A design-oriented research of Thales' capital expenditure process

Scrutinize the Capital Process and resolve occurring constraints

public version

UNIVERSITEIT TWENTE.

Master Thesis in Business Administration

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University of Twente

June 2013

A design-oriented research of Thales' capital expenditure process

Scrutinize the Capital Process and resolve occurring constraints

MSc in Business Administration

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Acknowledgements

In the context of my graduation in the Master of Business Administration program, specialization Financial Management, I have written this thesis. After I successfully finished my Bachelor at Saxion, starting the Master program at the University of Twente was the next step for me. After completing the pre-master program and several courses belonging to the Master of Business Administration program, as well as the Financial Management track, I have done a research to accomplish the completion of my Master education. This research is commissioned by Thales in Hengelo (ov), The Netherlands.

The research went well and it provided a satisfying result. Logically, the research had its better and less moments. I have found the cooperation of the Thales staff pleasant, and I am satisfied with their openness for improving alternatives and the ability of thinking along. For that reason I am convinced this research about Thales' Capital Process gave me a lot of research experience and I find its performing interesting. Unfortunately, due to the restricted time period of this research not all the processes of the Capital Process could be included in this research.

I would like to express my gratitude towards Thales that offered me the chance to do my research. For their help and support, I would like to thank several persons. Most important, my supervisor T. Hondebrink for his guidance, advice, and comments. Furthermore I would like to thank the staff of Thales who helped me with my research.

From the University of Twente I would like to thank my supervisor H. Kroon for his advice, comments, and feedback during the period of my research and writing this thesis. I would also like to express my gratitude towards my second supervisor B. Roorda.

Last but not least, I would also like to thank my family and friends for their support during my research period at Thales.

Hengelo (ov), The Netherlands
June 2013

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Abstract

The origin of this research arises from Thales' unfinished intention of streamlining its Capital Process. Thales experiences possibilities to improve its capital expenditure process and wishes to investigate the possibilities to improve the Capital Process.

Preliminary investigation of the Capital Process is done by obtaining the prescribed workflow from the system of accounting and internal controls. Based on this workflow the performed actions on the work floor were analysed by means of conversations with involved staff[1].

By the realization of investments in fixed assets, it can be stated that the capital expenditure process is effective. However, process analysis and the input of staff revealed opportunities for improvement of its efficiency. Process analysis and the contribution of involved staff made clear that the process can be more efficient.

Thales perspective of the Capital Process is a fully integrated capital expenditure process in its Enterprise Resource Planning system[2] Oracle, wherein this research provides the first steps to accomplish this perspective. Two main recommendations are made to accomplish the first improvement of the process: (1) introducing a digitalized capital expenditure process with standardized request- and disposal-forms; and (2) providing a total overview of the tasks and responsibilities of the staff involved in the Capital Process. The introducing of a digitalized capital expenditure process is done by describing the system requirements. Such requirements ranges from (reminder) milestones that must stimulate or ensure actions to be performed to describing the tasks and responsibilities of involved staff in the capital expenditure process. In line with the last mentioned, is the second main recommendation of providing a total overview of the tasks and responsibilities of the involved staff in the Capital Process. It contributes to the improvement of the Capital Process by (re-)introducing work instructions and supports the introduction of the new digital capital expenditure environment.

The above mentioned main recommendations fulfil the first steps towards a fully in Oracle integrated capital expenditure process. Realization of a fully integrated process cannot be achieved until Thales performs all Capital Process linked processes in Oracle-modules, therefore this research came up with compromise that can function as handhold for the future fully integration improvement.

Besides the two main recommendations that improve the Capital Process efficiency, research findings showed other opportunities for improvement. These recommendations do not influence the process efficiency directly but are worth considering.

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[1] Their words are verified by colleagues of other business units, because they are independent and could provide an honest and reliable verification.

[2] *"An Enterprise Resource Planning system is a suite of integrated software applications used to manage transactions through company-wide business processes, by using a common database, standard procedures and data sharing between and within functional areas"* (Aloini, Dulmin, & Mininno, 2012, p. 183).

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1   Introduction of the research framework

This chapter provides an introduction of this thesis by describing the research framework. The first section will describe the contract granting organization, specified towards the ramification that has the responsibility of managing the Capital Process. The second section describes the research and the third mentions its occasion in general.

1.1   Contract granting organization

The Thales Group is a world player operating in several markets i.e. air traffic, space travel, civil safety, defence, and it has over 68,000 employees divided over more than 50 countries worldwide.

Thales Nederland is part of the international Thales Group and has branches in Hengelo (headquarter), Enschede, Huizen, Eindhoven, and Delft. Its sales in 2012 went down to € 404 million, which is a decrease of 16,5% compared to 2011[3]. More than 75% of its sales are due to export. Between 1,800 and 2,000 employees who are specialized in the design and production of professional electronica for defence and safety applications like radar and communication systems, are employed by Thales Nederland[4]. Thales Nederland BV began in 1922 as NV Hazemeyer's Fabriek van Signaalapparaten. The company had several names throughout its existence caused by buys and sells of most of the shares and a restart after World War II. From NV Hazemeyer's Fabriek van Signaalapparaten, Hollandse Signaalapparaten, and Thomson CSF Signaal, Thales Nederland got its current name in the year 2000.

Throughout history Thales Nederland has built up a trustworthy reputation if it comes to technological lead and highly qualitative products. On the market of radar systems used on marine ships it is even market leader. Logically Thales Nederland delivers the equipment itself, including all hard- and software for the control of the weapon systems. Also the integration of all other systems on board is part of the services Thales Nederland offers, creating an overall view of that what happens in and around the ship. To maintain its position in the market and perform the way it does now, Thales Nederland keeps investing in its Research & Development trajectories.

The headquarter of Thales Nederland is located in Hengelo[5] and has five domains: (1) Corporate; (2) Naval; (3) Real Estate; (4) Sensors; and (5) Thales Research & Technology. The domains are divided in business units, where this thesis only mentions those that are covered in this research. BU Surface Radar (domain Sensors), develops and builds radar equipment for the defence market. BU Thales Real Estate-BV (domain Real Estate), rents space (per square) meter to the other business units. BU Thales Research & Technology (domain Thales Research & Technology), is operative on the research and development of technologies. BU Thales Corporate (domain Corporate), is active on the general operations of Thales. A department of BU Thales Corporate is Information Systems Department (ISD), which is the ICT support of Thales and provides IT equipment.

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[3] Thales Annual Rapport 2012.
[4] Corporate presentation of Thales Nederland BV (15th of October 2012).
[5] In this thesis will be referred to the headquarter of Thales Nederland by mentioning Thales.

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Besides the mentioned business units, Thales also has the supportive staff department (Van Dam & Marcus, 2005) Corporate Shared Services Thales Nederland. A department of Corporate Shared Services Thales Nederland is Finance, which monitors, controls, and administers the financial activities of Thales. Accounting & Reporting is part of the department Finance and consists of four departments: (1) Accounting; (2) Accounts payable; (3) Contracts & Programs; and (4) Payroll. Included in appendix A is the flowchart of Thales' organizational structure like described above.

The third mentioned department, Contracts & Programs, is responsible for the data quality in Thales' Enterprise Resource Planning system Oracle and the consistency between data in the different financial systems. The duties of the Contracts & Programs department start at the moment Thales receives a new or supplementary order of a customer, wherein it makes record of the contract substantial in Oracle, advices the business units concerning the ideal design of program structures, and registers the project. This last duty contains the data entering of the projects' task structure, budgets, billing structure, and revenues milestones. (Thales Intranet).

1.2   Research of the Capital Process

This research is related to the improvement of Thales' Capital Process and it contains the request for capital expenditure, in combination with its authorization, effectuation, finishing, and monitoring. This research will localize the constraints (Goldratt & Cox, 2004) in the process by performing a process analysis and investigating possible contributions of involved staff. The founded gaps will be interpret by a combination of literature research and my gained knowledge at Saxion and the University of Twente, resulting in a guide that enables Thales to smoothen the Capital Process operating.

Process analysis is a fuzzy understanding and therefore it needs to be clarified. In this research the estimation is made that the workflow of the Capital Process as prescribed by Thales' system of accounting and internal controls (Chorus 2) does not give a representative view of the performed process. Therefore a process analysis is conducted to compare the prescribed workflow with the performed actions on the work floor. This analysis investigates the performed actions in the Capital Process and compares the findings with the actions that should be performed according to the system of accounting and internal controls. Chapter 3 describes the performed process analysis and its findings in further detail.

A final remark must be made about the involvement of the system of accounting and internal controls. The goal of this research is the localization of constraints in the Capital Process, interpret these constraints, and by that providing the required instructions to improve the process. Therefore this research does not further test or investigate the system of accounting and internal controls' involvement in data- or systematic approaches of control (Van Vlaenderen, 2002; Westra & Mooijekind, 2002).

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1.3   Origin of the research

Thales wants to have its Capital Process analysed and improved. The recommended alternatives for improvement have to fulfil the guidelines of Chorus 2, as it is the precondition of this research. The Capital Process achieves the desirable results of authorized capital expenditures being realized (effective), but nonetheless possibilities to smoothen the process operating exist (efficiency). For a long amount of time the intention exists of streamlining this process, but it has never been successfully finished. This research is the result of that unfinished intention and its outcome in the form of recommendations and instructions enables Thales to improve its Capital Process.

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2 Research design

This chapter is dedicated to the chosen framework for this research. The problem statement and definition are mentioned in the first section. Section 2.2 defines the main research question and also enumerates the sub-questions. The explanation of the chosen methodology is described in the third section and also contains a literary basis of the methodology. The last section describes the structure of this thesis.

2.1 Problem statement and definition

Thales sees possibilities for improving its Capital Process. The capital expenditure request, authorization, effectuation, finishing, and monitoring all together form Thales' Capital Process. The process is operating and achieves the desirable results, but experiences of involved staff suggest the operating could be more efficient.

Recently Thales undertook actions for streamlining its Capital Process, but these have never been completed. Also, the process must fulfil the guidelines of the system of accounting and internal controls (Chorus 2). A system of accounting and internal controls forces an organization to consider to what extent the processes are clearly described (Leijnse, 2006). The workflow and arrangements should be digitally available or on paper and it must be provided towards the staff. The staff on the other hand is expected to know about the workflow and its arrangements.

Observations indicate the existence of possible process improvements. Based on this awareness Thales saw the opportunity to investigate its Capital Process. The expectations of Thales consist of an overview of the possibilities for improving its Capital Process and the instructions to realize the implementation and improvement.

The research started by investigating Thales as organization and the Capital Process in general. In case of the Capital Process, the prescribed workflow obtained from the system of accounting and internal controls is used. By following the prescribed actions one by one the overall picture of the performed actions in the Capital Process became solid. The comparison between the prescribed and performed actions resulted in an overview of the constraints in the process and is defined in the chapter Capital Process (chapter 3). A literature review is included in the chapter after that to analyse the constraints that are found and which could be of use to localize other constraints. Besides the literature review, the research input of the involved staff in the Capital Process is taken into account for the same reason. The literature is also of use by valuating this input.

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The findings of the process analysis combined with the input of staff members and literature review, made clear that the bookings and journal entries also had to be analysed. This resulted in some findings that indicated possible improvement opportunities. These alternatives are further explained in the chapter that is dedicated to the recommendations (chapter 7).

Thales is interested in improving the Capital Process operating, which must be guided by change instructions. That chapter describes the recommended alternatives that are the result of the Capital Process research. Based on theoretical background, advices are described and further explained. Recommendations and their implementation (chapter 7) enumerates the actions Thales has to perform in order to improve its Capital Process and make the process more efficient and transparent.

The last chapter of this thesis contains a summary of the research findings by mentioning the conclusions of the research. It provides the answers on the sub-questions and main research question. The restrictions and advices for further research are also described in that chapter.

The goal of this research is to compose a plan of improvement that Thales could use to improve and smooth the Capital Process operating. Due to the time limitation of this research, delimiting choices have been made in consultation with the supervisors of Thales and the University of Twente, T. Hondebrink and H. Kroon respectively.

2.2   Research questions

The following main research question is formulated for this research: *'What are the constraints of Thales' Capital Process and what responses does Thales have to undertake in order to improve the process efficiency in compliance with the system of accounting and internal controls (Chorus 2) and maintain its goal congruence?'*.

In order to create an unambiguous understanding of what is meant by the main research question, some of the concepts will be further explained by conceptualization. Babbie (2010) endorses conceptualization and describes it as: *"the mental process whereby fuzzy and imprecise notions (concepts) are made more specific and precise"* (p. 127). The constraints of Thales' Capital Process that are localized by process analysis and/or research input of involved staff, are those activities that slow down the process operating. Goldratt and Cox (2004) came up with the Theory of Constraints wherein the approximation approach of this research is derived. *Improving efficiency* will be achieved by introducing changed methods of process operating or recommend alternatives to solve or at least reduce the localized constraints. The in this thesis recommended alternatives have to be *in compliance with Chorus 2*, Thales' system of accounting and internal controls. By *maintaining its goal congruence*, the prevention of losing sight on realizing capital expenditure is meant.

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In order to be able to answer the main research question, six sub-questions are formulated to provide the required information.

➢ *How is the framework of the Capital Process structured and is the process actually performed as prescribed?*

➢ *Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?*

➢ *What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?*

➢ *What suggestions does the involved staff of the Capital Process have as a contribution to this research and how can this be reflected with the available literature?*

➢ *How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales' accounting policy?*

➢ *What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?*

2.3 Research methodology

This research has a design-oriented methodology and its form is specifically chosen. This section explains this further.

2.3.1 Research framework

In the problem statement is already described that the units of analysis in this research is Thales' Capital Process (Babbie, 2010; Yin, 2009), wherein the process belongs to the Finance department. In order to realize a plan of improvement, the Capital Process has to be analysed first to understand how it is operating at the moment. Or, in the words of Peecher, Schwartz, and Solomon (2007, p. 469): *"One cannot judge the fairness of a representation of a business state without an understanding of the business state"*. After the analysis has given the knowledge of the Capital Process current operating, literature could provide alternatives for improvement. This kind of research is commonly known as a design-oriented research (Van Aken, 2004; Van Aken, Berends, & Van der Bij, 2007; Verhoeven, 2007; Verdouw, Beulens, Trienekens, & Wolfert, 2010; Visscher, n.d.) and serves a descriptive purpose (Babbie, 2010; Yin, 1981, 2009). According to Leijnse (2006) the described purpose is known as due diligence research.

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Based on the goal of this research, the focus is on business problem-solving (Van Aken, 2004; Van Aken et al., 2007; Visscher, n.d.). Compared to the in figure 2.1 illustrated regulative cycle of Van Strien (1997), this research concentrates on the phases: problem definition, analysis and diagnosis, and plan of action. Thales experiences a problem mess and this thesis will define the problem. An analysis will be performed and the diagnosis will be reported. The last part of this research is the plan of action-phase, which consists of recommendations and instructions to realize improvement of the Capital Process. Thales should be able to smoothen its Capital Process
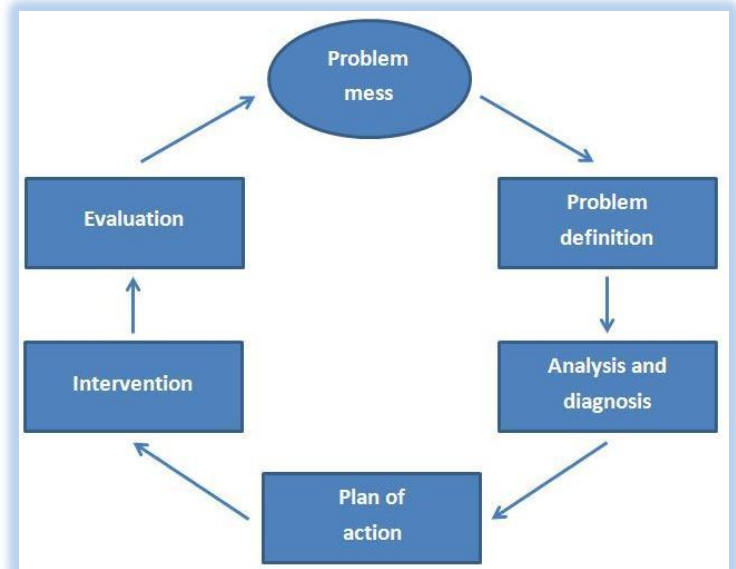
Figure 2.1 - Regulative cycle (Van Strien, 1997)

operating by using these instructions, which are constructed by process analysis and interviews held with the staff working in the process flow (primary data). Combined with a literature review it fulfils the call of Yin's (1981, 2009) chain of evidence to overall findings and conclusions. The above mentioned framework is in line with the practice theory, wherein the study of organizational phenomena is described (Feldman & Orlikowski, 2011).

In conjunction with the described method above, Den Hertog (1988) experienced a lack in literature research on the methods for performing design-oriented researches in organizations. In order to solve business problems, Den Hertog (1988) mentions to make use of the in figure 2.2 illustrated knowledge cycle. Business problem-solving based on the knowledge cycle makes use of general theory and knowledge to change the current operating towards the required situation.

In conclusion can be stated that this research is the result of a problem mess and focuses on business problem-solving. By the use of general literature and knowledge as described in Den Hertog's (1988) knowledge cycle this research will result
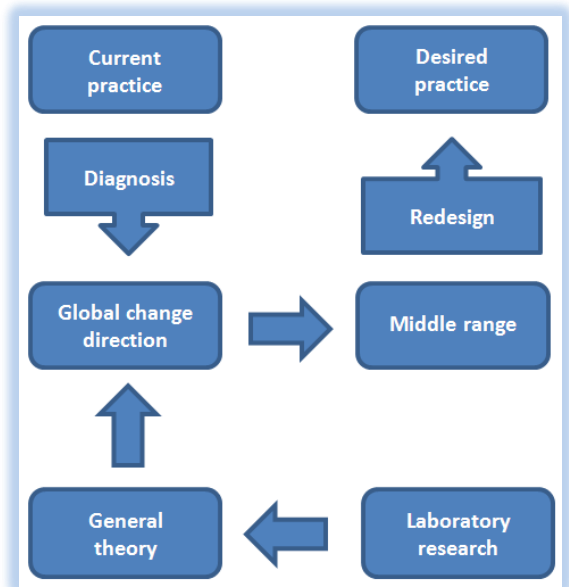
Figure 2.2 - Knowledge cycle (Den Hertog, 1988)

in a well-founded guide of recommendations and instructions to react on the experienced problem mess and resolve it. This research has a design-oriented character and is commonly known as due diligence research.

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2.3.2   Answering research questions

This sub-section describes the underlying methods for answering the research questions. The first sub-question of this research is formulated as '*How is the framework of the Capital Process structured and is the process actually performed as prescribed?*' and can be answered by performing a process analysis. A process analysis is commonly known as a case-oriented analysis, wherein its aim is to understand the process by looking closely at the details (Babbie, 2010). Organizations need to strengthen their processes to remain viable in a competitive environment, just as any organism has to do. The qualitative and quantitative information accessed by process analysis enables the organization to make decisions and take action in order to remain viable. (Clarke, 1990). Several authors, like Günther, Rinderle-Ma, Reichert, Van der Aalst, and Recker (2008), Hevner, March, Park, and Ram (2004), and Meyer, Tsui, and Hinings (1993), mention the importance of the process design for receiving valuable knowledge about the process, in where they agree with Clarke (1990). Therefore, process analysis can be seen as building theory (Ravenswood, 2010) and serves the organization by the ability to improve its operating (Babbie, 2010; Clarke, 1990; Günther et al., 2008; Hayes, 2010; Hevner et al., 2004; Van Aken, 2004; Van Aken et al., 2007; Van Dam & Marcus, 2005).

The second sub-question, '*Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?*', can also be answered due to the above described process analysis. However, the possibility exists that the process analysis only answers that sub-question partly because the analysis could unconsciously overlook constraints. For that reason two other sub-questions are formulated and covered in separate chapters. That first sub-question, '*What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?*', indicates the possibility of other insights due to literature review. With regard to the introduction of Thales' perspectives, these are already defined in the appointment where the description of this research was explained[6]. However, the possibility exists that the process analysis extents these perspectives. For that reason Thales' perspectives of its Capital Process are formulated and considered in this research. The other sub-question is '*What suggestions does the involved staff of the Capital Process have as contribution to this research and how can this be reflected with the available literature?*', and is formulated in the estimation that a researcher being confronted with a specific problem mess lacks on the know-how of the process and everything around it. In 't Veld, Slatius, and In 't Veld (2007) mention the missing knowledge of students and recommend to ensure the process has a steady state character wherein the students conceptualize the research. Hoskins and White (2013, p. 181) warn student researchers: "*…it is not possible to really know or understand another without wholeheartedly learning in*". In order to fulfil the completeness of this research the knowledge and experience of the involved staff is therefore included.

Holding interviews with the Thales staff that have a role in the Capital Process is chosen in order to avoid the problem of not obtaining the required knowledge of the situation. Such interviews are an alternative method of a survey research. The interviews held for this kind of research are known under the name of qualitative interviews, because the respondents do most of the talking about the topics

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[6] This meeting at Thales was on the 10th of December 2012.

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covered by the interviewer (Babbie, 2010). Several authors e.g. Filios (1985), Grit (2000), In 't Veld et al. (2007), Visscher (n.d.), and Yin (1981, 2009) corroborate the value of staff experience in a design-oriented research. Those who are involved in the Capital Process for a long time, have the know-how of its operating and occurring constraints. Besides their knowledge they could also come up with ideas for improvement, based on their years of experience. Holding interviews with these employees leads to valuable data that could be useful in creating a plan of improvement or serves as link in constructing a literature framework. Chapter 5, Research contribution of the staff, is dedicated to the contribution brought into this research by the staff of Thales. It summarizes the most important information which is of relevance in this research.

The findings of both the process analysis as well as the input of the involved staff have to be verified by literature review in order to fulfil the research's accuracy and completeness. The goal of this research is to come up with recommendations and instructions that guide Thales to improve the efficiency of its Capital Process. The described recommended alternatives therefore have to fulfil the call for a chain of evidence (Yin, 1981, 2009). A literature review will be performed after the Capital Process analysis and the interviews held with the staff. This literature review is needed to provide a comprehensive overview, place all information into perspective, and verify the improvement alternatives (Green, Johnson, & Adams, 2006; Yin, 2009). We can define three varieties of literature review: (1) narrative; (2) qualitative systematic; and (3) quantitative systematic[7]. Despite the varieties, all valuable and accessible literature for this research will be used. In the end this could result in a combination of all three kinds. However, Wu, Aylward, Roberts, and Evans (2012) mention that finding suitable literature can be hard if the index terms of different search engines are not in line. The purpose of the literature review is to substantiate alternatives for improvement. The advice of Van Dam and Marcus (2005) to find or develop a larger amount of alternatives for valuation rather than start with the first (developed) alternative, will be kept in mind.

The Capital Process analysis and the input of involved staff brought up the requirement for further depth on the account justification of some findings, because the findings with regard to depreciations, budget exceeding, and costs could not be clarified by the words of the staff only. In case of completeness of this research the accounting methods and journal entries had to be analysed. Therefore the following research sub-question is formulated: *'How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales's accounting policy?'*. Like experienced in this research and confirmed by the research of Debreceny and Gray (2010), there is almost no research literature available on the data mining of journal entries. The same authors give the following reason for this lack in literature: *"...firms are deploying data mining technology, but what they are doing is proprietary and, as such, rarely gets published for public consumption"* (Debreceny & Gray, 2010, p. 158). While their research focuses on the fraud detection of journal entries that does not cover the purpose of this research, it does mention theoretical background that could be useful. Insofar does this

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[7] See Green et al. (2006).

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research sub-question focus on a Thales-specific situation, which requires the use of Den Hertog's (1988) knowledge cycle again.

Like described before, the goal of this research is to provide recommendations and instructions to improve the Capital Process operating. Therefore this thesis must serve as a guideline for Thales to improve its efficiency. The process analysis, input of involved staff, and literature review will provide the required information to construct this guideline. Its purpose is to expose the constraints of the Capital Process and clarify the required activities or actions in order to resolve these constraints. The recommended alternatives should have a positive effect on the Capital Process operating efficiency. The recommended alternatives for improvement can therefore be seen as a theory that must be falsifiable by auditing (Popper, 1983). By that, the last formulated sub-question of this research will be answered: *'What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?'*.

If all sub-questions of the research can be answered and are also well-founded by literature and/or intern knowledge of the staff and researcher, the main research question can be answered: *'What are the constraints of Thales' Capital Process and what responses does Thales have to undertake in order to improve the process efficiency in compliance with the system of accounting and internal controls (Chorus 2) and maintain its goal congruence?'*.

2.4 Thesis structure

The first chapter of this thesis serves as the introduction of this research. The following chapter gives a brief description of the research and the definition of the problem. The explanation of the chosen methodology as well as the main research question and its sub-questions are described in chapter 2 also. Chapter 3 focuses on the analysis of the Capital Process and must provide the information to answer the sub-questions *'How is the framework of the Capital Process structured and is the process actually performed as prescribed?'* and *'Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?'*. This chapter mentions the prescribed workflow and the performed actions on the work floor and compares the two by mentioning the differences. In conjunction with chapter 3, the following chapter formulates Thales' perspectives with regard to the Capital Process and provides a literature framework. This chapter must serve as the endorsement of the findings and could possibly provide other insights of improvements. The research sub-question of this chapter is formulated as: *'What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?'*. The following chapter is dedicated to the research contribution of the Thales staff. Their insights for improvements and the valuation of alternatives by available literature are discussed, thereby providing the required information to answer the research sub-question *'What suggestions does the involved staff of the Capital Process have as a contribution to this research and how can this be reflected with the available literature?'*. The focus on journal entries with regard to the Capital Process is included in chapter 6. In

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order to give an answer on the sub-question *'How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales' accounting policy?'*, depreciations, budget exceeding, and the costs of projects will be explained. The last chapter of the research framework contains Thales' guideline to improve its Capital Process. Based on the findings in this research recommended alternatives and instructions to accomplish improvement of the Capital Process are described. This chapter answers the last formulated sub-question of this research: *'What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?'*.

After these chapters, the main research question, *'What are the constraints of Thales' Capital Process and what responses does Thales have to undertake in order to improve the process efficiency in compliance with the system of accounting and internal controls (Chorus 2) and maintain its goal congruence?'*, will be answered in the conclusion. Also described in this last chapter are the research restrictions and advices for future research.

The glossary, appendixes, and bibliography cover the last pages of this thesis.

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3   Capital Process analysis

The Capital Process will be further explained in this chapter. Its main content will be the first sub-question of this research: *'How is the framework of the Capital Process structured and is the process actually performed as prescribed?'*. The analysis of the Capital Process will also localize constraints in the process, thereby providing input to answer the second formulated sub-question: *'Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?'*.

The first section consists of an introduction of the process analysis by describing general and relevant information to obtain an overall view before the research focusses on the details. The actual process as performed on the work floor is described in the second section, whereby it makes use of the workflow as prescribed by Chorus 2. Section 3.3 compares the prescribed workflow with the performed actions on the work floor and discusses the differences. The section also recommends several corrections in the workflows.

3.1   Introduction

The capital expenditure request, authorization, effectuation, finishing, and monitoring all together form Thales' Capital Process. It belongs to the primary processes of Thales according to Van Dam and Marcus (2005). Thales' Accounting Standards and Procedures Manual[8] defines capital expenditure as a property, plant, or equipment that is expected to be used during more than one period and is held by an enterprise for use in the production or supply of goods or services, for rental to others, or for administrative purpose. According to Chorus 2, the Capital Process consists of two main processes: (1) create capital expenditure; and (2) manage capital expenditure. Appendix B contains the Capital Process-workflow as included in Chorus 2[9]. Appendix B.2 shows another process flow i.e. disposal capital expenditure, which is applicable if the capital expenditure request (asset) is a substitute of another asset or an asset is no longer used. Most of the time the asset serves as substitute and the disposal-flow will be part of the create capital expenditure process. Figure 3.1 illustrates the overview of the capital expenditure.

Figure 3.1 - *Capital expenditure overview*

Thales has five domains i.e. Corporate, Naval, Real Estate, Sensors, and Thales Research & Technology, in which its business units can request for a capital expenditure. The multiyear budget ensures the business units to choose only those capital expenditures that have their highest priority. Because this research does not focus on the budgets in general nor their creation, only the conflict between budget and the capital expenditure request will be described.

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[8] Obtained from Thales Intranet (Thales Group, Controlling).
[9] Obtained from Livelink. Create capital expenditure and manage capital expenditure are appendixes B.1 and B.3 respectively.

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During August/September the Business Unit/Line Controller (Controller) of the business unit's finance department, asks the heads of the departments (Budget Holders) for their capital expenditure forecast. The Budget Holders collect and summarize all the forecasted necessary items and report it to the Controller. The Controller compares the requests with the budget and asks the Budget Holders to rank the requests and make decisions based on the budget. On a monthly basis the Business Unit/Line Director (BU Director) reports the remaining budget to the Controller allowing him to negotiate with the Budget Holders.

This section does not explain the above described process in further detail, because the following section investigates the actual workflow and the section after that compares both prescribed and actual workflow with each other.

3.2   Workflow on the work floor

By following the phases in the Capital Process a comparison can be made between the process on paper and how it is actually performed. As mentioned by Yin (2009, p. 141): *"To 'explain' a phenomenon is to stipulate a presumed set of causal links about it, or 'how' or 'why' something happened"*. This process flow analysis provides the basis for possible improvements.

A brief description of the performed process on the work floor will be given below. All described phases are explained by illustrating the part of the workflow that the text refers to. Figure 3.9 on page 26 of this thesis illustrates the create capital expenditure-workflow. Because of the A3-layout of page 26, the figure can be viewed while reading the described workflow in this thesis. A smaller illustration of the workflow will return in all sub-sections, indicating the phase in the process by red marking.

However, there are some remarks that have to be made also. The first remark regards to the context of sub-section 3.2.1 where it should be noticed that this research does not focus on the establishment of capital expenditure requirements and will therefore not be described in detail. Secondly, the described disposal process in sub-section 3.2.3 is a separate process and mostly comes along with the capital expenditure request. Finally, manage capital expenditure (sub-section 3.2.8) is divided in a monthly and yearly action. The prescribed workflow is based on the yearly duty of managing the capital expenditure, but Thales made an additional choice by performing a phase of the process on a monthly basis.

In case of the completeness of this thesis, the workflow is analysed by following the workflow phases in the process. Involved staff of the specific phase(s) described the performed actions, and after the whole process is written down on paper others have confirmed the correct interpretation of the words by the researcher. For that reason the input and interpretation can assumed to be complete.

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3.2.1 Preparing capital expenditure request

When staff of a department (requestor) require something that asks for a capital expenditure (e.g. building space, machinery, and ICT-equipment), they inform the head of their department (Budget Holder). The Budget Holder accepts or declines the idea of starting a request. If the idea is accepted the requestor starts with gathering the required information for filling in the request-form i.e. descriptive information, substantiation, information related to strategy of Thales, several costs, subsidies, depreciation category, et cetera. Appendix C includes the capital expenditure request-form[10]. After all the information is gathered (together), the requestor or the Budget Holder fills in the request-form by hand or computer.
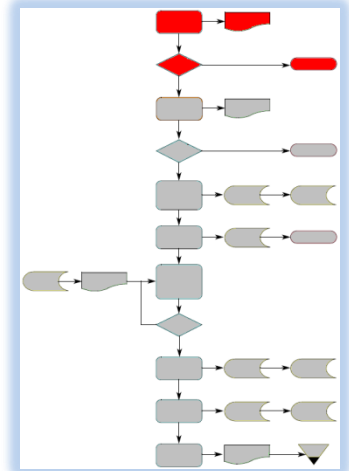
Figure 3.2 - *Preparing capital expenditure request*

3.2.2 Authorization

After the requestor has filled in the request-form, the next phase in the capital expenditure request consists of its authorization. The first authorizations are given by the Budget Holder, Controller, and BU Director. Chorus 2 prescribes the Chief Financial Officer (CFO) of Thales to authorize all capital expenditures. Thales does not deviate from this prescription and makes its CFO authorize all capital expenditure requests. After the CFO has authorized the request, the Contracts & Programs-Clerk (Projects Administrator) verifies if the request-form fulfils the demand of data he needs to perform his task. If the Projects Administrator notices missing data, he corresponds with the responsible person(s) i.e. requestor, Budget Holder, Controller, and authorizers, to obtain either the missing data or the required authorization. When the Projects Administrator is able to accept the request-form, the data can be entered into Oracle.
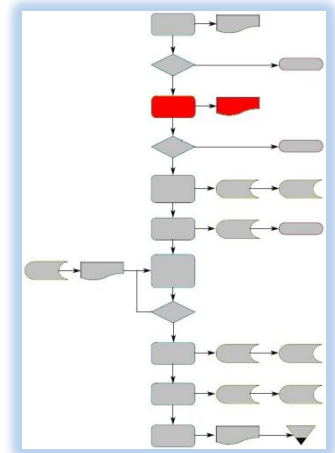
Figure 3.3 - *Request authorization*

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[10] Obtained from Thales Intranet (Finance; Forms & Presentations). This format is adapted by every business unit to contain only the relevant and required information of its requests i.e. appendixes and authorization cadres.

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3.2.3   Disposal

The introduction of this chapter already mentioned that the process of disposal capital expenditure stands on itself. There are two situations wherein the disposal-flow should occur: (1) an asset is of no longer use and it can be sold or must be demolished and destroyed; and (2) a new asset must replace another wherein the old can either be sold or has to be demolished and destroyed. In case of situation two, the disposal process has to be started if the authorization phase approved the disposal of the asset.

In contradiction with the situation mentioned first, the disposal process does occur if a new asset must replace another. The person filling in the capital expenditure request-form, uses the same form to indicate if disposal is preferred. The book value of the disposal asset is determined by the fixed assets journal

Figure 3.4 - *Asset disposal*

entry and will be filled in on the form by the requestor or Budget Holder. The disposal asset can be sold to a buying party, otherwise it will be demolished and destroyed[11]. Both alternatives will be described below, A) for selling the asset to a buying party, and B) for demolish and destroying the asset.

A. If a buying party can be found by the requestor, Budget Holder, or someone else, the selling price will be reviewed by the Controller and BU Director. If an agreement can be arranged, the buying party is asked to confirm its willingness to buy the asset. The department of Shipping & Receiving will prepare the sending of the asset, including the administration on the moment it receives the confirmation and billing from the Controller. Authorizing the disposal is the next phase and is comparable with the before mentioned authorization. The Fixed Assets-Clerk verifies if all the required signatures are present on the form before disposing the asset out of the Fixed Assets sub-Ledger in Oracle (sub-Ledger) and archive the administration. Sub-section 3.2.6 describes the settlement of fixed assets in further detail.

B. The Budget Holder will contact a third party to demolish and/or destroy the asset. The additional costs on the occasion of the asset handling (e.g. environmental, chemical waste, and man hours), will be charged directly to the financial result of the department. All information with regard to the demolishment and destroying must be mentioned on the form by the Budget Holder and authorized by the persons as described in the previous sub-section (3.2.2). The Fixed Assets-Clerk verifies if all the required signatures are present on the form before disposing the asset out of the sub-Ledger and archive the administration. Sub-section 3.2.6 describes the settlement of fixed assets in further detail.

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[11] As can be seen in appendix B.2.

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3.2.4   Oracle & start of purchasing

When the Projects Administrator is able to accept the request-form because the request contains all required data and the signatures of the authorizers, the data can be entered into Oracle. The Projects Administrator creates a 'project' with a unique number in Oracle to enter the information of the capital expenditure request-form. The project should contain all by the initiator of the request gathered data about the capital expenditure[12], although the Projects Administrator has to make description choices due to character limitations. After the project is created, the Projects Administrator informs both requestor and Budget Holder about the project being activated in Oracle and provides them the systematic given number of the project.

Figure 3.5 - Data entering & start of purchasing

After informed by the Projects Administrator, the requestor places a purchase order (requisition) in the Oracle module i-Procurement. The requisition will be picked up by the purchasing department after digital authorization by the authorizers. This digital approval workflow differs from the authorization mentioned earlier. Thales has recently accepted the changed Requisition Approval Rules, which are included in appendix D of this thesis. When the requisition is successfully gone through the approval flow, the purchasing department places a purchase order to acquire the necessary assets. If the assets are delivered by the supplier, this will be processed in Oracle. Because purchasing is independent of the Capital Process, this thesis does not mention the purchasing process in further detail.

3.2.5   Projects analysis

The requestor and Budget Holder are responsible for the project performance, while the finance department of the business unit is responsible for the projects analysis. The analysis of projects consists of the comparison between the actual costs i.e. invoices and expenses of the project, and the budget. The analysis is performed by using the interim results represented in the monthly provided Project Status Inquiry (PSI). This PSI is constructed by the Projects Administrator and consists of output from Oracle i.e. PA90, and WIP GL[13]. The financial department of the business unit uses the PSI to control the projects and instructs the Budget Holder to perform certain actions based on the findings. The possibility exists that the realized costs are higher than predicted in the budget. Several reasons could cause this difference (e.g. additional bookings of hours, increase of prices, inflation, taxes). If the capital expenditure exceeds the budget, there are three possibilities to overcome the difference. The first option is a check-up correction
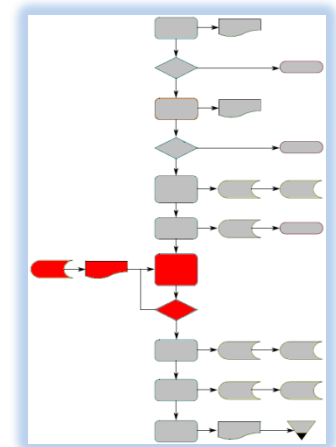
Figure 3.6 - Projects analysis

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[12] This includes the depreciation category, which will be described in the sub-section Fixed assets (3.2.6).

[13] The PA90 (Project Administration 90) is an overview of almost all projects containing data. The PA90 can be obtained from the Cognos-application in Oracle.
WIP GL (Work In Progress General Ledger) is an overview of all work in progress data of projects. The WIP GL can be obtained from the ADI-module (Applications Desktop Integrator) in Oracle.

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wherein bookings are transferred out of the project towards other projects, or the costs will be directly charged to the income statement of the relevant business unit. The request for a supplementary budget is the second possibility. Finally, the last reaction on the exceeding is an amendment of the budget. Section 6.3 will explain the budget exceeding in further detail. All three options in reaction of budget exceeding have to be authorized by the authorizing staff as described before in sub-section 3.2.2.

In conjunction with the progress analysis of the projects does the Controller inform the Projects Administrator which costs can be capitalized. It is part of the Projects Administrator's job description to prepare the capitalization of assets.

In practice it appears that the above mentioned projects analysis is in most of the occasions performed by the Projects Administrator. When the Projects Administrator performs the projects analysis, he indicates which costs can be capitalized. The preparation of capitalization is based on experience with the cost flow of projects, wherein the Projects Administrator uses his own rules of thumb. An example is the 95%-rule: when ninety-five per cent of the budgeted costs are reached, the Controller is asked if the costs of the project can be capitalized. Another rule of this kind is corresponding with the Controller when projects are open for a longer amount of time than the Projects Administrator thinks should be normal. Other rules of thumb he uses for checking the performance of projects, is asking the Controller for a statement if the costs of projects exceed the budget by an amount of € 100,000 or the excess contains at least ten per cent of the budget. Appendix E illustrates a shortened overview of the costs specified to a project, which is used by the Projects Administrator to perform the above described analysis.

The Projects Administrator performing the projects analysis can be seen as a check if the Controller has done its task and informed the Projects Administrator about the possible actions he could undertake. However, one should be aware that this does not indicate that the Controller does not do his job well. This research only observed the Projects Administrator performing a specific task of the Controller.

3.2.6   Fixed assets

An asset or a part of its costs will be capitalized if these costs are solid and it is likely that no other costs will occur. Once a month the Projects Administrator activates the to-be-capitalized costs in the Projects-module after being informed by the Controller which assets or costs can be capitalized. By activating the costs, these become available to the Fixed Assets-Clerk in the sub-Ledger. The Projects Administrator prepares the capitalization, while the Fixed Assets-Clerk actually realizes the capitalization.

Figure 3.7 - Capitalization

However, a notification has to be made. Costs will not be prepared for capitalization before corresponding and negotiation with Controller and/or Budget Holder. Only when the Projects Administrator is granted by the Controller, the capitalization of assets will be performed.

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The Fixed Assets-Clerk checks the prepared administering of the depreciation and the values of the fixed assets. If the requestor made a mistake with regard to the depreciation categories and it is not detected in the authorization, the Fixed Assets-Clerk corrects these after corresponding with the Projects Administrator. The Fixed Assets-Clerk runs the data of the sub-Ledger, thereby capitalizing the assets and starting the depreciation in the General Ledger Assets (Ledger)[14].

The Fixed Assets-Clerk is responsible for capitalizing the fixed assets and the archive of the fixed assets administration. If new costs of an asset occur beyond expectations, these costs will be added to the already capitalized asset (costs). Thales makes use of accelerating depreciation to correct the values of these specific fixed assets.

3.2.7   Project closure

After the assets are capitalized by the Fixed Assets-Clerk, the Projects Administrator runs an Oracle-request to check if the assets are capitalized. Oracle demands the interface between preparing the capitalization of costs and the actual capitalization before a project can be closed. Eventually when the project and its administration are successfully finished, the Controller informs the Projects Administrator to close the project. After the project is closed in Oracle, the Projects Administrator administers the data and archives these.
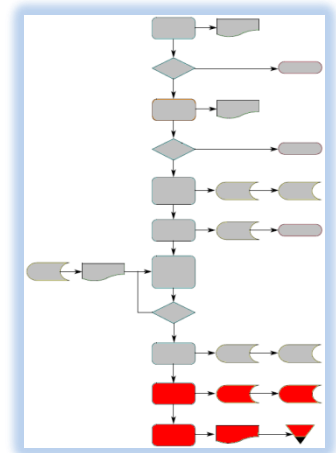
Figure 3.8 - Project closure

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[14] The General Ledger Assets is a module in Oracle which is linked to Thales' balance and serves as balancing item. The sub-Ledger is used to adapt or correct the values in the General Ledger Assets.

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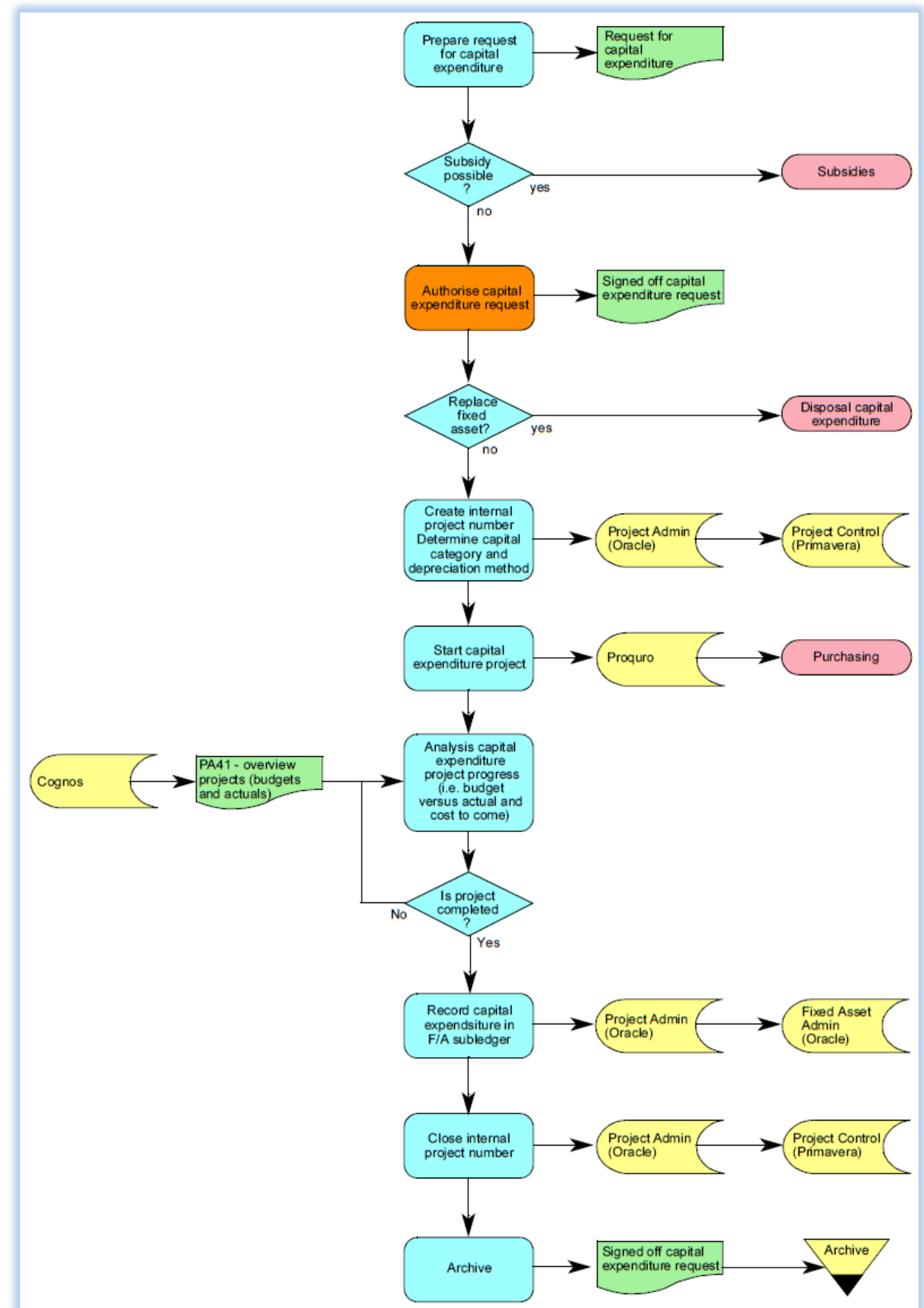
Figure 3.9 - *Create capital expenditure-workflow*

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3.2.8   Manage capital expenditure

The last process in the Capital Process is managing the capital expenditure. The Chorus 2 workflow of this managing process is included in appendix B.3. There is some overlap with the performed activities of the Fixed Assets-Clerk.

On a monthly basis the Fixed Assets-Clerk checks if there are accelerating depreciations or asset documentations that are not administered yet. If this is the case, these will be processed in the sub-Ledger before a printout of the Fixed Assets Trial Balance is made. The printout will be compared to the administration overview of the fixed assets (Assets per Category). The Fixed Assets-Clerk authorizes the Assets per Category if the comparison shows no differences. If the Fixed Assets Trial Balance and Assets per Category do show differences, which is uncommon, the Fixed Assets-Clerk examines what has caused this. The correction will be made in negotiation with the Budget Holder of the department. The Finance & Accounting Manager is required to authorize the Assets per Category before the documentation will be archived by the Fixed Assets-Clerk.

Once a year the Fixed Assets-Clerk produces an overview of the fixed assets per department[15], which he provides to the Controller of the business unit. The Budget Holder checks if the overview is correct according to his believes, and if this is not the case he will have to prove what the condition of the relevant asset should be either sold, destroyed, not operating, or unknown. Any changes in the sub-Ledger must be substantiated by documentations (e.g. sending, selling, or disposal). The (revised) overview made by the Budget Holder has to be authorized by the Controller and the BU Director.
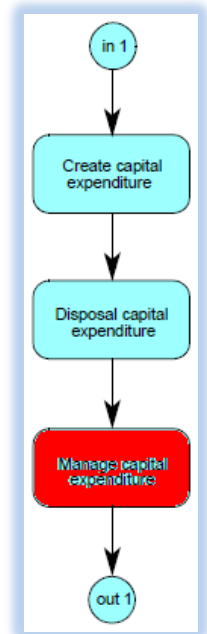
Figure 3.10 - *Manage capital expenditure*

3.3   Workflow comparison

This section compares the workflow of the Capital Process according to Chorus 2 with the performed actions on the work floor as described in the previous section. The structure of this section can be compared with the previous one wherein the differences are named by process phase. Those phases that are not mentioned in this section show no difference between the prescribed workflow and actual performed actions on the work floor.

Exception is the last sub-section (3.3.5) which enumerates the general findings of the constraints in the Capital Process.

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[15] The overview of the fixed assets per department is also used in the establishment of the multiyear budget.

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3.3.1 Disposal-phase (create capital expenditure)

The prescribed workflow of the capital expenditure request shows a link towards the disposal of capital expenditure if the requested asset must replace another. According to the workflow, the disposal process is not part of the create capital expenditure process and starts from a phase of that same process. This is partly correct, because the disposal of capital expenditure is an individual process and therefore cannot include the phases that contain the creation of assets. For that reason the lack in the current workflow is the discontinuation of the process after disposal of capital expenditure occurs. The workflow has to be changed at the point that the asset must replace another. Like illustrated in the proposition part of figure 3.11, does the create capital expenditure process continue and should the disposal capital expenditure be started.

With regard to the process of disposal capital expenditure, it is prescribed to fill in a disposal-form. The current form and the way it is used, can be further improved.
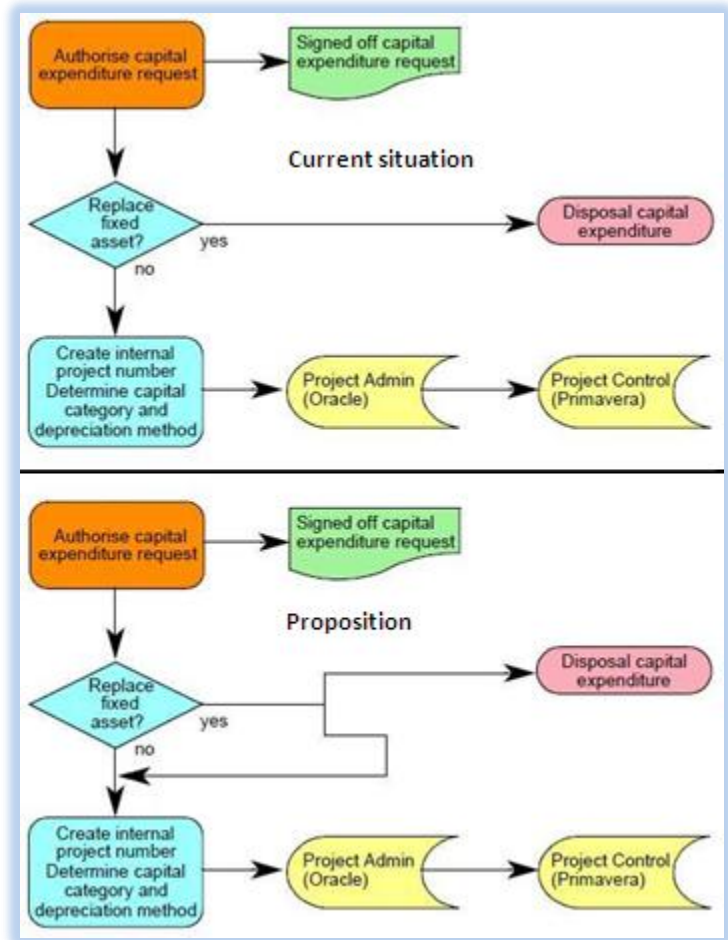
Figure 3.11 - *Change proposal in create capital expenditure-workflow*

3.3.2 Projects analysis-phase (create capital expenditure)

The prescribed workflow indicates that the Controller has the responsibility to compare the actual costs with the budgeted perspectives. Based on the PA41[16] the Controller can indicate which Budget Holder has to make a statement about the performance of projects he has to control. If necessary the Controller has to inform the Projects Administrator about the costs of these projects that can be prepared for capitalization. In practice the comparison of budget and actual costs is done by the Projects Administrator.

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[16] The PA41 (Project Administration 41) is an overview of projects containing data like: accumulated costs, responsible persons, dates, and inscriptions. The PA41 can be obtained from the Cognos-application in Oracle.

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Also prescribed in the workflow is the Projects Administrator who should be informed by the Controller when a project can be closed. In practice the Projects Administrator often asks the Controller if a project can be closed based on his performed analysis.

3.3.3 Correct asset differences-phase (manage capital expenditure)

The prescribed workflow implies a continuous flow, which in practice is split up in a monthly comparison of the Fixed Assets Trial Balance with the Assets per Category and a yearly departmental check of the assets' presence and its status[17]. Insofar this separation does not appear from the workflow and does not have to be shown.

3.3.4 Corrections in workflow designations

As mentioned earlier, some designations in the workflows are not up-to-date and it is admired to use the actual designations. In this sub-section the required corrections of the designations are summarized per workflow.

3.3.5 Enumerating general findings of process analysis

This sub-section enumerates the general findings of the Capital Process analysis. In the first place, these findings will only be mentioned. The well-founded recommendations will be discussed in chapter 7. Figure 3.12 illustrates the discussed phases in the capital expenditure process.

1) The requestor or Budget Holder is able to start a capital expenditure request. In the current approval flow both requestor and Budget Holder are required to authorize the request. We may assume that it is unnecessary to let individuals authorize their own work, therefore indicating both requestor and/or Budget Holder should not be part in the approval workflow. Other findings concerning the approval flow in general, it is time consuming due to its paper form (Slywotzky et al., 2000; Thirunaraya et al., 2005) and its progress is unknown until the request is authorized.

2) If the disposal process gets started, it appears that the process operating is not efficient.

3) When creating the capital expenditure request as a project in Oracle, the Projects Administrator experiences entering problems due to character limitations (Scott, 2011; Thirunaraya, Berkovich, & Sokol, 2005). These problems consist of creating a project name of up to thirty characters out of the descriptions in the request and finding the core meaning in that description which is out of the Projects
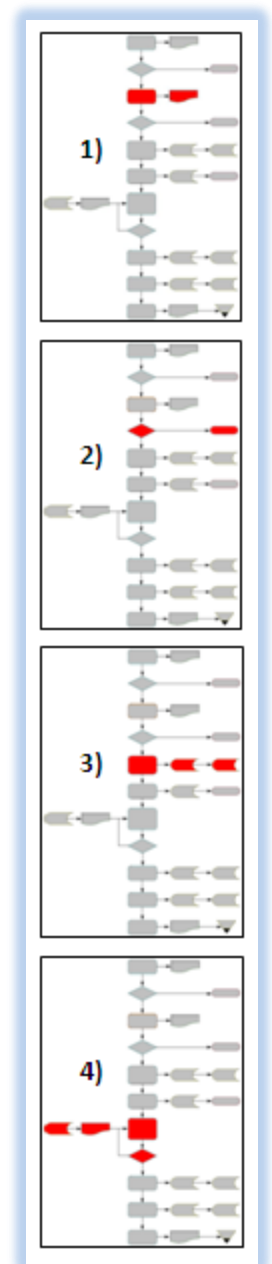
Figure 3.12 - *Findings in the phases*

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[17] These actions are described in sub-section 3.2.8.

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Administrator's educational field.

4) Most important finding in the projects analysis-phase is the analysis itself being performed by both the Projects Administrator and the Controller.

3.4 Conclusion

The goal of this chapter is to answer the first two sub-questions of this research, *'How is the framework of the Capital Process structured and is the process actually performed as prescribed?'* and *'Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?'*, by describing the workflow of the Capital Process and localizing its constraints.

This chapter compared the prescribed workflow of the system of accounting and internal controls with the performed actions on the work floor. It turns out that there are constraints in the process. The main findings of the process analysis were the inefficiency of the request authorization, entering limitations in Oracle, inefficient disposal process of capital expenditures, and projects analysis done both Projects Administrator and Controller.

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4   Perspectives and literature review

The research sub-question *'What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?'* will be answered in this chapter.

Thales' perspectives with regard to the Capital Process are explained in the first section. The second section includes a literature framework which is useful in two ways. Firstly, it can endorse findings in the process analysis and valuate input. Secondly, it could bring up possibilities for improvement that is useful later on in the research.

4.1   Perspectives

For organizations change is inevitable and serves as a comprehensive understanding of organizational life (Van de Ven & Poole, 1995). For that reason, and the experience of bottlenecks, the Capital Process can be improved. Goldratt and Cox (2004) define bottlenecks as the constraints that slow down the operating process. Although the Capital Process is build-up of phases which follow one another and thereby does not consist of a coherence of individual processes that could operate independently, solving constraints in the process is desired by Thales. The literature research about organizational change by Van de Ven and Poole (1995) gave four basic schools of thought, and these are illustrated in figure 4.1. If the basic schools of thought have to be applied on Thales' desire to smoothen its Capital Process, the change would be of a teleological nature. This is because the goal is to guide movement and by that improvement.
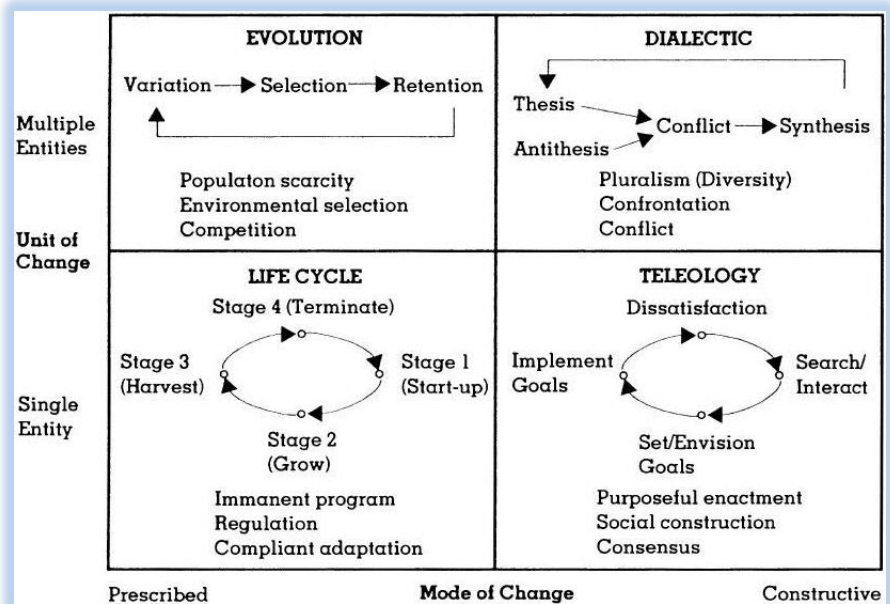
Figure 4.1 - *Process theories of organizational development and change (Van de Ven & Poole, 1995)*

Thales' intention is to integrate currently used applications in Oracle-modules. In the near future Thales wants to integrate its applications in Oracle, because its perspective is to use Oracle for all its processes.

Thales' perspective of this research is a guide that instructs the first step towards a fully in Oracle integrated Capital Process. Besides, it experiences constraints in the process and therefore sees opportunities for improvement. This research should therefore result in a guide that leads Thales towards a smoothened process wherein the functionality and operating of the Capital Process are improved. Included in this perspective is the awareness of the involved staff's responsibilities and the status of the process which can be monitored anytime throughout the process.

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4.2   Literature framework

In this section a literature review of a best practice with regard to the Capital Process is enumerated. However, it has to be noticed that literature research concludes there does not exist such a best practice approach (Kahn, Barczak, & Moss, 2006; Tidd, 2001; Visscher, n.d.). The literature explains that contingency theory[18] is based on best practice approaches, but also states that organizational structures do not fit best practice approaches. It is the other way around, best practice fits an organizational structure. This implies that a best practice approach of the Capital Process could demand a change in the organizational structure. Logically, a change in Thales' organizational structure is not desired in this research. Its goal is to improve the Capital Process operating that also fits the current organizational structure.

To accomplish improvement, change is preferred. Change is a subject of many researches wherein it knows several faces. The Capital Process (main process) can be divided into smaller processes i.e. capital expenditure request, authorization, effectuation, and monitoring. In 't Veld et al. (2007) recommend to think in smaller processes in order to improve the process as a whole. These smaller processes are the phases of the Capital Process, and for that reason they are separately clarified in sub-sections.

4.2.1   Capital expenditure request

This research will not focus on the establishment of the capital expenditure request, but rather picks up from the moment the capital expenditure request-form will be filled in. Because experts[19] fill in these forms and the Projects Administrator has to summarize the data due to data restrictions, there exists a chance others do not understand the full meaning of the context after the project is entered in Oracle. Sub-section 4.2.3 will discuss this topic in further detail. In general can be stated that the communication among staff is not maximal efficient. Thompson (2003) suggests stimulating the communication between staff, which can lead to insights by creativity. According to the author, creativity is a valuable necessity for change and development. In the end, the effectiveness of a process depends on all involved staff. Therefore staff should act like a dedicated group and all of them have responsibilities with regard to their activity in the process (Gibson & Birkinshaw, 2004; Kahn et al., 2006; O'Connor & DeMartino, 2006; O'Reilly & Tushman, 2004; Thompson, 2003). Although, Merchant and Van der Stede (2007) warn for motivational problems among staff and state that *"individuals are self-interested"* (p. 8). This conflict between agent and principal caused by self-interest is also known as the agency theory (Chong & Syarifuddin, 2010; Eisenhardt, 1989; Johnson & Droege, 2004).

Shin and Kim (2002) describe the inefficiency of business capital expenditures. They have proven that expenditures are far higher in the last quartile of a yearly budget than in other quartiles approximately. It appears that the budget is holding back capital expenditures in the beginning assuming that there is still a long period living on the budget, while at the end many capital expenditures are accepted because

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[18] See Meyer et al. (1993).
[19] The experts are employees with the knowledge and know-how of the required assets and describe this in the jargon of their functions.

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of the remaining budget. According to the same authors this leads to inefficient capital expenditures[20]. These findings imply possible improvements if it comes to decision making throughout the budget-period. Although, there is more that comes along with decision making like obedience pressure for example (Chong & Syarifuddin, 2010). The authors state that agents feel no responsibility for their performed actions, due to the fact that unfavourable consequences can be transferred back to the supervisor. The authors further mention the reputation of decision makers influencing the decisions. According to Heerkens (2006, p. 385) decision-making comes along with: *"…the assessing of the importance of attributes (characteristics that describe the alternatives from which the choice is to be made)"*.

The request process for capital expenditure is performed on a paper form and is included in appendix C of this thesis. The most frequently mentioned experience of the staff involved in the capital expenditure process, is the amount of time it takes before they are privileged to undertake actions. Their experience is acknowledged by Slywotzky, Morrison, and Weber (2000) and Thirunaraya et al. (2005). Additionally is the deficiency in the traceability of the form. With no feedback until the notification of acceptance of the request, the status of the process is unknown to everybody except for the one who has the form in his or her possession. The overall view of the request process implies indistinctness and in general it can be stated that there is a need for representative documentation. Wang, Yu, and Hailey (in press) found that electronic forms perform better than paper-based forms if it comes to administering of information. For Thales and its request process, digitalizing the request-form could help providing solutions for the experienced constraints. Although the research of Schleyer, Spallek, and Hernández (2007) warns for digital forms which could contain information partially. Their research find that standardized digital forms can restrict valuable information what is not the case with paper forms.

4.2.2   Authorization

"Information technology (IT) systems have conquered almost all of the world and our global economy has grown to be totally dependent on them" (Ashley, Vandenwauver, & Siebenlist, 2000, p. 1613). The authorization of the capital request is done on paper. Based on experiences[21] and literature study we may assume that digitalizing the authorization is a required improvement. In conjunction with digitalizing the capital expenditure request, several authors (e.g. Ashley et al., 2000; He et al., 2012; Liu, Wu, & Lee, 2004; and Pluimakers, 1988) have done research if it comes to the required structures in authorization workflows consisting of human and computing tasks. Such an authorization system also asks for a secure and safe digital environment, which can be ensured by several methods. Nilakanta

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[20] The findings of Shin and Kim (2002) are not applicable to Thales, as will be concluded in the performed capital expenditures-test included in section 8.2.
[21] Before interviews could be held, involved personnel advised to digitalize the authorization. The authorization on paper is outdated, as several personnel mentioned and I personally experienced in my BSc-graduation.

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(1989), Pérez, Bernabé, Calero, Clemente, Pérez, and Skarmeta (2011), and Ulltveit-Moe and Oleshchuk (2012) discuss several of these methods (e.g. accounts, and document structures).

Last point worth mentioning is the awareness of some publication dates of the above mentioned literature. IT is a fast changing world (Geels, 2002) and the industry is experiencing creative change (McGahan, 2004). This indicates that some of the discussed researches above could be outdated. Nonetheless could this literature be useful to indicate possible solutions.

4.2.3   Effectuation

In conjunction with the earlier discussed experts filling in the request-form for capital expenditure, the effectuation of the request in Oracle results in another limitation. The request-form consists of descriptions that are big in volume and contain jargon that could be unknown to none-experts. The project name therefore may result in a fuzzy reflection of what is originally meant by the expert. The Projects Administrator has to interpret the meaning of the asset and gives the project its definition according to the description of the expert. Scott (2011) links this task of the Projects Administrator to the thousand words metaphor[22]. In order to explain the required asset, the expert describes it in detail resulting in a description of thousand words. It is up to the Projects Administrator to summarize this data. Scott (2011) and Thirunaraya et al. (2005) both mention the difficulty of summarizing such data and provide approaches in their researches to overcome this issue.

4.2.4   Monitoring

Monitoring the Capital Process is done by the output of computer control systems, which is in line with IT auditing. Stoel, Havelka, and Merhout (2012) have conducted research about the importance of IT auditing and thereby improving the IT audit quality. Although the research of the authors concentrates on IT audits, it can also be useful across other types of audits. Blokdijk (2004) also agrees on the essence of technology in control systems, dividing it in general ICT controls (i.e. change controls and access controls) and application controls (i.e. programmed controls and user controls). The research is about the methods of internal control and focuses on the test of control by indicating their effectiveness. While audits are of importance, Chan and Vasarhelyi (2011) discuss the traditional auditing model and conclude that it is outdated. They mention the importance of continuous auditing to accomplish development of real time assurance. If the continuous auditing system of these authors does not produce any exceptional reports, it can be assumed that the information is free of material errors, omissions, and fraud. Although monitoring is based on the output of systems, Dobre, Vilsanoiu, and Turlea (2012) mention the importance of the audit team as the audit process is deeply influenced on the performers. A firm does not only require qualified individuals, but also wants *"…a proper estimation of the working time"* (Dobre, Vilsanoiu, & Turlea, 2012, p. 204). The authors therefore propose a multiple regression model based on ranks for determining the optimum number of hours to be involved on audit engagements.

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[22] 'A Picture is worth a thousand words'.

Alsop and Farrington (1998) mention performance improvement by process monitoring, documentation, and analysis, which is in line with In 't Veld et al. (2007). Most of the Capital Process monitoring and analysis are based on spread sheet-analysis. Debreceny and Gray (2010) mention its importance, but Janvrin and Morrison (2000) warn for the risks that such analysis brings with it (e.g. fraud, realization errors, and easily made mistakes). Alsop and Farrington (1998) came up with a 'nested' system which focuses on the information flow inside the entity (communication). In conjunction with the described importance of communication in the capital expenditure request, Kemp, Owen, and Van de Graaff (2012) speak of Corporate Social Responsibility (CSR) that can manage the social performance better. The incremental movement toward dialogue and discussion in the audit space is recommended in their research. CSR does not conform to the current 'audit culture', but in the words of the authors it *"…rather seek to challenge and extend it"* (Kemp et al., 2012, p. 8).

4.3   Conclusion

The goal of this chapter is to answer the third sub-question of this research, *'What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?'*, by describing Thales' perspectives of the Capital Process and providing a literature review in order to endorse findings and find possibilities for improvement.

This chapter described Thales' perspectives of the Capital Process and mentions some available literature that could be useful in the establishment of a guide that serves Thales to accomplish improvement of the Capital Process.

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5   Research contribution of the staff

This chapter is dedicated to the research contribution of the Thales staff and the reflection of their input with the available literature. The added value of staff in design-oriented research is discussed in the papers of Filios (1985), Visscher (n.d.), and Yin (1981), and the books of Babbie (2010), Grit (2000), In 't Veld et al. (2007), and Yin (2009). The research sub-question that will be answered in this chapter is *'What suggestions does the involved staff of the Capital Process have as a contribution to this research and how can this be reflected with the available literature?'*.

The first section introduces the method in which the information used in this research is gathered, while the second section described Thales' previously performed investigation on the Capital Process. The actual contribution done by meetings, conversations, discussions, and considerations is mentioned in section 5.3.

5.1   Introduction

During the research period the staff involved in the Capital Process has brought in suggestions for improvement. Those suggestions came up in meetings and conversations and are valued by discussions, considerations, and literature review. Although the intention was to interview most of the involved staff in order to create a representative sample of the staff population involved in the Capital Process (Babbie, 2010), it appeared to be unnecessary. Due to the many conversations during the process analysis and verification of the findings in this research, holding interviews would not give new or other information. This awareness is based on the experience of the staff's willingness to contribute in the research and their given input. This also indicates the completeness of the staff's contribution to this research. The research provided all space and time for the Thales staff to contribute in any kind of way, which included the verification of the research progress. Due to the research structure, the Chorus 2 workflow functioned as a guide and thereby did it avoid the bias of a wrong track.

The several phases in the three different workflows involve all kinds of staff. This research involved at least one of all the different job functions to obtain the information, and preferred a second independent one to verify the input of the other. For that reason it can be stated that the process analysis and by that the input of staff can be considered accurate and complete.

Appendix F includes an overview of the persons that have given input in this research by meetings, conversations, discussions, and considerations.

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5.2 Previous investigation

The introduction of this research already explained Thales' intention to streamline its Capital Process. This research is the result of the unfinished intention of smoothing the Capital Process operating. The current Projects Administrator, P. Veenstra, and an externally hired employee specialized in the administration of projects were designated to perform this streamlining intention. Their investigation started in the year 2010 and the findings and corresponding mail traffic are documented. The documentation of the investigation in 2010 is made available for this research.

The analysis of the documentation provided insight about the character limits of Oracle when projects are entered in the system. These limits have been verified in this research and were found to be correct. The findings of the investigation in 2010 also resulted in the creation of a simplified template in Microsoft Excel. It was the intention to let it replace the current capital expenditure request-form. This template gave a solid handhold in the required information of a capital expenditure request. The last contribution of Thales' streamlining intention to this research, is the finding of some constraints in the process that resulted in the specification of this research assignment. These findings guided this research in specific directions, without creating any kind of bias due to validation of all suggestions.

5.3 Capital Process

The contribution of the staff by meetings, conversations, discussions, and considerations is mentioned in this section. The purpose of this section is to enumerate the subjects, and for that reason the alternatives refer to the in chapter 7 described recommendations.

Contribution of the staff reveal that there is a need for further clarification of tasks and responsibilities. In combination with the realization of the staff members this will form the basis for improvements (Gibson & Birkinshaw, 2004; Kahn et al., 2006; Kemp et al., 2012; O'Connor & DeMartino, 2006; O'Reilly & Tushman, 2004; Thompson, 2003).

The Projects Administrator and Controller both perform projects analysis, that must be better aligned.

Digitalization of the capital expenditure request was a frequently mentioned alternative. The origin of this feeling arises from the staff's believe that digitalization speeds up the process. Another need that came up is clarification of the process as a whole. Staff loses insight in the process status after they have performed their action(s).

Thirunaraya et al. (2005, p. 215) confirm the suspicions of the staff that digitalization would speed-up the process: *"the use of paper based specs is extremely labor-intensive, quality-impacting, and time-consuming"*. Like also discussed in the literature review of section 3.5, several authors[23] have different reasons why digitalization of the Capital Process will benefit Thales. These include the improvement of monitoring and by that clarification of the process status.

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[23] Ashley et al., 2000; Blokdijk, 2004; Chan and Vasarhelyi, 2011; He et al., 2012; Liu et al., 2004; Nilakanta, 1989; Pérez et al., 2011; Pluimakers, 1988; Schleyer et al., 2007; Slywotzky et al., 2000; Stoel et al., 2012; Thirunaraya et al., 2005; Ulltveit-Moe and Oleshchuk, 2012; Wang et al., in press.

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With regard to the digitalization of the capital expenditure request-form, the contribution of the Thales staff included the restrictions formulation of the form and providing advices in general. There were two meetings held to accomplish the digital formats[24]. The first meeting regarded the verifications of systematic restrictions or borders by the Enterprise Content Manager Consultant, while the second was related to the requirements of the format according to the Projects Administrator, Fixed Assets-Clerk, and Business Controller ISD.

On the 20th of February 2013 a meeting was held with the Finance & Accounting Manager, Contracts & Programs Manager, and Purchase Process Control Manager about the approval flow in the capital expenditure process. This meeting came too early in this research to understand all the mentioned topics or to ask direct questions about it. Although noting the mentioned topics had its contribution to this research. The Manager Contracts & Programs, who is also the Thales supervisor in this research, provided his notes of the meeting also.

Most topics and discussions of this meeting were in line with the other constraints that are found in the process analysis. The meeting focused on the approval flow that has to pass through twice, first by authorizing the request-form and the second time by the digital approval in i-Procurement. Also discussed was the budget exceeding that occurs due to additional costs in the quotation. The mentioned alternatives in the meeting are noted and taken into account in this research.

5.4 Conclusion

This chapter answered the fourth research sub-question, *'What suggestions does the involved staff of the Capital Process have as a contribution to this research and how can this be reflected with the available literature?',* by mentioning the input of the involved staff in the Capital Process and value their contribution by a literature review.

The contribution of the Thales staff in this research is explained by enumerating the topics. The first contribution concerned a previous investigation of the Capital Process in 2010. This investigation resulted in a template for capital expenditure and contributed in this research as a handhold. Other contributions to this research were given during meetings and conversations. Involved staff mentioned their fuzzy awareness of the process status during the capital expenditure request and the unawareness of their colleagues' tasks and responsibilities. Besides providing valuable knowledge about the Capital Process and details of the processes, the staff also contributed by coming up with ideas and draw attention on specific actions. For example the digitalization of the capital expenditure.

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[24] Thursday the 2nd of May 2013: defining the digital environmental borders of formats.
Tuesday the 14th of May 2013: data requirements of the capital expenditure request- and disposal-form.

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6 Analysis of journal entries

This chapter is dedicated to the sub-question: *'How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales' accounting policy?'*. The section Project costs (6.1) describes the handling of project costs with regard to the bookings of journal entries. The next section focuses on the depreciation policy of Thales wherein it compares the performed methods with the prescribed ones. Section 6.3 explains the exceeding of budgeted costs of projects in more detail. The last section of this chapter compares the performed policy of Thales with the prescribed accounting policy and literature review.

6.1 Project costs

The investment process of an asset is classified as a project. By using the asset flow and its timeline, the bookings of project costs will be further explained in this section. To illustrate these bookings, the text refers to figure 6.1.

The Purchasing department is classified as a cost centre. The Intra Group Trading Rules (trading rules)[25] prescribe the use of a profit margin by cost centres when they serve other business units or departments of Thales. The Purchasing department uses a profit margin, which is in line with the trading rules. As can be seen in part A of figure 6.1, the value of the project rises by debiting the investment expenses and crediting both purchase expenses and profit margin to the journal entries Creditors and Departmental cover Purchase respectively.

A purchased asset does not always meet the requirements of a final product, and for that reason it has to be adapted. The budgeted hours spend on preparation of the asset are booked by debiting investment expenses and crediting departmental covering. If it is required to adapt the asset with internal stock, the warehouse stock will be credited while its contra booking is Investment expenses. Part B illustrates the combined booking of hours spent by staff and the use of internal stock to adapt the asset.

The project will be transferred to Fixed Assets after all costs are realized. The booking results in the journal entry as illustrated in part C of figure 6.1. For sake of simplicity we assume that all purchased or

Figure 6.1 - *Journal entries of project costs*

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[25] Obtained from Chorus 2.

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produced assets are machinery, resulting in debiting this journal entry. The accumulated value of the project will be credited and is thereby reduced to its origin.

The last part of figure 6.1, part D, illustrates the journal entry of asset depreciation. The following section will explain both the depreciation booking of figure 6.1 part D in general.

6.2   Depreciation policy

This section contains depth of bookings and choices made by Thales with regard to depreciation. It will first mention the prescribed method of depreciation by the Thales Group as it is available in the Accounting Standards and Procedures Manual (accounting principles)[26]. The second part describes the by Thales performed depreciation method.

6.2.1   Accounting Standards and Procedures

Thales depreciation policy is described in the accounting principles. Determining the planned depreciation schedule of an asset is based on: (1) the useful life of the asset for the enterprise; (2) its residual value; and (3) the depreciation method. The useful life of the asset depends on its physical wear and tear, economic obsolescence either of the equipment itself or the goods that it produces, and the period of rights of use owned by the enterprise. The residual value is estimated at the date of acquisition and based on market conditions. Depreciation on a straight line basis is required, unless another way is more appropriate. According to the accounting principles, depreciation should commence as soon as the asset is in a condition to operate and should cease as and when it is derecognised. Depreciation of an asset should not be stopped when the enterprise stops using the asset.

Thales uses standardized categories for depreciation.

In conclusion can be said that Thales' choices with regard to the depreciation categories are legitimate and in line with the accounting principles.

6.2.2   Depreciation method

In conjunction with the described workflow of fixed assets, all depreciations are justified on the results of the business units. Some of the business units subsequently subdivide the amount proportionally among their departments. Mutation in the depreciation bookings is not possible, unless the assets are changed in Oracle (sub-Ledger). The depreciation booked in Oracle is illustrated in figure 6.2, where it shows that the business unit receives the booking of the depreciation amount and the contra account in the booking is the assets accumulated depreciation-post. Not all asset categories have unique accumulated depreciation-posts, but are divided in groups according to their nature.

Departmental costs	€8,100	
to Accumulated depreciation		€ 8,100

Figure 6.2 - Journal entry for depreciation

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[26] Obtained from Chorus 2.

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The origin of the booking illustrated in figure 6.2 is the same as part D of figure 6.1. Referring back to section 6.1, the values of assets are booked on their nature group and the depreciation at Accumulated depreciation. These journal entries will be restored to their origin when the asset is of no longer use and will be disposed.

The above described depreciation booking applies to all business units. Although two others go a step further. The first of these is the ISD department of the business unit BU Thales Corporate, that provides services and IT-equipment (e.g. computers) to Thales' other business units and departments. ISD divides the amount of depreciation to its services and products.

Real Estate is that second one where the depreciation bookings do not stop with the in figure 6.2 illustrated booking. Real Estate does not divide the depreciation amount to its departments, but rather to its projects. This is because Real Estate rents space per square meter. Just like ISD, Real Estate is considered a cost centre. The business unit uses a profit margin allocated as a surcharge to the prices. To be able to divide the depreciation amount to its projects, a hand-made booking needs to be made by the Fixed Assets-Clerk. The internal invoice[27] created by the Accounts Payable enables the Fixed Assets-Clerk to make the booking as illustrated in figure 6.3. This booking is sequel to the booking mentioned earlier and illustrated in figure 6.2.

Project 1	€3,750
Project 2	€ 200
Project 3	€1,800
Project 4	€2,350
to Departmental costs	€ 8,100

Figure 6.3 - Real Estate's journal entry for depreciation dividing

6.3 Budget exceeding

The expenses of projects do not always meet the estimated costs, instead they may exceed the budget. Like sub-section 3.2.5 already introduced, there are several factors that could cause budget overruns. This thesis only mentions those that occur most at Thales or have a big impact on the exceeding. First, estimation errors about the price are made. Staff members expect to attract assets for a price that cannot be realized. Also occurring is a form of inadvertence, where additional costs are not taken into account nor will they be interpreted. Secondly, the time period between the quote and purchasing the asset at the supplier results in a price difference. It is possible that the purchasing of an asset starts after a year from quotation or longer. Most costs of purchased assets are estimated by quotation, which are not offers. These purchasing costs are influenced by the functioning of the market, and could be different every day. Furthermore, a long time period also makes requested offers invalid. A third factor is the infrastructure that needs to be changed after the asset is purchased. In some of the occasions the estimation does not fit the asset, which requires adapting the asset so it fulfils the (new) requirements. Finally, staff could notice possible improvements of the asset. The involved staff can be classified as experts, therefore they could notice improvements of the asset functioning after certain adaptions. This additional material and the hours spent on adapting the asset are not taken into account, which therefore would result in an exceeding of the budget.

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[27] The creditors create an internal invoice for the Fixed Assets-Clerk to divide the depreciation amount to the projects at the expense of the Real Estate account.

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In response on the budget exceeding of a project, there are three possible actions wherein one of them has to be performed. A check-up correction is the first option, wherein the exceeding costs are transferred out of the project. These costs will be borne by other projects or directly charged to the income statement of the business unit. However, charging the costs directly to the income statement is not desirable. This is because the costs will be expensed in a single year, while in another situation it gets depreciated over several years and thereby influencing the results less directly. Second option contains a supplement budget and is a request for an additional budget to cover the exceeding. Finally, the last option as response to budget exceeding is an amendment of the budget[28]. Such an amendment contains the change of the budgeted amount. The difference between the second and third response on budget exceeding is the fact that a supplement budget is used for additional costs which are not taken into account at first, while an amendment covers the exceeding of a wrong estimated budget.

All three responses to budget exceeding are characterized as another capital expenditure request. This indicates that the described capital expenditure process in section 3.2 has to be performed again, with exception of the project closure and the actions from that phase on.

6.4   Findings of analysis

This section compares Thales' performed depreciation policy with the prescribed policy as mentioned in the accounting principles. There is also made use of a literature review in this comparison. With regard to the findings of the budget exceeding, these are already discussed in the previous section.

Thales currently uses a straight-line depreciation method. According to the accounting principles this is the right method to use if it cannot be shown that another basis is likely to be more appropriate. Kulp and Hartman (2011) found in their research that straight-line and accelerate depreciation methods can have a significant impact on the present value of expected tax payments. Jackson, Liu, and Cecchini (2009) mention that most organizations use accelerate depreciation after considering the economic consequences. In the case of Thales, where its assets do not generate uncertain cash flows or negative taxable income, the accelerate depreciation method provides a greater deduction in earlier periods and would therefore lead to a greater present value of tax savings. Based on this awareness Thales should consider the opportunity to change its standardized straight-line depreciation method.

There is room for administrational improvements in performing the disposal process.

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[28] In the time period of this research the domain Sensors, which starts the most capital expenditure requests, introduced a directive when to choose for an amendment. If the exceeding of the budget is at least ten per cent and/or the amount itself is € 5,000 or more, their response would be an amendment.

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6.5   Conclusion

The content of this chapter is to answer the research sub-question *'How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales' accounting policy?'*.

The process analysis brought up the need for more depth of the bookings, because the findings with regard to depreciations, budget exceeding, and costs could not be clarified by the words of the staff only. In case of completeness of this research the accounting methods and journal entries had to be analysed. This chapter is dedicated to Thales' accounting and the main purpose consists of a comparison between Thales' operative accounting policy with its performed bookings and the prescribed policy by the Thales Group. It appears that most aspects of Thales' accounting policy is in line with the accounting principles when it comes to depreciation, budget exceeding, and costs.

Although Thales' straight-line depreciation method is in line with the accounting principles, Thales could consider a change in their standardized depreciation method. The accelerate depreciation method provides Thales tax savings on its asset depreciations and is also an acceptable method according to the accounting principles.

The subject which is also discussed in this chapter is the disposal process.

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7   Recommendations and their implementation

In this chapter the last sub-question of this research will be answered: *'What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?'*. Thereby does this chapter serve as Thales' guide to accomplish improvement of its Capital Process. Included is a theoretical background of the recommended alternatives.

The first section contains an introduction of implementing the recommended alternatives in general. The second and third section discusses the two main improvement alternatives as result of this research i.e. digitalization, and clarifying tasks and responsibilities. Some other recommendations according to the findings in this research are discussed in the fourth section.

7.1   Introduction

Although the findings of this research suggest changes in the Capital Process as described in next sections, an introduction of implementing alternatives has to be made at first.

Skinner (1971) warns for the piecemeal syndrome when it comes to organizational change. According to the author many organizations make the mistake to change on a step-by-step scenario (piecemeal) instead of change on a span that links the entire system. A piecemeal implementation is a long lasting process which creates resistance among the involved staff. For that reason it is recommended to pick up all, or own selected, alternatives for improvement and integrate these all together, instead of implementing them separately. The research of Battilana, Gilmartin, Sengul, Pache, and Alexander (2010) and Zimbardo, Johnson, and McCann (2011) mention the classification of two types of leadership at organizational change implementation i.e. task-oriented and person-oriented. In the view of this research and the performed analysis, the implementation of the alternatives can be managed best by a person-oriented leader, who is more focused on communicating activities. According to Zimbardo et al. (2011), the change of Thales has to be managed by a transformational leader.

The move towards a new working method can be based on the change model of Kurt Lewin (Van Dam & Marcus, 2005). This model is illustrated in figure 7.1. At first the staff has to accept the change by taking distance from their current working method (unfreezing). After the staff is able to take the required distance, they can be introduced with the new working method (move). After the effectuation of the new working method is successfully completed, this becomes the new working standard (freezing). It is not uncommon that

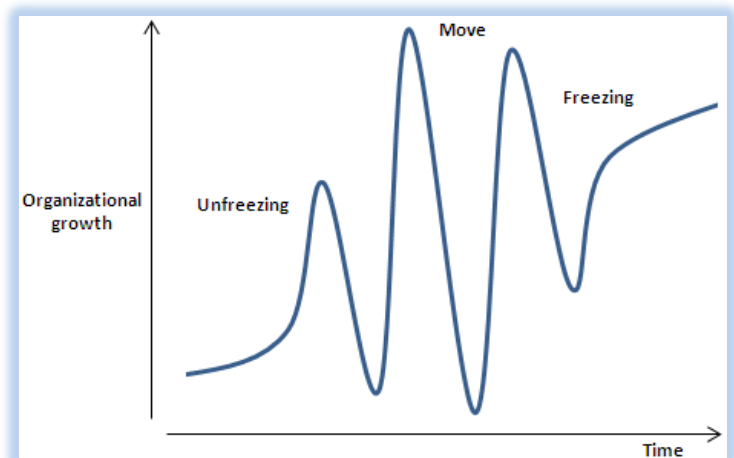*Figure 7.1* - *Lewin's change model (Van Dam & Marcus, 2005)*

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some fall back to old habits in the last phase. For these individuals it is required to provide them the extra support they need. Kotter (2009) also mentions this fall back of staff and warns for those that act in a consciously way in order to resist against the change.

The recommendations and their implementation can be seen as a theory that must be falsifiable by auditing (Popper, 1983). By auditing the Capital Process operating efficiency after implementing and integrating recommended alternatives, the guide to improvement is falsifiable. In conjunction with this falsifiability, Hammer, Haney, Wester, Ciccone, and Gaffney (2007) warn for seven pitfalls of performance measurement. Because the streamlining intention that is brought off the ground by the experienced constraints did not resulted in direct improvements, we assume that the pitfalls laziness and pettiness are most relevant for Thales. Hammer et al. (2007) define laziness as assuming knowing what is important to measure without thinking it over, and pettiness as measuring only a small component of what matters. With regard to these two pitfalls, Merchant and Van der Stede (2007) for example imply that performance measurement is not explicitly focused on the staff's performed actions but can also be useful to find out if the right measurements are used.

A last remark has to be made about the recommended digital environment for capital expenditure requests and clarification of tasks and responsibilities. These two changes towards improvement of the Capital Process are essential to accomplish a better and maybe best efficiency of the process. For that reason this research compels at least the implementation of these two main recommendations. The described alternatives in section 7.4 are meant for Thales to be considered at least. Therefore, these are also advised to implement. Although not all individual recommendations influence the improvement of the Capital Process efficiency directly, these do effect the performed actions in a positive way.

7.2   Digitalization of the capital expenditure process

This section about the digitalization alternative of the capital expenditure request and disposal forms is divided into two sub-sections. In the first part the digitalization alternative is well-founded, and the second part describes the requirements of the digital environment. The in this research localized constraints of the Capital Process are resolved in the new situation, due to the recommended alternatives that are explained and supported by literature in the first sub-section. To accomplish this recommended digital environment Thales has to perform certain actions and must pay attention to several requirements. These are described in the second sub-section.

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7.2.1 Alternative founding

As became clear from the previous streamlining-research in 2010[29], Thales experienced constraints in its Capital Process and wants the process to be streamlined. The unfinished intention of smoothing the process operating resulted in a simplified Microsoft Excel-template for capital expenditure requests. Combined with the contribution of the Thales staff and the findings of this research, the first and possibly one of the most important change opportunities for improving the Capital Process is the digitalization of a standardized request- and disposal-form for capital expenditures.

If the digitalization is implemented well, most of the constraints found in this research will be resolved.

Digitalization of these forms is in favour of time reduction (Slywotzky et al., 2000; Thirunaraya et al., 2005) and can restrict the requestor's capital expenditure descriptions in his request. Wang et al. (in press) found that electronic forms perform better than paper-based forms if it comes to administering of information, although Schleyer et al. (2007) warn that such forms could contain information partially if the requestor does not have to opportunity to be complete in his description.

Also the founded lack of traceability can be undone if the digitalization provides insight in the request status for the attendees (Slywotzky et al., 2000; Thirunaraya et al., 2005). It does not have to end with the form itself, but could be combined with an approval flow like Thales currently uses in i-Procurement (Ashley et al., 2000; He et al., 2012; Liu et al., 2004; Pluimakers, 1988). In addition to the digitalization of the two processes is the ability to monitor both. Stoel et al. (2012) and Blokdijk (2004) mention the improvement of monitoring by IT auditing and Chan and Vasarhelyi (2011) conclude that the traditional auditing model is outdated. The digitalization as described in this section fulfils Thales requirement of an improved way of auditing the process of capital expenditure by IT auditing.

It has to be kept in mind that digitalization also asks for a safe digital environment i.e. tasks and responsibilities, especially with regard to the authorization (Nilakanta, 1989; Pérez et al., 2011; Ulltveit-Moe & Oleshchuk, 2012). The digital environment for capital expenditure should therefore be secured by account and document structures, as will be explained in the next sub-section.

In conjunction with these recommendations, Alsop and Farrington (1998) mention the essence of the information flow inside the entity. The essence of the Capital Process as digital environment is called managing bits (Slywotzky et al., 2000) and can result in a cheaper, faster, more efficient, more accurate, and safer process.

Digitalization can also ensure the necessary start of the disposal process by providing the involved staff reminding messages in the digital environment. This instant reminder messaging stimulates the operating of colleagues and creates solidarity among the involved staff by providing the opportunity to inform each other about the operating status. Such an environment with reminding messages can also correspond to others in the workflow. Altogether, the digital environment could result in a dedicated workgroup which makes the process more efficient (Gibson & Birkinshaw, 2004; Kahn et al., 2006; O'Connor & DeMartino, 2006; O'Reilly & Tushman, 2004; Thompson, 2003).

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[29] Section 5.2 explained this performed research by P. Veenstra and an employee hired externally.

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7.2.2 Environmental requirements

A standardized request and disposal-form for capital expenditures is an important change opportunity for improving the Capital Process. However, such formats must fulfil several requirements to be applicable for all business units' capital expenditure requests and disposals. This sub-section discusses the structure of these formats[30].

The required input data of both request and disposal capital expenditure is mentioned first. After these requirements the workflow of both formats is described.

As guiding principle for the required data in the request-format, there is made use of the input entered in Oracle by the Projects Administrator. For the disposal-form, the same procedure is followed only the Fixed Assets-Clerk gave the input instead of the Projects Administrator. The reason for this choice is that the structure of the formats should be in line with Oracle. The staff being unfamiliar with certain jargon of Oracle is kept in mind by letting the formats provide both jargon of Oracle as that of the involved staff, if necessary.

Capital Expenditure Request-format

Start date	will be filled in automatically and cannot be adapted. The date will always be the Monday of the week wherein the request is started;
Finish date	expected finish date must always be a Friday;
Project name	gives the name of the project in Oracle. It must have a limit of thirty characters;
Description	a description of the requested asset can be given in this frame. The limit should be determined at fifty characters;
Extra description	for mentioning other relevant information with regard to the requested asset (e.g. subsidies, lease, approached suppliers). This frame does not have character limits;
Business unit	optional selection: (1) Corporate; (2) Corporate - ISD [076]; (3) Naval - Combat Systems; (4) Naval - Industrial Services; (5) Naval - Naval Services; (6) Real Estate; (7) Sensors - Surface Radar; or (8) Thales Research & Technology;
Cost controller	will be filled in automatically, depending on the choice made at the optional selection of business units. An additional frame without a character limit can be filled in if the requestor requests another Controller, but it is not obliged to be filled in;
Project manager	open field that has to be filled in and does not have a character limit;
Additional authorizers	the requestor should be able to add additional authorizers to the approval flow. These individuals should be available by an optional list[31];

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[30] The structures of the formats are verified by the ISD department that confirmed the possibility of implementing.
[31] Due to the restricted time period of this research the optional individuals of different business units could not be investigated. This thesis recommends to let the heads of the business units decide who they want to have available

Investment foreseen   optional selection: yes or no. If requestor choses 'yes': a number of six characters must be filled in another frame;

Disposal request   optional selection: yes or no. If requestor choses 'yes': the system automatically starts with the creation of a disposal request with the same staff as joined in this request. Recommended is an additional milestone[32] that waits till the request is successfully finished before it actually starts the disposal request. By reminder-messages the requestor of the requests is asked to pick up the created disposal and start the process;

Specifications   the request could contain several assets with their own specifications, therefore these can be specified into subprojects. The total amount of the subprojects must be entered in a frame, and its depreciation category in another. The depreciation category is an optional selection. If the depreciation category Office machinery - hardware' or 'Office machinery - software' is chosen and the optional selection choice of business units is not 'Corporate-ISD [076]', than the head of the ISD department should receive a by the system provided notification of the request. That way ISD is able to require for cancelation of the original request and start a new one themselves;

Financial data   all the before specified subprojects are mentioned, including their total amounts. For all these specified subprojects there is an optional selection: material/equipment or labour. Further specification is required if 'labour' is chosen. Linked with the 'labour'-choice is a check-selection of: (A) hours registration by MFG Time; (B) hours registration by Profit based on primavera; and (C) hours registration by Profit without primavera. Acceptable possibilities that can be checked: (1) A; (2) B; (3) C; (4) A & B; and (5) A & C. The data entered in Oracle by the Projects Administrator is based on the five options the requestor can choose, if option: (1) undetermined; (2) yes to primavera; (3) no to primavera; (4) yes to primavera; and (5) no to primavera;

KAM data   five questions that must be answered by an optional selection: yes or no. Questions: (1) corresponds with Wm license?; (2) corresponds with Wvo license?; (3) corresponds with Kew license?; (4) corresponds with user license?; and (5) relevant working conditions and environmental aspects identified and handled? If the requestor choses 'no' one or several times, a frame has to be filled in wherein he describes what actions he has undertaken instead.

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in the optional list. Furthermore could the optional selection be linked to the choice of business unit made earlier in the request format to reduce the additional authorizers-options.
[32] A systematic action that starts after a predefined status, action, or amount of time. This could be the start of a project or process, but also reminders to involved staff.

Capital Expenditure Disposal-format

Project name   the name of the asset as it is registered in Oracle;

Project number   the number of the asset as it is given after entered in Oracle. A number of six
                         characters must be filled in;

Book value   the book value of the asset at the moment of disposal must be filled in;

Destination   optional selection: sale or demolish & destroying. Both options should be
                         further specified by filling in the revenues of sale or costs of demolishment &
                         destroying.

After the requestor filled in the format, he confirms the request. The system checks if the required
data is entered, before the request continues with the approval flow.

Capital Expenditure Request-approval flow

The first authorization must be done by the KAM functionary. The system provides the KAM
functionary the confirmed request, which he cannot modify. His task is to authorize the request by
confirming that the KAM data is correct. After the confirmation of the KAM functionary, the Controller
receives the same overview. His overview shows the request and confirmation of the KAM functionary
and gives him the possibility to authorize also. After he confirmed the correctness of the request, the
approval flow continues with the BU Director. The authorization is not any different from the previously
mentioned. After the BU Director also confirmed, the last approval has to be given by the CFO. After he
has authorized the request, the Projects Administrator receives the request. His task is to enter the
required data in Oracle and thereby creating a new project. When the Projects Administrator created
the new project, Oracle gives the project a unique number. This number of six characters has to be
entered in the request by the Projects Administrator before he confirms the entering in Oracle and can
close the request. The system provides this project number to the requestor and/or Budget Holder, and
Controller before it closes the request.

Capital Expenditure Disposal-approval flow

The approval flow of the disposal works the same as described in the Capital Expenditure Request-
approval flow above. It only differs on small points. All authorizers have to be in a same kind of approval
flow, except for the KAM functionary and CFO. Although this thesis recommends the CFO to authorize
the disposal if the asset still has a book value on the moment of disposal.

Unfortunately, the start of the unique disposal request cannot be predicted. Because its start depends
on several factors (e.g. introduction of substitute, destination of disposed asset, and accompanying
data), a beforehand determined start is impossible. Otherwise, to ensure that the process will be started
a link must be made between the capital expenditure request format and the disposal format if the
requested asset is the substitute of another. Because the time period of a capital expenditure request
fluctuates and is hard to predict, there is no solid opportunity to integrate a reminder-milestone. For
that reason the link between the capital expenditure request and the disposal must consist of a

milestone that ensures the creation of a disposal process after the request is successfully finished[33]. As reminder to pick up the disposal process, the confirmation of the creation will be send to the requestor by the system.

Besides the specific reminder towards the requestor to pick up the disposal process, the approval flow of both processes should be integrated with reminder-milestones. If the authorization of a staff member takes longer than seventy-two hours based on a normal workweek[34], this person receives a reminder that the task is not completed. This reminder will also be provided to the other staff members involved in earlier phases of the process to ensure transparency.

The system should have another requirement in the form of a back-up or fall-back of all authorizers. Due to staff's long-term absence that could have several reasons, delay in the process could occur. To ensure its continuing, all authorizers must have the possibility to designate their duty to another staff member in case of a long-term absence. The substitute occurs in the approval flow when the absentee cancels his participation and thereby delegating its task. It might also happen that the authorizer wants to delegate its task to a colleague even if long-term absence is not the case[35]. In all the described cases does the dedicating authorizer keeps the responsibility of authorization, even though the approval task itself is given to another colleague.

If Thales decides to follow the digitalization recommendation, the request- and disposal-formats are most likely be designed by an external hired employee. An externally hired employee which is currently working at Thales and could design such formats, is asked to make a price indication. It appears that the design and implementation would cost Thales approximately € 2,000. This estimation of the costs is provided by mail correspondence on the 3rd of May 2013.

7.3 Clarification of tasks and responsibilities

This section will mention the tasks and responsibilities of the involved staff in the digitally improved Capital Process at first. After the tasks and responsibilities belonging to the digital capital expenditure environment are discussed, some other optional tasks and responsibilities are mentioned. These could be introduced and/or integrated by Thales together with the digitalization.

Requestor   starts the capital expenditure request after required data is requested and available. The request gives an overview of the involved costs and other information about the asset;

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[33] After the Projects Administrator has confirmed the creation of the project in Oracle by entering the project number in the request, the request can be closed.

[34] Inquiry suggested a time span of three days for the authorizer to give a response e.g. confirmed and not (yet) confirmed in combination with an additional remark. This proposed time span should give authorizers enough time to respond and prevents delay in the process.

[35] The reasons could vary from a temporary overload of tasks to a lack of knowledge with regard to the requests.

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<u>Budget Holder</u>	could also start the request and thereby being the requestor performing the same actions as described above. If the Budget Holder is not the requestor, he supports the requestor with starting the capital expenditure request. The Budget Holder is also responsible to examine the request with the remaining budget;
<u>KAM functionary</u>	authorizes the capital expenditure request if it corresponds with the required licenses;
<u>Controller</u>	has a role in the establishment of the multiyear budget, which this paper does not mention in detail. He is also responsible for the authorization of capital expenditure requests and disposals. If it comes to the projects, the Controller's tasks are analysing the progress by examining the costs, exceeding, hours, and materials. If the total amount exceeds the budget, he has to undertake actions. Besides these tasks, he also has to inform the Projects Administrator to close a project or prepare the capitalization of certain costs. His last responsibility with regard to capital expenditures is the on a yearly basis check if assets are unused. If this last situation is the case, he has to start the disposal process;
<u>BU Director</u>	informs the Controller about the remaining budget on a monthly basis, and gives authorization to the asset request and disposal;
<u>CFO</u>	authorizes the capital expenditure request;
<u>Projects Administrator</u>	responsibility is with the request and disposal check for accuracy and completeness, including its authorizations. Among his tasks are the creation of the projects in Oracle and its closure. Besides that, he provides the monthly PSIs to the business units and prepares the costs that can be capitalized by the Fixed Assets-Clerk;
<u>Fixed Assets-Clerk</u>	responsibility is with the check if all required staff members have authorized the capital expenditure disposal, and if the depreciation category of the requested asset is correct. His task is to manage the fixed assets by capitalization, including any possible accelerating depreciation.

The above mentioned tasks and responsibilities are divided by the function of the involved staff in the Capital Process' new digitalized environment. Some tasks and/or responsibilities in the current situation are taken away if Thales decides to implement the recommended digitalization alternative. In relation to what has been previously discussed, Thales could also decide to extend this alternative by introducing or implementing the below mentioned tasks and/or responsibilities.

The Projects Administrator is sympathetic to an expansion of his tasks by performing the projects analysis on budget exceeding.

The above recommended alternative should improve the monitoring of projects. By this conclusion we assume that all data registration is done correctly and is up-to-date.

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In line with the above recommended capital projects analysis performed by the Projects Administrator, is the notice of costs that can be capitalized. The origin of this responsibility arises from the job prescription of the Controller and should also be maintained. Although the advice here is to confirm this task to be part of the job description of both Controller and Projects Administrator, while the responsibilities only belong to the Controller. Because the Projects Administrator currently performs both mentioned analyses, it is recommended to make use of his experience (Filios, 1985; Grit, 2000; In 't Veld et al., 2007; Visscher, n.d.; Yin, 1981, 2009). As explained earlier, he makes use of rules of thumb to select capital projects and investigates the possibility to capitalize these projects or specific costs by asking the Controller. These two rules are: (1) the 95%-rule, where ninety-five per cent of the budgeted costs must be reached; and (2) time period-rule, when projects are open for a longer time than the Projects Administrator thinks should be normal[36]. However, no costs will be prepared for capitalization before corresponding and negotiation with Controller and/or Budget Holder. The performed projects analysis by the Projects Administrator can be seen as a check if the Controller has performed the analysis himself and informed the Projects Administrator.

7.4   General findings

Thales' perspective of the Capital Process is a fully integrated capital expenditure process in Oracle, wherein the two main recommendations provide the first steps to accomplish an improved process. These main recommendations, (1) introducing a digitalized capital expenditure process with standardized request- and disposal-forms; and (2) providing a total overview of the tasks and responsibilities of the staff involved in the Capital Process, fulfil the first steps towards a fully in Oracle integrated capital expenditure process. Realization of a fully integrated process cannot be achieved until Thales performs all Capital Process linked processes in Oracle-modules, therefore this research came up with a compromise that can function as handhold for the future fully integration situation.

Besides these main changes the findings of this research indicate other required changes also.

The first finding consists of the need for updating the designations in the workflows, because these are outdated. Second finding is the depreciation method Thales performs. The accounting principles do not only provide restrictions, but also makes room for own choices. The depreciation of assets can be performed in another way than prescribed, if it can be proven to be more appropriate. Jackson et al. (2009) and Kulp and Hartman (2011) found that accelerate depreciation methods of capital expenditure could have positive economic consequences. Applied on Thales, this thesis recommends reconsidering its current straight-line depreciation method and notices that this is no compelling advice. The last recommendation of this thesis would be the stimulating of communication between the staff of different departments. As mentioned earlier, the above mentioned alternatives do support the improvement of communication. However, it can be improved further. Besides the implementation of the alternatives, the recommended transformational leader (Zimbardo et al., 2011) should also focus on

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[36] This rule is based on experience with the time periods of projects and is therefore impossible to formulate in a solid indicator.

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communication in general. Although the communication between departments is an important factor in the operating processes, this advice is not compelling.

7.5   Conclusion

This chapter answers the last sub-question of this research, *'What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?',* by describing the methods to improve Thales' Capital Process.

This chapter serves as Thales' guide in the teleological change to improve its Capital Process (Van de Ven & Poole, 1995). It started with an introduction to accomplish the transition to the recommended alternative of working, thereby indicating that the change must not take place by a step-by-step scenario (piecemeal syndrome) and requires leadership of a transformational leader. The core of the plan of improvement is divided into two main changes: (1) digitalization of the capital expenditure process; and (2) clarification of involved staff's tasks and responsibilities. Provided in this chapter are the requirements of the digital environment like data frames, milestones, and restrictions for example. The staff's tasks and responsibilities are partly in conjunction with the digitalization, which are described in this chapter also.

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8   Conclusions and future research

This chapter is dedicated to the overall conclusion of this research and thereby answering the main research question. Also does this chapter provide future research recommendations with regard to Thales' Capital Process.

First, the sub-questions of this research which all cover at least one chapter in this thesis will be answered. Secondly, the main research question which asks how Thales can improve its Capital Process efficiency will be answered based on the answers of the research sub-questions. Finally, the restrictions of this research are described in the second section of this chapter. Also does that same section give advices for further research.

8.1   Research questions

After Thales and the research in general are discussed in chapters 1 and 2, chapter 3 was dedicated to the analysis of Thales' Capital Process. The performed analysis provided insight of the process structure and localized constraints and malfunctions, thereby it gave the opportunity to answer the first two sub-questions of this research. These first two sub-questions are formulated as *'How is the framework of the Capital Process structured and is the process actually performed as prescribed?'* and *'Where do constraints or malfunctions appear in the Capital Process and what do they say about the operating performance?'* respectively. The process analysis concluded that the Capital Process is effective within the meaning of capital expenditures being realized. It also appears that the process itself is not efficient, because the in the process involved staff experiences uncertainty about the request status and is not always familiar with the tasks and responsibilities of themselves and/or others.

The comparison of the prescribed workflows of the system of accounting and internal controls with the performed actions on the work floor turned out that there are constraints in the process. The main findings of the process analysis were the inefficiency of the request authorization, entering limitations in Oracle, and projects analysis performed by both Projects Administrator and Controller. Another finding was that some designations in the workflows were not up-to-date.

Besides this research being the result of Thales' unfinished intention of smoothen the Capital Process operating, Thales also wanted to examine the opportunities to integrate the Capital Process in Oracle. The process analysis already localized constraints in the process, but in order to introduce possibilities for improvement Thales' perspectives with regard to the Capital Process had to be known. Besides its perspectives that influence the possibilities for improvement, available literature can also indicate or introduce improvements. For those reasons the following sub-question is formulated: *'What are Thales' perspectives concerning the process operating and what possibilities for improvement does the literature provide?'*. In the near future Thales wants to integrate its applications in Oracle, because its perspective is to use Oracle for all its processes. Its perspective of this research is a guide that instructs the first step towards a fully in Oracle integrated Capital Process. Besides, it experiences constraints in the process and therefore sees opportunities for improvement. Included in this perspective is the awareness of the involved staff's responsibilities and the status of the process which can be monitored anytime

throughout the process. The included literature review founded some of the findings in the process analysis and provided possibilities to change and improve the process operating. It also functioned as indicator of constraints which the process analysis failed to brought up.

However, as researcher performing a design-oriented research in a business problem-solving context he experiences a lack of inside knowledge to ensure covering all ins and outs of the research subject. Based on that awareness this research is also built on the contribution of involved staff concerning a combination of providing detailed information about the process and localization of constraints and their possible improvements. For that reason the fourth sub-question of this research is formulated: *'What suggestions does the involved staff of the Capital Process have as a contribution to this research and how can this be reflected with the available literature?'*. Besides this research being the result of the unfinished intention of smoothen the Capital Process operating, this same unfinished intention did provide the first contribution to this research: an overview of some constraints in the Capital Process that was the reason for making a standardized template for capital expenditure. Both the overview and template functioned as a handhold in this research. Other contributions were given during meetings and conversations. Involved staff mentioned their fuzzy awareness of the process status during the capital expenditure request and the unawareness of others' tasks and responsibilities they should know about. Besides providing valuable knowledge about the Capital Process and details of processes, they have also contributed by bringing in ideas or draw attention on specific actions i.e. digitalization of the capital expenditure request.

The fifth sub-question is a result of the process analysis and dedicated a chapter to the justification of depreciation, budget exceeding, and costs in the accounts. This sub-question is formulated as: *'How are depreciations, budget exceeding, and costs (e.g. consumer goods, hours) justified in the accounts and what possibilities for improvement does the literature provide in comparison with Thales' accounting policy?'*. In general can be concluded that Thales' accounting policy with regard to its assets is in line with the Dutch law. Although Thales' straight-line depreciation method is in line with the accounting principles, Thales could consider a change in their standardized depreciation method. The accelerate depreciation method provides Thales tax savings on its asset depreciations and is also accepted by the accounting principles.

After the Capital Process analysis and the input of its involved staff has identified the constraints of the process, literature review is used to verify possible alternatives for improvement. This resulted in the formulation of the last research sub-question: *'What actions does Thales have to undertake in order to improve its Capital Process with regard to the findings of this research and how do these actions need to be performed?'*. Answering this last sub-question resulted in a guide towards improvement by describing recommended alternatives and their implementation. The core of this guide is divided into two core changes: (1) digitalization of the capital expenditure process; and (2) clarification of involved staff's tasks and responsibilities. The findings of the process analysis combined with Thales' perspectives, the contribution of staff, and literature review indicated improvement by digitalizing the Capital Process.

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The second core change is recommended due to the importance of the involved staff's awareness of their tasks and responsibilities.

Provided in this chapter are the requirements of the digital environment like data frames, milestones, and restrictions for example. For a part in conjunction with the digitalization are the staff's tasks and responsibilities, and these are described in detail. The plan of improvement also describes change alternatives based on the contradiction between the Thales Group policy and the performed policy of Thales.

The answers of the sub-questions provided all required information to be able to answer the main research question of this research: *'What are the constraints of Thales' Capital Process and what responses does Thales have to undertake in order to improve the process efficiency in compliance with the system of accounting and internal controls (Chorus 2) and maintain its goal congruence?'*.

Thales experiences constraints in its Capital Process in the form of delay that affect the efficiency of the process. According to the process analysis and the input of involved staff, this is mainly caused by the paper form of the capital expenditure request. This research came up with a guide to instruct Thales how to respond on the established constraints in its Capital Process. The instructions in the guide describe a digital environment and clarification of tasks and responsibilities as the core alternatives to resolve the constraints. This alternative is provided based on Thales' desires of having all its applications integrated in Oracle including the Capital Process and smoothen the Capital Process operating. Although it has to be noticed that the digital environment described in this thesis does not instruct the integration of the Capital Process in Oracle, but prepares the process for integration if the opportunity to do so is there. With regard to the compliancy of Chorus 2, the recommendations in this thesis are in line with the prescribed accounting policy of the Thales Group. All recommended alternatives influence the improvement of the Capital Process' efficiency and effectiveness. The two core alternatives i.e. digitalization, and clarification of tasks and responsibilities, are essential to execute, while the other alternatives are advised. Nonetheless, these advised alternatives are recommended for implementation.

8.2   Restrictions and directions for future research

This research has some restrictions and limitations. Most important is the basis of the performed analysis. Due to the restricted time period this research was unable to select or create a capital expenditure request and follow the phases of the workflow. Therefore this research is based on the explanation of involved staff. The data gathered by meetings, conversations, and discussions is verified by colleagues of other business units. Guideline in the research was the prescribed workflow of the system of accounting and internal controls. The performed method of analysing a process by the prescribed workflow is an advisable method for such a characteristic research. Due to the researcher's lack of knowledge in design-oriented business problem-solving, a solid handhold like the prescribed policy or a workflow provides the researcher a guiding tool to perform its research (Van Aken, 2004; Van Aken et al., 2007; Visscher, n.d.). Also useful in design-oriented researches is the contribution of general literature and theories as explained by the knowledge cycle of Den Hertog (1988). This research made use of such contribution.

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However, due to time limitation this research does have the restriction of not covering all processes in the Capital Process and those that are related to it. The scope of this research is Thales' process of capital expenditure, therefore it did not focus on the purchasing of assets nor the arise of the need for capital expenditure. These and other factors that are allied with the Capital Process and could be subject for analysis, are mentioned in the topics for further research.

To conclude the chosen methodology for this research, in my opinion it has given a satisfying result and I would recommend others to perform their research in a comparable way if their research has a design-oriented structure.

This thesis recommends further research on the main topic. Since Kotter (2009) explains that people can fall back to the old habits if there is insufficient support by the management after the change is realized or when they do not agree with the change, evaluation of the new situation would be an advice if Thales decides to implement the alternatives. Also does this research realize the perspectives if the digitalization recommendation is implemented. Thales' desire is a fully in Oracle integrated Capital Process. This indicates that when and if it gets realized, the recommended and discussed formats of this research are of no longer use. However, these do serve as a solid handhold to accomplish Thales' integrating desire.

Since this research was not able to cover all processes allied to the Capital Process, future research of these processes or subjects is advisable. For example the decision-making of capital expenditure requests. The findings of Shin and Kim (2002) show that capital expenditures in the last quartile of a yearly budget are far higher than in other quartiles. However, the in appendix G included test that is performed in this research concludes that the findings of Shin and Kim (2002) are not applicable to Thales. What could be worth investigating on the other hand, is the necessity of several capital expenditure requests. Not only because Thales makes use of a multiyear budget, but also because this budget is based on the expected need of capital expenditure in the future. In line with these budgets, the establishment of a capital expenditure budget could also be a research topic.

In conjunction with the above described recommendations, the estimation of costs in the preparing phase of the capital expenditure request would be interesting to further investigate. Due to the boundaries of this research, the topic is not included.

Finally, purchasing is the last recommended topic for future research. This recommendation is given, because this research was not able to take it into its scope.

A research on decision making with regard to the multiyear budget and the acceptance or declining of capital expenditure proposals, is not recommended. However, it could be a reminder to Thales if it finds the topic interesting.

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Glossary

Accounting	Sub-department of Accounting & Reporting.
Accounting & Reporting	Sub-department of Finance.
Accounting Standards and Procedures Manual	The accounting policy prescriptions of the Thales Group.
Accounts Payable	Sub-department of Accounting & Reporting.
ADI	Applications Desktop Integrator supports the extraction of data from Oracle. In this thesis is referred to ADI as the module in Oracle that is used to obtain work in progress data of project.
Amendment	One of the options to react on budget exceeding.
Approval flow	Digital authorization in the module i-Procurement after the purchasing order is made.
Assets per Category	Administration overview of the fixed assets, obtained from the Fixed Assets sub-Ledger.
BU Surface Radar	Business unit of the domain Sensors, which develops and builds radar equipment for the defence market.
BU Thales Corporate	Business unit of the domain Corporate, which is active on the general operations of Thales.
BU Thales Real Estate-BV	Business unit of the domain Real Estate, which rents space per square meter to the other business units.
BU Thales Research & Technology	Business unit of the domain Thales Research & Business, which is operative on the research and development of technologies.
Business Intelligence	Future module which is planned to replace the Cognos-application in the end of the year 2014.
Business Unit	Group of departments that is responsible for a certain branch of Thales.
Capital Expenditure	Costs related to the new assets (e.g. purchasing, transportation, installation, taxes).
Capital Expenditure Disposal-form	The form that has to be filled in to dispose an asset. It is the same form as the with Capital Expenditure Request-form.
Capital Expenditure Request-form	The form that has to be filled in, including the authorization signatures, with regard to the request of capital expenditure. It contains the necessary information about the product.

Capital Process	Capital expenditure request, authorization, effectuation, finishing, and monitoring.
Chorus 2	Thales' system of accounting and internal controls.
Cognos	Currently used application in Oracle to extract the PA41.
Contracts & Programs	Sub-department of Accounting & Reporting, responsible for the data quality in Oracle and the consistency between data in the different financial systems.
Corporate	Domain of Thales (Hengelo). In this thesis does Corporate refer to the business unit BU Thales Corporate.
Corporate Shared Services Thales Nederland	Supportive staff department of Thales.
Create Capital Expenditure	The process of creating capital expenditure, which contains the request, authorization, effectuation, and finishing by allocating and activating the costs.
Disposal Capital Expenditure	A separately mentioned process of Create Capital Expenditure, which takes place if the capital expenditure is a substitute for another.
ERP	Enterprise Resource Planning, software system which enables the information flow between departments of an organization.
Finance	Sub-department of Corporate Shared Services Thales Nederland, monitors, controls, and administers the financial activities.
Fixed Assets sub-Ledger	Registration of the fixed assets and their values by the Fixed Assets-Clerk.
Fixed Assets Trial Balance	Administration overview of the fixed assets, obtained from the General Ledger Assets.
General Ledger Assets	Oracle's administration overview of the fixed assets after the Fixed Assets-Clerk converted the registration in the Fixed Assets sub-Ledger.
i-Procurement	Module in Oracle wherein purchasing requisitions are made.
Intra Group Trading Rules	The trading policy prescriptions of the Thales Group.
IAS 16	International Accounting Standards 16 - *Property, Plant and Equipment*. Old, but still leading, accounting standards that are also known as the International Financial Reporting Standards and prescribe the revaluating of property, plant and equipment in the accounting.

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IFRS	The International Financial Reporting Standards prescribes the preferred accounting standards for entities. Most country laws about financial accounting accepted the prescribed methods of IFRS.
ISD	Information Systems Department, part of BU Thales Corporate. It is the ICT support of Thales and provides IT equipment.
KAM functionary	Staff member of Thales specialized in the quality, working conditions, and environment (Kwaliteit, Arbeidsomstandigheden, en Mileu). Its responsibility is to authorize the capital expenditure request when it corresponds with the required licenses.
Livelink	Document management tool that structures the documentation of Chorus 2, including process flows, job descriptions, work instructions et cetera.
Manage Capital Expenditure	The auditing of the Capital Expenditure process.
MFG Time	Module of Oracle wherein staff registers their labour-hours.
Milestone	A systematic action that starts after a predefined status, action, or amount of time. This could be the start of a project or process, but also reminders to involved staff.
Multiyear budget	The budget of a business unit for the coming years.
Naval	Domain of Thales (Hengelo).
Operational Expenditure	Costs that do not classify as Capital Expenditure (e.g. reparation, maintenance, service contract).
Oracle	Thales' Enterprise Resource Planning system (ERP).
PA41	The PA41 (Project Administration 41) is an overview of the performances of projects. It can be obtained from the Cognos-application in Oracle.
PA90	The PA90 (Project Administration 90) is an overview of projects data which the PA41 cannot contain, because the PA41 is constructed in an earlier phase of projects than the PA90. It can be obtained from the Cognos-application in Oracle.
Payroll	Sub-department of Accounting & Reporting.
Primavera	Supporting program of Oracle to plan and register labour-hours of bigger projects with about 1,000 hours.
Profit	Supporting program of Oracle to register labour-hours.

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Proquro	Divested application in Oracle which belonged to the purchasing-system.
Project Status Inquiry	The monthly PSI contains financial information of all projects and is constructed by the Projects Administrator based on input from Oracle, the PA90, and WIP GL.
Real Estate	Domain of Thales (Hengelo). In this thesis does Real Estate refer to the business unit BU Thales Real Estate-BV.
Recoverable amount	The higher value of the selling price of an asset or its value in use (discounted value of future cash flows).
Requisition	The purchasing orders made by the requestor of a capital expenditure.
Requisition Approval Rules	Overview of the approval restrictions that state when specific authorizers have to provide their authorization.
Rules of Thumb	By the Projects Administrator used indications of when to undertake actions.
Sensors	Domain of Thales (Hengelo). In this thesis does Sensors refer to the business unit BU Surface Radar.
Thales Group	Group of all Thales representatives around the world.
Thales Nederland	Group of all Thales representatives in the Netherlands, wherein its headquarter is located in Hengelo.
Thales Research & Technology	Domain of Thales (Hengelo).
VERA	Verzend Advies, divested application in Oracle which belonged to the shipping-system.
WIP GL	WIP GL (Work In Progress General Ledger) is an overview of all work in progress data of projects. The WIP GL can be obtained from the ADI-module (Applications Desktop Integrator) in Oracle.

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Appendixes

Appendix A   Thales' organizational structure (focused on Contracts & Programs)
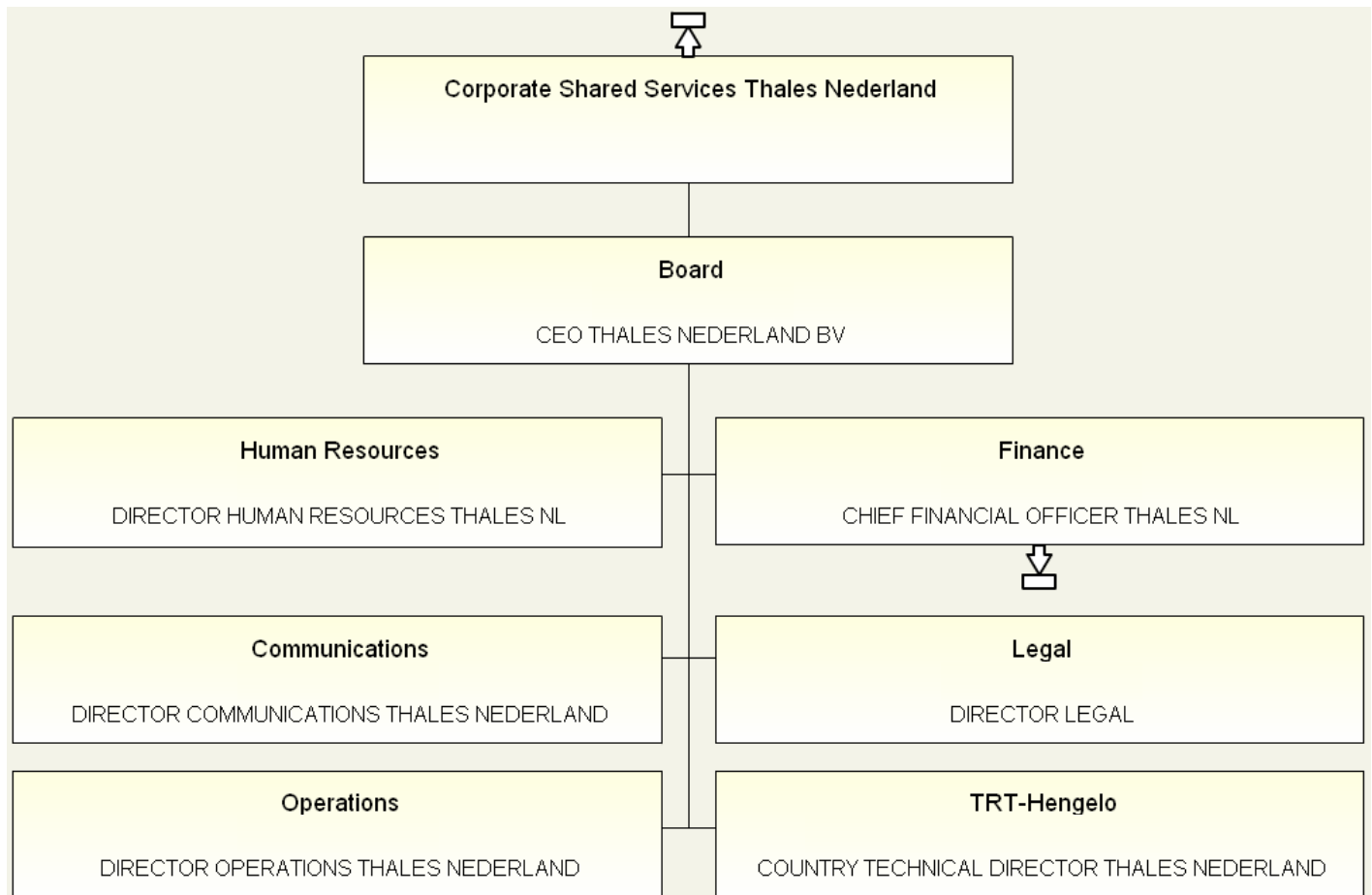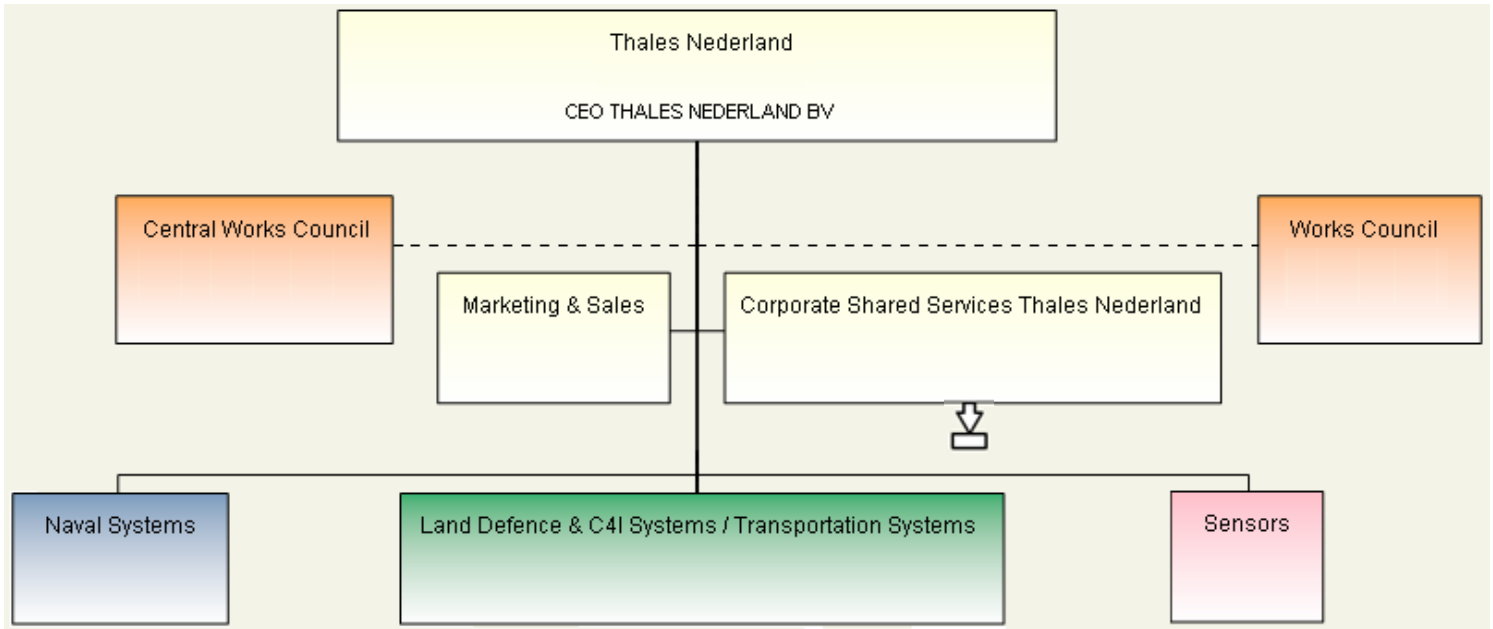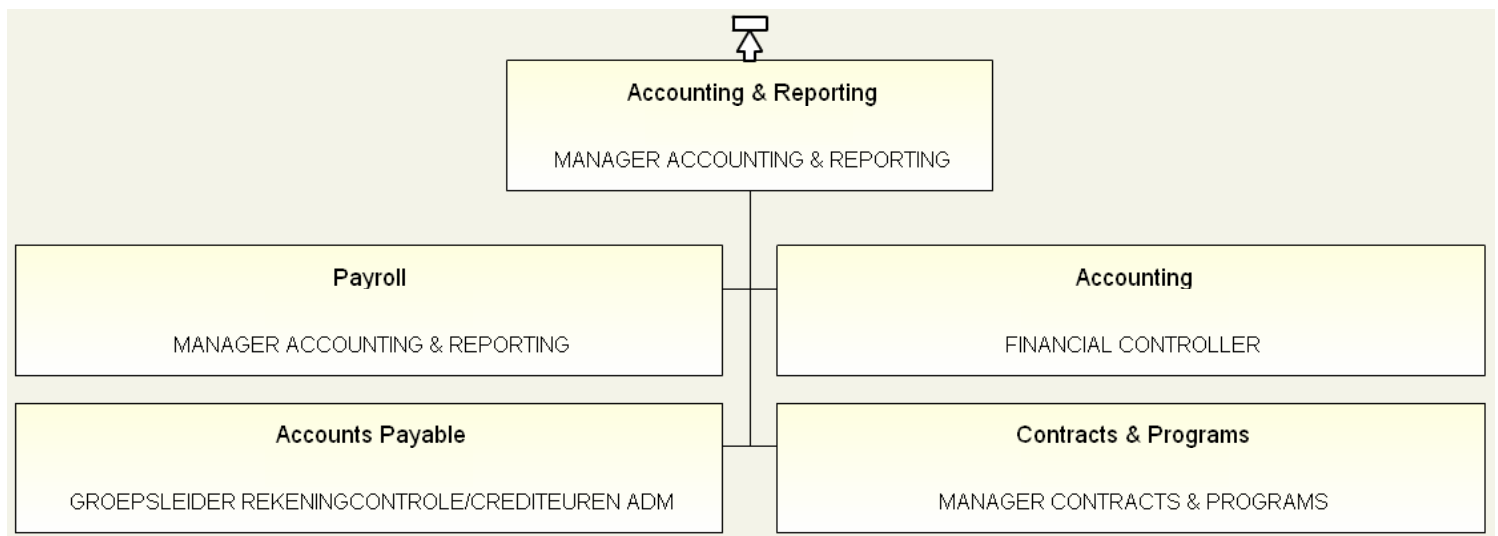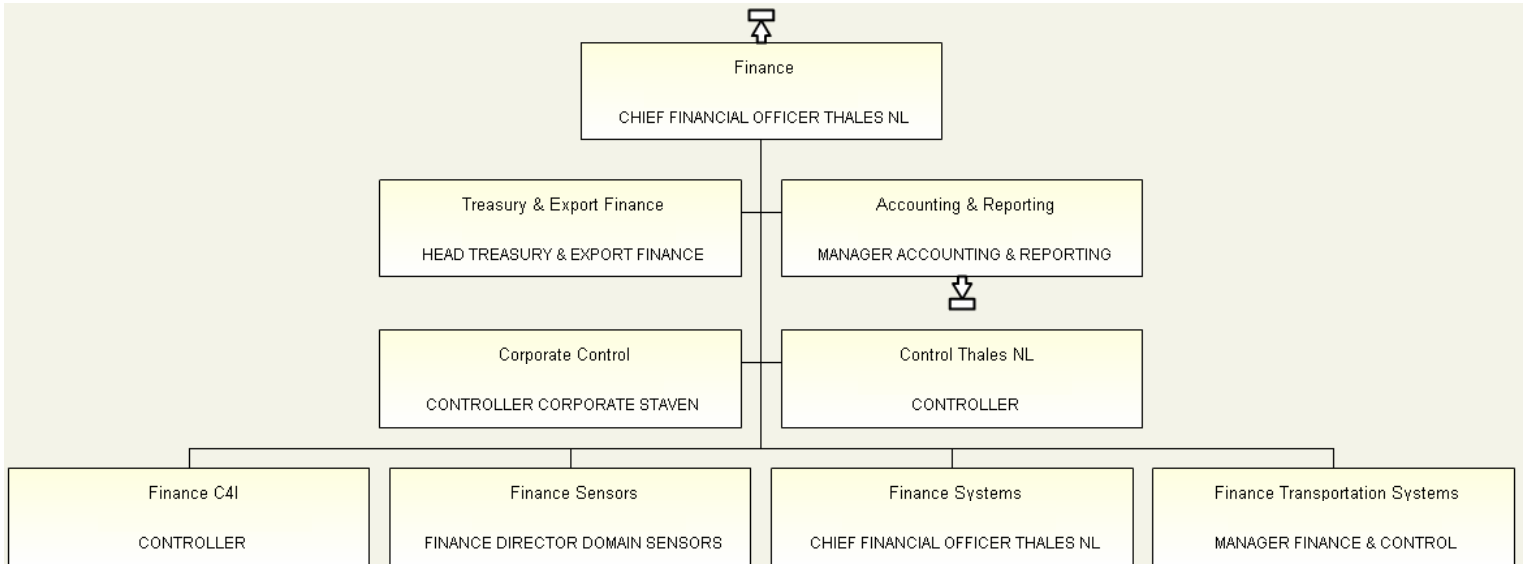
(Source: Thales Intranet, 6th of February 2013)

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Appendix B   Capital expenditure overview

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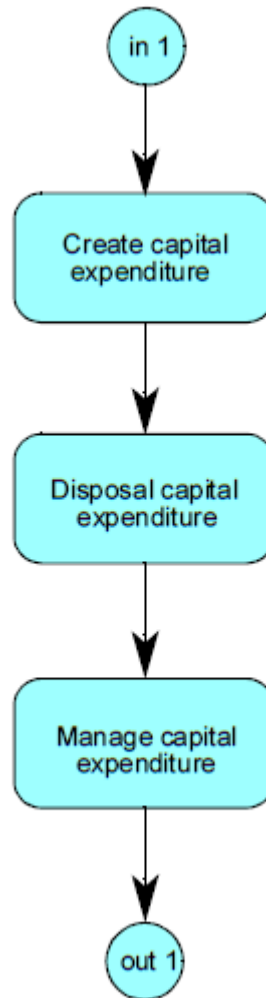
Appendix B.1   Create capital expenditure

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[*public version*]
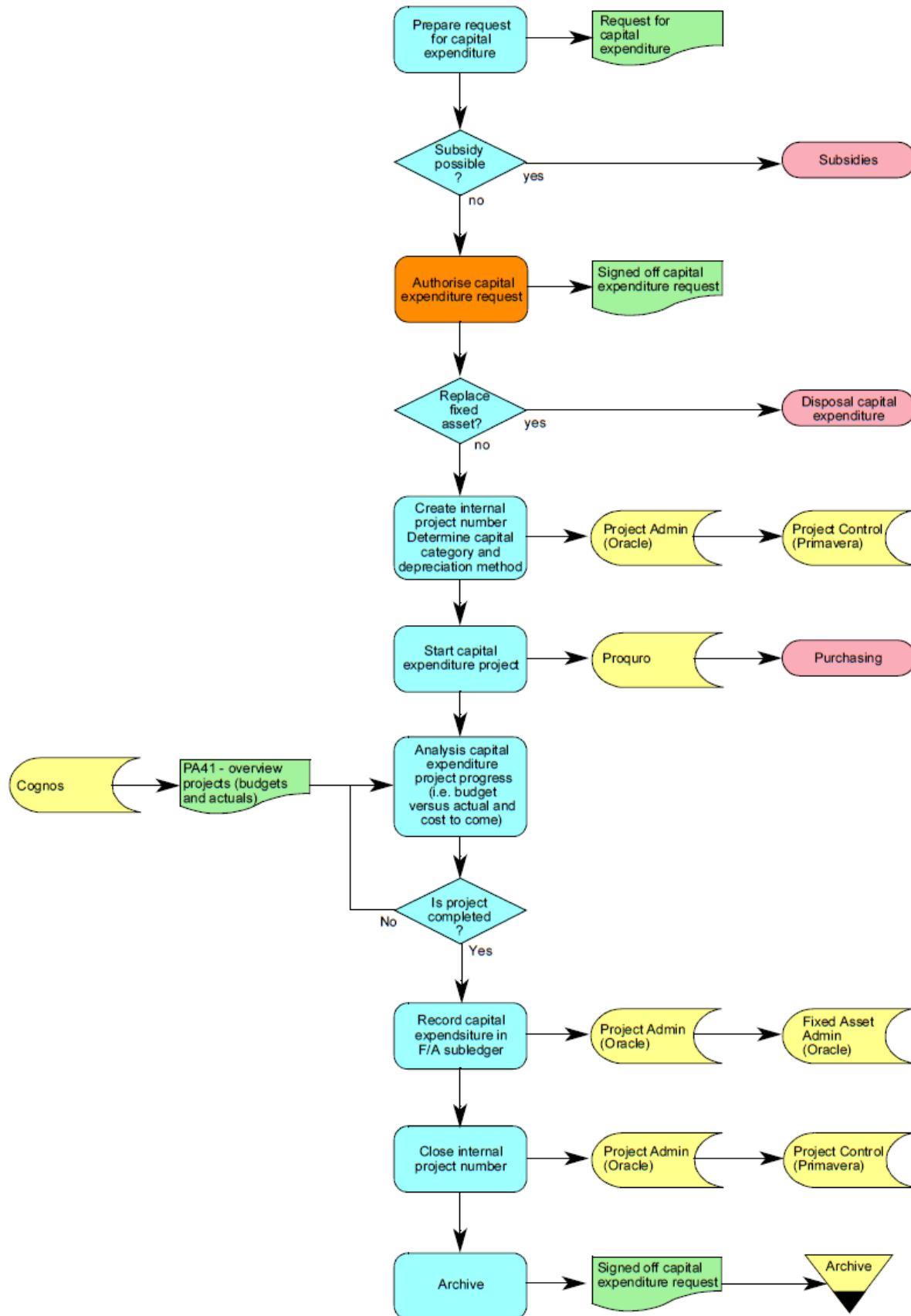
Appendix B.2   Disposal capital expenditure

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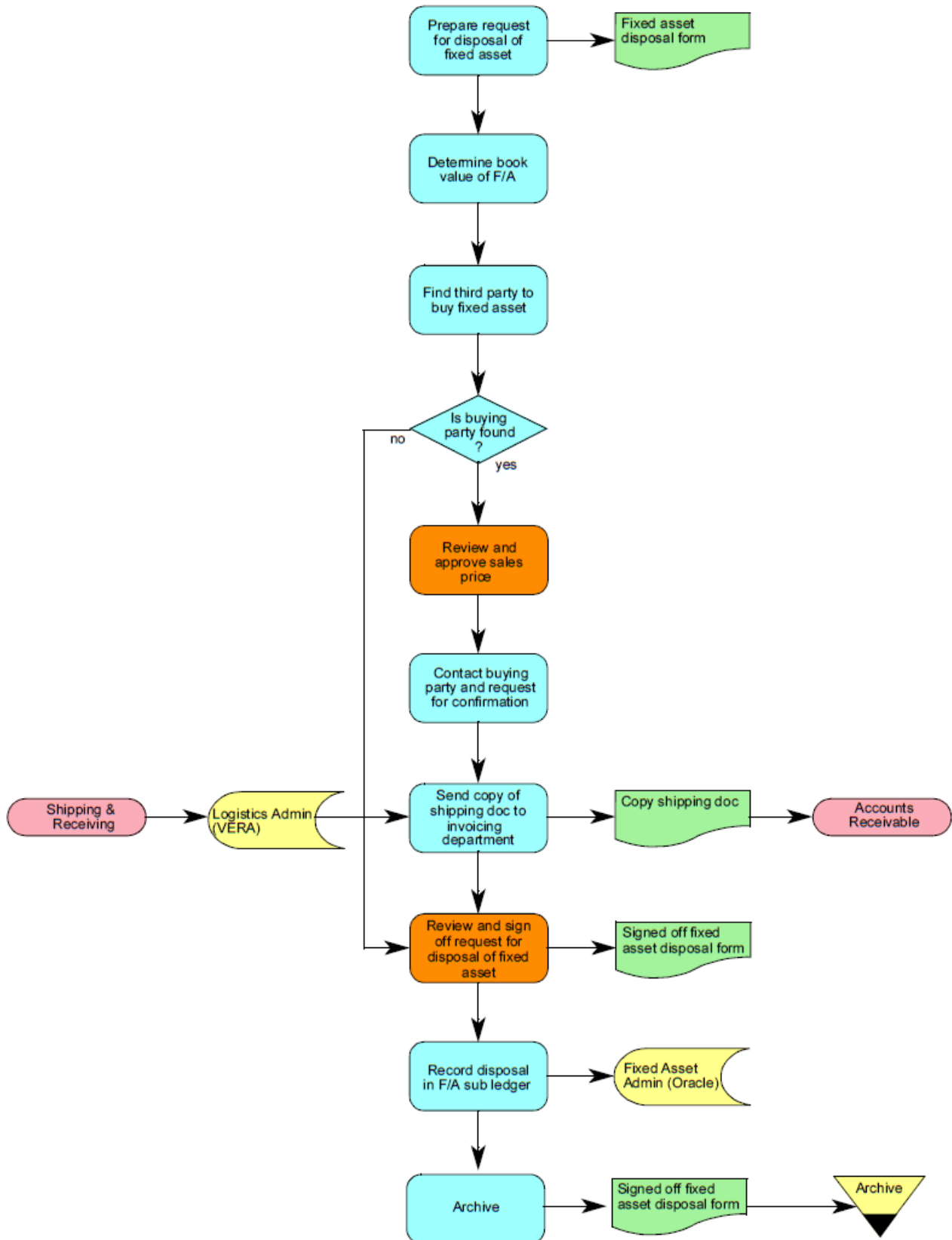
Appendix B.3   Manage capital expenditure

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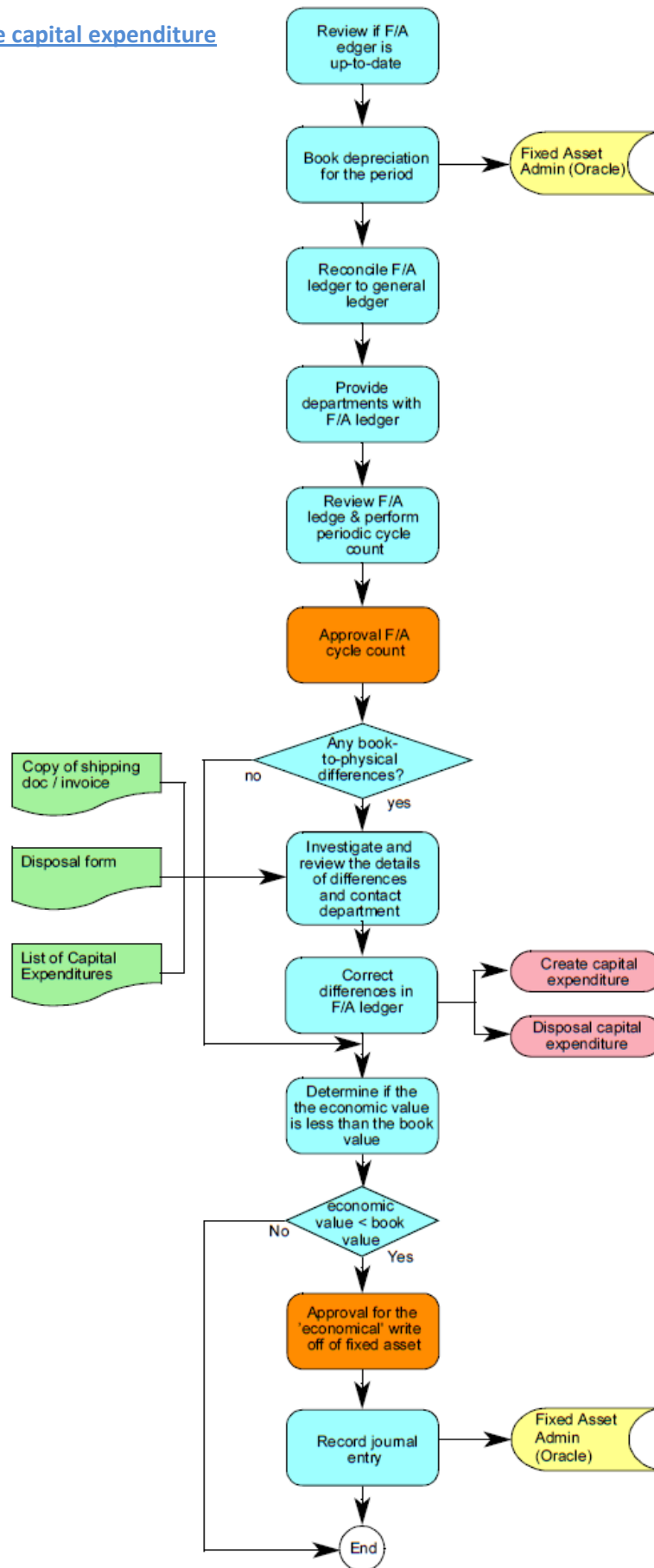
Appendix C   Capital expenditure request-form

THALES

Capital Expenditure Request - form

Datum

< € 50.000	Alleen I en II invullen
≥ € 50.000 - € 100.000	Format volledig invullen met uitzondering van bijlage 1
> € 100.000	Format volledig invullen.

Entiteiten binnen de vestiging Hengelo dienen alle voorstellen in bij de CFO van Thales Nederland BV. Voor Thales Communications Bv, Thales Optronics BV, Thales Cryogenics BV en Thales Munitronics BV, geldt dat alleen investeringen boven de 100.000€ aan de CFO van Thales Nederland BV worden voorgelegd.

Bijlage 3 dient altijd te worden ingevuld.

I   Algemene gegevens

Datum aanvraag

De investering betreft:

❏ Een kapitaalsinvestering in vaste activa (productiemiddelen zoals machines en apparatuur)
❏ Aanschaf van ICT-middelen(hard- & software), voor zover deze niet zijn ondergebracht in de SLA van ICT.
❏ Meet- en testapparatuur
❏ Inventaris
❏ Een infrastructurele investering, inclusief groot onderhoud

❏ Een desinvestering; afstoten/verkopen van vaste activa

Korte omschrijving van de voorgestelde investering

Is de voorgestelde investering voorzien?
❏ Ja, onder het volgende nummer/budget.
❏ Nee, de investering is onvoorzien.

Opsteller van de aanvraag (naam & afdeling)

THALES   **Capital Expenditure Request - form**

II Financieel overzicht

1) Omvang van de investering, excl. BTW	€
2) Interne kosten voor activiteiten van de FD t.b.v. plaatsing en aansluiting.	€
3) Totaal van gerelateerde kosten zoals installatiekosten en opleidingskosten.	€
4) Vervolgkosten per jaar zoals onderhoud, updates, etc.	€
5) Looptijd van de investering (gewenste levensduur)	€
6) Geschatte restwaarde aan het einde van de levensduur	€
7) Betreft het een vervangingsinvestering? ❏ Ja, benoem de te vervangen activa in bijlage 2 (of voeg een kopie uit het MAVA-bestand toe, met daarin de betreffende posten duidelijk aangegeven) ❏ Nee	
8) Komt (een deel van de investering) in aanmerking voor externe subsidiëring? ❏ Ja, namelijk (omschrijving van de subsidie)	
9) Heeft de investering een directe relatie met een specifiek project of programma? Indien dit het geval is hiernaast de omschrijving en nummer van het project toevoegen.	
10) Is het voorstel gerelateerd aan andere investeringen (dit kunnen zowel reeds afgesloten -, lopende - of toekomstige investeringen zijn)? Zo ja, hieronder de omschrijvingen en nummers weergeven.	

III Relatie met strategie

Hoe past de voorgestelde investering binnen het strategisch beleid van de BU en/of THALES Nederland BV, en geef hieronder een korte motivatie.

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THALES   **Capital Expenditure Request - form**

IV   Onderbouwing prijsstelling

Zijn er meerdere bronnen (leveranciers) geraadpleegd?

❏**JA**, geef een samenvatting van de analyse en onderbouwing van de keuze.

❏**NEE**, want…

❏Onderbouwing prijsstelling plaatsing & aansluiting (FD)

Is er gekeken naar de mogelijkheden voor een leaseconstructie, voor zover niet meegenomen in bovenstaande beantwoording?

De volgende parameters zijn belangrijk om eventueel te kunnen leasen:
1. *De investeringen dienen algemeen bruikbaar te zijn, dat wil zeggen dus niet zeer specifiek (aangepast) voor gebruik bij Thales.*
2. *De activa dient na max. 5 jaar opnieuw ter beschikking gesteld te worden van de verhuurder. Langer dan vijf jaar is wel mogelijk maar dan dient de leverancier een restwaarde te garanderen.*
3. *Het onderhoud blijft voor risico en rekening van Thales.*

❏JA, uitkomst toelichten.

❏NEE, want…

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THALES   **Capital Expenditure Request - form**

Bijlage 1   Uitgebreide financiële analyse

Deze bijlage moet verplicht worden ingevuld voor investeringsvoorstellen met een financiële omvang ≥ € 100.000,-.
Raadpleeg eventueel de BU-Controller.

Cash flow overzicht:

In onderstaand overzicht aangeven wat de financiële consequenties, in termen van kasstromen, zijn van de
voorgestelde investering. Hanteer hierbij de volgende uitgangspunten:
- Laat alleen veranderingen in kasstromen zien die het gevolg zijn van de investeringen. ***Let op het gaat dus om
  kasstromen, niet om veranderingen in kosten, winst of andere boekhoudkundige grootheden!***
- De veranderingen in kasstromen hebben altijd betrekking op THALES Hengelo als geheel. Lokale voordelen
  (bijvoorbeeld op BU-niveau) zijn te beperkt.
- Zorg dat alle relevante kasstromen worden meegenomen, zowel positief als negatief. Denk bijvoorbeeld aan
  additioneel of minder werkkapitaal, restwaarde en 'opportunity'-kosten.
- Gebruik een disconteringsvoet van <u>X</u> %

Looptijd (t …. T) Kasstromen	t	t+1	t+2	t+3	…….	…….	T
1. 2.							
Netto contante waarde (NCW) per jaar							

De totale netto contante waarde bedraagt | € 0,000,000 |

De profitability index bedraagt (NCW/Hoofdsom) | 0.0   % |

De Internal Rate of Return bedraagt (IRR: rentevoet waarbij de NCW van de | 0.00 % |
investering nul bedraagt).

8.2.1.1.1   Bijlage 2   Vervanging bestaande activa

Vervanging van de volgende activa		
Nummer	Omschrijving	Boekwaarde

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Bijlage 3   ARBO & Milieu

Voor het invullen van deze bijlage zo nodig assistentie vragen van KAM functionaris / AMCP.

	JA	NEE*)
1 – In overeenstemming met de Wm vergunning?		
2 – In overeenstemming met de Wvo vergunning?		
3 – In overeenstemming met de Kew vergunning?		
4 – In overeenstemming met de gebruikersvergunning?		
5 – Relevante arbo & milieu aspecten geïdentificeerd en geregeld?		

*) Indien NEE, te nemen / genomen acties vermelden:

Naam & Paraaf KAM functionaris (voor gezien):

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THALES   **Capital Expenditure Request - form**

Procuratie

1. Aanvrager

datum handtekening

2. Afdelingshoofd

datum handtekening

3. hoofd Supply Chain
(igv aanvraag voor Radar Delivery)

datum handtekening

4. Financial Director SR

datum handtekening

5. CFO Thales Nederland BV

datum handtekening

Verwerking administratie dd/mm/yyyy

Toegekend investeringsnummer

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Appendix D   Requisition Approval Rules

Project Type	Cost Centre	Cost Centre	Cost Centre	Cost Centre	Capital	Capital	Program	Program	Program	Program
Total Amount	< € 1,000	≥ € 1,000 and < € 10,000	≥ € 10,000 and < € 100,000	≥ € 100,000	< € 100,000	≥ € 100,000	< € 1,000	≥ € 1,000 and < € 25,000	≥ € 25,000 and < € 250,000	≥ € 250,000
Task Manager		X	X	X	X	X		X	X	X
Project Manager		1)	X	X	X	X		1)	1)	X
BU Director				X		X				
BU Controller		2)	2)	2)	x	X		2)	X	X
HR Manager	3)	3)	3)	3)	3)	3)	3)	3)	3)	3)

When the preparer is a task manager or project manager, the system will not assign the preparer to the approvers list.

1) When the preparer is the same person as the task manager, the system uses the project manager.
   When there is no task manager, the system uses the project manager.

2) When the preparer is the same person as the project manager, then the system uses the BU Controller.

3) If DFF HR approval is yes at Item Purchasing Category, then the HR-representative is retrieved from the DFF at BU-level from the Organization-hierarchy of the Project-Organization.

These Requisition Approval Rules apply per March 2013

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Appendix E   Project costs specified

Trans Id	Task	Expnd Type	Item Date	Receiver PA Period Name	Quantity	UOM	Proj Func Burdened Cost	Comment
4694770	1.05	Tooling Consumable Suppl/Mat	25-06-2012	Mar-13	0	Euro	1.10	
4694484	2.53	Tooling Consumable Suppl/Mat	25-06-2012	Mar-13	6	Euro	19.84	Producthouders
4675659	1.01	Freight & Packaging	23-10-2012	Mar-13	0	Euro	16.69	
4675570	1.05	Freight & Packaging	23-10-2012	Mar-13	310	Euro	53.07	
4199765	1.10	PJM Resource	27-11-2012	Dec-12	1,001	Hour	51.70	Mech. Montage
4131339	1.01	Tooling Consumable Suppl/Mat	12-11-2012	Nov-12	9	Euro	2.50	VRACHTKOSTEN
3863075	1.01	Tooling Consumable Suppl/Mat	21-06-2012	Sep-12	0	Euro	-21.44	
3655815	1.01	Tooling Consumable Suppl/Mat	25-06-2012	Aug-12	1	Euro	42.35	
3654698	1.36	Tooling Consumable Suppl/Mat	25-06-2012	Aug-12	1,111.5	Euro	111.20	Proto transporthouder
3549653	2.02	Tooling Consumable Suppl/Mat	21-06-2012	Jul-12	2,222.6	Euro	222.99	Transportkar Offerte…
…	…	…		…	…	…	…	…

Totale kosten	500.00
Budget	445.00
Overschrijding €	55.00
Overschrijding %	12.36%

The values are fictitious.

Definitions of the columns

Trans Id	Transaction ID is the unique cost-number which the cost-activity (or product) is given by Oracle
Task	A project is divided in head- and subtasks and all these tasks get a number in Oracle
Expnd Type	The expenditure type defines the way the costs are accounted in the system
Item Date	The item date contains the invoice date of the activity or product
Receiver PA Period Name	Contains the month wherein the costs are activated
Quantity	The number of hours or the value of the activity or product
UOM	The unit of the costs (i.e. hours or currency)
Proj Func Burdened Cost	Actual realized costs of the activity or product
Comment	Specification that can be filled in by the activator of the activity or product

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Appendix F   Corresponding staff

During the research period the below mentioned Thales staff have brought in suggestions for improvement of the Capital Process or gave other kinds of input which was valuable throughout the research. All input came up in meetings and other kinds of conversations.

Function title

Business Controller ISD

Business Unit/Line Controller domain Sensors

Chief Financial Officer

Contracts & Programs Manager

Controller Corporate Functions

Corporate Country Controller

Enterprise Content Manager Consultant (external)

Finance & Accounting Manager

Finance Director domain Sensors

Financial Accountant

Financial Controller Corporate Finance

Projects Administrator

Project Manager and Architect

Purchase Process Control Manager

Senior Financial Accountant

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Appendix G   Capital expenditure analysis

Year	First quartile	Second quartile	Third quartile	Fourth quartile	Total
2006	55	26	14	28	123
2007	46	13	7	70	136
2008	74	34	22	25	155
2009	31	27	15	39	112
2010	25	39	29	31	124
2011	28	32	16	30	106
2012	27	24	24	25	100
Total	286	195	127	248	856

Year	First quartile	Second quartile	Third quartile	Fourth quartile	Total
2006	€ 1,774.88	€ 590.08	€ 571.16	€ 1,692.83	€ 4,628.94
2007	€ 1,069.57	€ 227.22	€ 220.28	€ 5,309.34	€ 6,826.40
2008	€ 4,168.52	€ 2,626.87	€ 1,364.58	€ 1,276.49	€ 9,436.47
2009	€ 598.53	€ 915.14	€ 442.11	€ 1,594.24	€ 3,550.03
2010	€ 634.86	€ 932.69	€ 3,051.08	€ 1,708.12	€ 6,326.75
2011	€ 2,224.15	€ 1,327.34	€ 455.60	€ 1,312.98	€ 5,320.07
2012	€ 1,228.59	€ 2,115.70	€ 908.18	€ 528.26	€ 4,780.73
Total	€ 11,699.10	€ 8,735.03	€ 7,012.99	€ 13,422.27	€ 40,869.39

The values of the projects are revised by a distributive code.

   Thales has a strict security policy, which implies that sensitive information cannot be published outside the organization. The use of a distributive code did not influenced the representativeness of the test and thereby gives a representative view of the expenditure relationship between the quartiles.

   The capital projects sample is based on the years 2006 till 2012. The implementation of Oracle was in the year 2005, which means that all projects where entered in the system that year. Because the year 2005 would not give a representative overview, it is excluded from the scope. Furthermore, the time period of this research will not reach the end of the year 2013 and for that reason the year 2013 is also excluded from the scope.

   The finding of Shin and Kim (2002) indicated that capital expenditures in the last quartile of a yearly budget are far higher than in the other quartiles. The performed test in this research conclude that the findings of Shin and Kim (2002) do not apply for Thales. Both the amount of capital projects started in the last quartile as their total amounts are not substantially higher compared to the other quartiles.

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Thales sources

Chorus 2:   - Accounting Standards and Procedures Manual
                 - Capital expenditure workflow
                 - Intra Group Trading Rules

Intranet: - Capital expenditure request-form
                 - Thales Annual Rapport 2012
                 - Thales general information

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