today, impact the defense ability of the branches negatively.

In my opinion, it would be a good idea to start a process with the different branches in aligning incentives based on a model that allows an evaluation of the net savings rather than cost savings. Exactly how this process of evaluating net savings should be done, must be identified in a process of collective learning between NDLO and the Army to overcome the obstacles presented in research question 1. It is certain that a model of evaluating net savings would counter the decrease in defense ability and therefore, increase the quality of the branches. The results found in this study are going to be presented to the Army and NDLO to show how improved coordination can be a short-term solution that has a positive effect on the management of cost savings. Further I plan on sending my results to the defense staff, to see if they want to include some of it in their works of improving the management of cost savings.

Interesting about this study is how the different members agree on the failure in management system today which should make it possible to overcome the issue. But achieving a long-term solution as recommended in this thesis will require dedication from the defense staff, NDLO staff, NDLO SP, the Army, Brigade, and the Battalions to find a solution to the studied problem. These are a lot of different levels that need to be included in finding the best solution, which represents a major obstacle and requires strong leadership. With all the different levels being understaffed in the financial sections finding a solution might not be prioritized as other economic issues that the defense sector is faced with and will be prioritized as they are more current.

6.3. Theoretical implications

There is little theory regarding the researched problem. The research problem is specific for the management of cost savings in the studied case company. There are several reports written on the issues regarding the controllability of efficiency gains, but less studies done on the obstacles in coordination between specific functions in NDLO and the Army leading to these issues. Therefore, this study presents theory in a field that is little researched for the defense sector that could break down the findings by Åmot (2015) and Lien (2019) to exemplify the obstacles in coordination for the lower levels in the defense sector. This study includes literature review on coordination problems.

6.4. Difficulties faced with the researched topic

There were multiple difficulties faced with the researched topic as the problem is specialized in the way economics are managed in the defense sector's supply chain. This made direct comparisons to other master theses or theoretical literature reviews challenging. Another aspect was the combination of public literature review, military literature review, and data gathering, that was difficult to combine. As most information in the defense sector is classified, heavy economic analysis would involve data that is shielded from public, such as calculating a change in cost of ammunition, as mentioned in the study.

The original idea when the research was started, was to have meetings in person with the Army and NDLO SP to look at more practical solutions to the studied issues. Covid-19 forced us to cancel the scheduled meeting between NDLO SP, the Army and myself, in-person and the meetings were held instead, with the use of skype. This made the task of getting a deeper understanding of the processes difficult, as explaining calculations on excel are more challenging when you cannot meet physically. Even though I would have liked to dive deeper into different obstacles, I ended up not prioritizing it, due to the uncertainty regarding the Covid-19 situation. As such, doing this analysis remote showed great difficulties.

6.5. Limitations and assumptions

The scope of the study is limited by the coordination between NDLO and the Army to reflect the situation for the entire defense sector. The research is limited to the process from the expected cost savings are reported until the point where the expected cost savings

are evaluated. This does not include the processes in the negotiation of new framework agreements. In the quantitative evaluation, only data that is naturally available for the Battalions was used in an evaluation of change in purchasing power. This was due to the circumstances of trying to evaluate the cost savings from the battalion's perspective. An evaluation of all data available at NDLO and the Army could provide a more accurate representation of the impact on the purchasing power, but the intention was not to evaluate the change in purchasing power, but rather to show the uncertainty in the budgets of the Army. Finally, the research was mostly based on qualitative findings and therefore, needs to be interpreted with caution. The use of a clinical management research method was intended to help in countering the researcher bias. The researcher acted as a consultant rather than being in constant contact with both parties. However, there will always be a risk that needs to be accepted when interpreting research.

6.6. Further research

For further study this thesis suggests an evaluation of the impact of the budget cuts the last five to ten years. Evaluating the net savings in purchasing power with the information available at NDLO. This process was too complex to include in this master thesis and would give a more complete idea of how the purchasing power of the Army is impacted. The study would have to focus on what data would need to be shared to make relevant data available for the different members of the supply chain. This would require a quantitative study.

7. References

7.1. Academic literature

- Adler, Paul S. 2001. "Market, Hierarchy, and Trust: The Knowledge Economy and the Future of Capitalism". *Organization Science* 12 (2).
- Albano, G.L. & Sparro, M. 2010. Flexible strategies for centralized public procurement. *Review of Economics and Institutions* 1 (2).
- Balaban, Marko.2016. "Public procurement measuring". *Master thesis: Molde University*.
- Baldi, S., Vannoni, D., 2017. "The impact of centralization on pharmaceutical procurement prices: the role of institutional quality and corruption". *Reg. Stud.* 51(3). 426–438.
- Barratt, M., & Oke, A. (2007). "Antecedents of supply chain visibility in retail supply chains: A resource-based theory perspective". *Journal of Operations Management* 25. 1217–1233.
- Campbell, A.J. 1997. "What affects expectations of mutuality in business relationships?". *Journal of Marketing Theory and Practice* 5 (4). 1-11.
- Casciaro, T. & Piskorski, M. 2005. "Power imbalance, mutual dependence, and constraint absorption: A closer look at resource dependence theory." *Administrative Science Quarterly* 50. 167-199.
- Checkland, P. 1999. "Systems Thinking". *Systems Practice: Includes a 30-year Retrospective*. Wiley: Chichester.
- Chopra. Sunil.2019. "Chapter 10 – Coordination in a supply chain". *Supply Chain management – Strategy, planning and operations 7th edition*. Harlow: Pearson education limited.
- Clemons, E.K. & Row, M.C. 1991. "Sustaining IT advantage: The role of structural differences. *MIS Quarterly*, 275-292.

- Clemons, E.K. & Row, M.C. 1993. "Information, power, and control of the distribution channel", *Chief Executive Vol. 85*, (May 1993), pp. 64-7.
- Delrapport B OSLO ECONOMICS. (2013). Bedre styring av offentlige anskaffelser. Retrieved from: <http://docplayer.me/2882179-Bedre-styring-av-offentlige-anskaffelser.html>
- Devaraj, S., L. Krajewski & J. Wei. 2007. "Impact of e-business technologies on operational performance: The role of production information in the supply chain." *Journal of operations management 25(6)*. 1199-1216.
- Duggan, M. & Scott Morton, F. 2010. "The effect of medicare Part D on pharmaceutical prices and utilization". *Am. Econ. Rev. 100 (1)*. 590–607.
- Dyer, J. H. & Singh, H. 1998. "The relational view: Cooperative strategy and sources of interorganizational competitive advantage". *Academy of Management Review 23*. 660–679.
- Ellram, Lisa M. 1996. "The Use of the Case Study Method in Logistics Research." *Journal of Business Logistics 17 (2)*. 93-138.
- Flynn, B., B. Huo & X. Zhao. 2010. "The impact of supply chain integration on performance: A contingency and configuration approach." *Journal of operations management 28*. 58-71.
- Frazier, G. & Antia, K. 1995. "Exchange relationship and interfirm power in channels of distribution." *Journal of the academy of marketing science 23*. 321-326.
- Germain, R. & Iyer, K. N. S. 2006. "The interaction of internal and downstream integration and its association with performance." *Journal of Business Logistics 27(2)*. 29–53.
- Håkansson, H. & Lind, J. 2004. "Accounting and network coordination." *Accounting, Organizations and society 29*. 51-72.
- Gripsrud, Geir, Ulf Henning Olsson, and Ragnhild Silkoset. 2004. *Metode og Dataanalyse: Med fokus på beslutninger i bedrifter*. Kristiansand: Høyskoleforlaget AS.

—. 2010. *Metode og dataanalyse*. Kristiansand: Høyskoleforlaget AS.

Gripsrud, Geir, Ulf Henning Olsson, and Ragnhild Silkoset. 2016. *Metode og Dataanalyse: Beslutningsstøtte for bedrifter ved bruk av JMP, Excel og SPSS*. 3. utgave. Oslo: Cappelen Damm.

Gulati, R. & Sytch, M. 2007. "Dependence asymmetry and joint dependence in interorganizational relationships: Effects of embeddedness on a manufacturer's performance in procurement relationships." *Administrative Science Quarterly* 52. Pp. 32-69.

Hayes, Adam. 2021. "Definition Purchasing Power". *Investopedia.com*. Updated March 15, 2021.

Hillmann, Amy J., Michael C. Winthers & Collins, Brian J. 2009. Resource dependence theory: A review. *Journal of Management* 35 (6). 1404-1427.

Karlsson, Christer. 2016. "Clinical management Research". *Research methods – For Operations management second edition*. Pp. 268-289.

Karjaleinen, K. 2011. "Estimating the cost effects of purchasing centralization- Empirical evidence from framework agreements in the public sector." *Journal of purchasing and supply management* 17(2). (May 2011): 87-97

Keränen, Outi. 2017. "Dynamics of the transition process towards partnership thinking in centralized public procurement". *Industrial marketing management* 65. (December 2015) 86-99.

Kim, K.K, N.S. Umanath, J.Y. Kim, F. Ahrens & B. Kim. 2012. "Knowledge complementarity and knowledge exchange in supply channel relationships." *International journal of information management* 32. 35-49.

Klein, R. & Rai, A. 2009. «Interfirm strategic information flows in logistics supply chain relationships." *MIS Quarterly* 33. 735-762.

- Kumar, N., K.L. Scheer & J.-B.E.M. Steenkamp. 1995. "The effects of perceived interdependence on dealer attitudes." *Journal of Marketing Research* 32. 348-356.
- Lambert, D.M., Stock, J.R. and Ellram, L.M. .1998. "Fundamentals of Logistics Management". Irwin/McGraw-Hill, Boston, MA.
- Lee, H.L., V. Padmanabhan & S.J. Whang. 1997. "Information distortion in a supply chain: The bullwhip effect." *Management science* 43. 546-558.
- Lee, H.L. & Whang, S. 2000. "Information sharing in a supply chain." *International Journal of manufacturing technology and management* 1. 79-93.
- Lee Ho, Kim Moon Sun and Kim Kyu Kyung. 2013. "Interorganizational information systems visibility and supply chain performance." *International journal of information management* 34 (2). 285-295.
- Levin, D.Z. & Cross, R. 2004. "The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer." *Management Science* 50. 1477-1490.
- Lunnan, R. & Haugland, S.A. 2008. "Predicting and measuring alliance performance: A multidimensional analysis." *Strategic management journal* 29, 545-556.
- Lusch, R.F. & Brown, J.R. 1996. "Interdependency, contracting, and relational behavior in marketing channels." *The Journal of Marketing*. 19-38.
- MacNeil, I.R. 1980. "The New Social Contract" *Yale University Press*. New Haven: CT.
- Malone, T.W. & Crowston, K.G. 1994. "The interdisciplinary study of coordination". *ACM Computing Surveys* Vol. 26 No. 1. pp. 87-119.
- Mwangi, Charles Nguyo. 2018. "Contract management strategies in public procurement." *Masterthesis Molde University*.

- Nahapiet, J. & Ghoshal, S. 1998. "Social capital, intellectual capital, and the organizational advantage." *Academy of management review* 23. 242-266.
- OECD (2000), "Centralised and Decentralised Public Procurement", *SIGMA Papers*, No. 29, OECD Publishing, Paris,
- Reid, D., D. Bussiere & K. Greenaway. 2001. "Alliance formation issues for knowledge-based enterprises." *International Journal of Management Reviews* 3. 79-100.
- Reve, T. 1990. "The firm as a nexus of internal and external contracts. In Aoki Masahiko, Gustaffson Bo, & E. Williamson Oliver (Eds.), *The firm as a nexus of treaties*. London: Sage publications. 133-161.
- Richardson, G. B. 1972. "The organization of industry". *Economic Journal* 82. 883–896.
- Ryu, S. & Eyuboglu, N. 2007. "The environment and its impact on satisfaction with supplier performance: An investigation of the mediating effects of control mechanisms from the perspective of the manufacturer in the U.S.A." *Industrial Marketing Management* 36. 458-469.
- Sawhney, M. & Prandelli, E. 2000. "Communities of creation: managing distributed innovation in turbulent markets". *California Management Review* 42 (4). 24-54.
- Schein, E.H. 1991. "Legitimizing clinical research in the study of organizational culture." *Working Paper No. 3288-91-BPS*. Hoboken, NJ: Stevens Institute.
- Senge, P.M. 1990. "The Fifth Discipline." *Doubleday*. New York: NY.
- Smith, D. 2000. "The Measurement Nightmare." *Lucie Press*. Boca Raton. FL.
- Thompson, J. D. 1967. "Organizations in action: Social science bases of administrative theory." New York: McGraw-Hill Book Co.

- Tian, Weiwei. 2009. "Coordination between different value chains". *Masterthesis Molde University*.
- Togar M. Simatupang, Alan C. Wright & Ramaswami Sridharan. 2002. "The knowledge of coordination for supply chain integration." *Business process management journal* 8(3). 289-308.
- Tushman, M.L. & D.A. Nadler. 1978. "Information processing as an integrating concept in organizational design." *Academy of Management Review* 3. 613-624.
- Wang, E.T.G, J.C.F. Tai & H.L. Wei. 2006. "A virtual integration theory of improved supply-chain performance." *Journal of management information systems* 23. 41-64.
- Yan, A. & Gray, B. 1994. "Bargaining power, management control, and performance in unites states- china joint ventures: A comparative case study". *Academy of Management Journal* (27). 425-445.
- Yin, R.K. 1994. "Case Study Research." *Sage*. Thousand Oaks: CA.
- Yin, Robert K. 2009. "Case Study Research Design and Methods 4th ed". *Sage Publications Inc*.
- Yin, Robert K. 2014. "Case Study Research: Design and Methods." *Thousand Oaks, California: SAGE Publications, Inc*.
- Zaheer, A., B. Mc Evily & V. Perrone. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* 9. 141-159.

7.2. Defense sector specific literature

- Bjerk, Rolf Erik. 2018. "Økonomihåndboken". *Defense sector internal document regulating management of economics*.

Forsvarsdepartementet. 2020. "Veileder for gevinstrealisering i forsvarssektoren".

Powerpoint: from 14.august 2020.

Kvalvik, Sverre Nyhus, Helene Berg, Elisabeth Elman, Emil Graarud, Ola Krogh

Halvorsen, Torbjørn Hanson, Brage Lien & Kristin Waage. 2019. "Hvordan skape økonomisk handlingsrom i den nye langtidsplanen? – potensial for forbedring og effektivisering 2021-2024." *FFI-rapport 19/01934*.

Lien, Brage. 2019. "Forbedring og effektivisering i forsvarssektoren - realiserte eller bare rapporterte gevinster? Gevinstrealisering i forsvarssektoren 2017-2018". *FFI-rapport 19/01785*.

Lien, Brage, Ola Krogh Halvorsen & Svein Tore Kristiansen. 2020. "Modenhetsanalyse for forbedring og effektivisering i forsvarssektoren". *FFI-Rapport 20/01551*.

Lien, Brage, Torbjørn Hanson, Petter Y. Lindgren & Helene Berg. 2019. "Et uunyttet gevinstpotensial? – Incentiver for forbedring og effektivisering på tvers av etatene i forsvarssektoren." *FFI-rapport 19/00102*.

Løberg, Frode. 2021. "Prosedyre for økonomisk metode for gevinsthåndtering i Forsvarssektoren (FST)." *FFI-rapport 19/01934*.

Stortinget. 2005. "Bevilgningsreglementet". *Kapittel 2 Grunnleggende prinsipper for statsbudsjettet - §3 Hvilke utgifter og inntekter statsbudsjettet skal inneholde*.
Acknowledged: 26.mai.2005

Åmot, Elisabeth Lindseth. 2015. "Tiltakene hadde kommet uansett – erfaringer fra interneffektiviseringen 2009-2014." *FFI-rapport 2015/00765*.

8. Appendices

8.1. Appendix 1 - Questionnaire

I am conducting a survey related to the coordination between NDLO SP and the Army regarding the internal efficiency measures, which are presented annually as "unspecified budget cuts" at a lower level. This is a sign that something is happening in the supply chain from the new framework agreements are being negotiated to the user department implementing these as "unspecified budget cuts". In my goal to look at the chain from NDLO SP to the using department (you), I need you to answer the following 14 questions. Answering the question will approximately take 30 minutes.

Based on your position as Chief of Finance in one of the Brigade 's units, I want to include you in my master's thesis. Your answers will be anonymized in the assignment, where I can use the answer in the assignment without specifying who has answered what (More about how your personal information is processed in the information letter).

Thanks for your help!

1. How long have you been in the position as Chief of finance?
2. What is your main impression regarding budget cuts based on new framework agreements?
3. How do you budget with these cost savings?
4. What impression do you get when these expected cost savings are presented as "unspecified budget cuts"?
5. How much time have you spent on implementing and controlling these budget cuts?
6. As these budget cuts are based on new framework agreements negotiated by NDLO SP, how much insight do you feel you have on the new framework agreements and how they will impact your budget?
7. Do you feel a good cooperation with NDLO SP and the Brigade regarding the follow-up of the budget cuts and how they match with actual cost savings?
8. In your experience do you get enough input to follow-up the correctness in regard to the budget cuts? Do you evaluate the budget cuts and compare them to the actual cost savings?

9. On a scale from 1-10 how much ownership do you feel to the process described?
10. Do you consider your own battalion loyal to the framework agreements?
11. Do you have an overview of how loyal your battalion is to the framework agreements, any form for report?
12. In order to treat the budget cuts as cost savings according to the new framework agreements is there any information you would require?
13. Have you ever requested more information regarding the budget cuts and have you received satisfactory response?
14. Do you know who you can contact to get more details regarding own budget cuts?
Do you have a contact at NDLO who can give you answers to your need for information?

8.2. Appendix 2 – Interview guide

Attached to this thesis is only the last interview guide as earlier versions have developed till the last version.

Introduction

- Advantage for the defense sector
- Progression in the project
- Duty of confidentiality/ Anonymization
- Focusing on the overall picture and cooperation rather than individual performances
- There is no need to answer on questions that you do not want to answer.

Background information

- Name
- Position
- How many years have you had in this position
- Which position have you had before this one?
- How much are you involved in the researched process?
- What is your role in the calculation of cost savings?

Incentive Obstacle

- Is there a claim to achieve cost savings?
- Is it a claim or a goal?
- What happens if these required cost savings get reported as not achievable?

Information-processing obstacles

- How are you involved in the calculation of cost savings?
- How are the cost savings divided between the branches?
- In the calculation of cost savings does this include the framework agreements that have gotten more expensive?
- What do you consider the biggest obstacle in regards to the expected cost savings?

Behavioural obstacles

- How do you and you department experience today's practice?
 - o What is good about today's model?
 - o Do you see any particular room for improvement?
- How involved is the defense staff in the processes?
- How easy is it to do procurement on behalf of the defense and registering all their needs?
 - o Do you see any obstacles in regards to this?
- Do you have challenges in regards to the staffing situation, that you are understaffed?
 - o How does the understaffing impact the quality of the products delivered?

Aligning goals and incentives

- Is information given from NDLO on how a follow-up of the cost savings can be done in the branches or how it should be done?
- What role should the branches have in the evaluation of the cost savings?
- Who is responsible for the cost savings being distributed to the right profit and cost center?
- What information do you receive from NDLO SP when they report their expected cost savings to you?

Improving visibility and accuracy

- Do you see obstacles between NDLO staff and the Army staff regarding the coordination of cost savings, resulting in the cost savings being categorized as “unspecified budget cuts”?
- The Army treats the budget cuts as “unspecified budget cuts”, what do you think why they do it?
- Do you see obstacles in the data availability for NDLO and Army that can impact the coordination?
- Do you have any thoughts on what could have a positive impact on the cooperation regarding the implementation and control of the expected cost savings?

Improving operations to synchronization

- How do the expected cost savings get divided on the different branches?
- Does the analysis team of NDLO come with a suggestion on how these cost savings should be divided on the branches?
- There are certain prerequisites in order to maximize the cost savings according to the framework agreements. How are the routines for sharing these with the affected branches?

Building strategic partnership and trust

- How do the actual cost savings get quality assured with the expected cost savings?
- Do you have routinely meetings in which the cost savings get evaluated?
 - o Do these get adjusted when differences between expected cost savings and actual cost savings are identified?
 - o How often?
- Do you have examples of earlier budget cuts, based on expected cost savings that were not realized and where the budget cuts were not adjusted. Resulting in a change in purchasing power for the defense sector?

Others

- Are there more conditions that have an impact on the management of cost savings that could be relevant for this research that you know of?
- Are there more conditions that were not mentioned that could facilitate for better compliance of the cost savings at the lower level?

- Is there anyone you would suggest that would be relevant to talk to, that may have relevant information that I should get in contact with?

8.3. Appendix 3 – Collection of questionnaire answers

The following table shows the answers from the survey from the different Battalions based on the relevant questions:

Question	Batallion 1	Batallion 2	Batallion 3	Batallion 4	Batallion 5	Battalion 6
What is your main impression of the budget cuts?	Do not believe that the budget cuts reflect the cost savings	Not enough information, documentat ion or calculation s showing expected cost savings. I feel there is high uncertainty on what the effect of the cost savings is.	Its obvious that some people do not ask the right questions regarding the budget cuts as nobody knows what to cut each year.	I do not have enough knowled ge about the change in the framewo rk agreeme nts. How do they affect my budget.	Little informati on from Army staff and Brigade staff. Framewo rk agreemen ts are not renewed or replaced. Therefore it does not work.	The budget cuts are done before they are realized and without closer analysis of how they affected the battalion/Bri gade or army.

How do you plan with the budget cuts?	Where it hurts the least!	Do not know where the new agreements give reduction in costs. Where it hurts the least.	Where It hurts the least. It is a direct consequence for the flexibility in the budget.	Where it hurts the least as I do not know where the cuts belong in the budget.	Where we see potential for savings in our own battalion or where it hurts the least.	Where it hurts the least if its unspecified. If its specified on the artskonto where it was specified as long as its possible.
What impression do you have when budget cuts are presented as unspecified?	I believe that the budget cuts are unspecified!	Missing documentation and calculations. Budget cuts are done based on the size of the different budgets.	When our budgets are cut and they expect us to solve the same missions it impacts the motivation. Difficult to justify the budget cuts for other employees affected.	For me budget cuts based on cost savings is only a simple budget cut.	It reflects poorly on the management of cost savings in the army. No system to facilitate for the defenses framework agreements.	Somebody needs money somewhere else in the system. Makes little to no sense for meg at level 4.

<p>How much insight do you have into the new agreements?</p>	<p>I was purchaser earlier and even then information shared was limited.</p>	<p>Little to no insight. They reduce the purchasing power of my battalion.</p>	<p>I have no insight into new agreements and how they affect us.</p>	<p>Do not know when new agreements are made and their contents. I have no idea on how they affect the budget.</p>	<p>I know where to find them, but not more than that.</p>	<p>I get a mail once in a while if there is a new agreement but nothing more about the content.</p>
<p>What type of information do you need to evaluate the budget cuts and plan with cost savings?</p>	<p>Concrete overview where we expect savings. Artskonto and supplier.</p>	<p>I have not spent time calculating or analyzing the budget cuts so far.</p>	<p>What agreements have changed and reports from the relevant suppliers. Information about the change in the agreement.</p>	<p>If we have more information regarding new agreements and their contents I could help evaluating the budget cuts.</p>	<p>I need information on why my budget gets cut so I can tell the employees in my battalion.</p>	<p>Information in order to purchase according to what gives the best effect. As of today I do not have any information about what has changed to the better or what we could do better.</p>

Do you have a contact at FLO that can help you with the planning of cost savings?	No.	No.	No.	No. Would be nice to have.	No.	No. But I believe I could find someone on the intranet. Not sure if it would be worth my time though.
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